ANALYZING COOPERATION IN INSTITUTIONAL SETTINGS: ILLUSTRATION OF TWO INSTITUTIONAL ARRANGEMENTS

A thesis submitted to the University of Hyderabad in partial fulfillment of the requirements for the award of the degree of

DOCTOR OF PHILOSOPHY
In
Economics
By

SUYOG DANDEKAR
(Reg.No. 14SEPH09)

Under the Supervision of
Prof. R. Vijay

हैदराबाद विश्वविद्यालय
University of Hyderabad

प्रतिष्ठित संस्थान
INSTITUTION OF EMINENCE
राष्ट्रीय अपेक्षाएँ, वैश्विक मानक
National Needs, Global Standards

School of Economics,
University of Hyderabad
Hyderabad-500046, India

June 2021

DECLARATION

I, **Suyog Dandekar** hereby declare that the research embodied in the present dissertation entitled, **"Analyzing Cooperation in Institutional Settings: Illustration of Two Institutional Arrangements"**, is an original research work and is free from plagiarism, carried out by me under the supervision of **Professor R. Vijay,** School of Economics, for the award of Doctor of Philosophy from University of Hyderabad. I also declare to the best of my knowledge that no part of this dissertation is earlier submitted for the award of any research degree or diploma in full or partial fulfillment in this university or any other university or institution. I hereby agree that my thesis can be deposited in Shodhganga/ INFLIBNET.

A report on plagiarism statistics from the University Librarian is enclosed.

Date: 30th June 2021
Place: Hyderabad

SUYOG DANDEKAR
Reg. No. : 14SEPH09

CERTIFICATE

This is to certify that this dissertation entitled "Analyzing Cooperation in Institutional Settings: Illustration of Two Institutional Arrangements", submitted by Mr. Suyog Dandekar, in partial fulfilment of requirements for the award of the Degree of Doctor of Philosophy in the School of Economics, as bonafide work carried out by him under our supervision and guidance. This thesis is free from plagiarism and has not been previously submitted, in part or full, for the award of any other degree of this or any other University.

Further, the student has the following presentation and publication before submission of the thesis:

I. Presentations:

A. Presented paper titled **"An Institutional Approach to Economic Development"** at a conference titled *"Social Sector Development: Issues, Challenges and Policy"* organized by Institute of Public Enterprise, Hyderabad in 2014.

B. Presented paper titled **"Exploring Institutional Mechanisms for Success of Act East Policy"** at a conference titled *"Act East Policy: Prospects and Challenges for North East Region"* organized by NIRDPR – NERC, Guwahati in 2019.

II. Publication:

Suyog Dandekar and A.V. Raja (2015) **Economic Analysis of Pre-trial Negotiations: Behavioural Approach**, *Asian Journal of Law and Economics*, Volume 6, Issue 1, Pages 1–21, ISSN: 2194-6086

Further, the student has passed the following courses towards the fulfilment of coursework requirement for Ph.D.

Course	Course Title	Credits	Results
I	Advance Economic Theory	4	Pass
II	Recent Development in Indian Economics Policy	4	Pass
III	Quantitative Analysis and Research Methodology	4	Pass

Prof. R. Vijay
Research Supervisor,
School of Economics
University of Hyderabad

Prof. R.V. Ramanamurthy
Dean
School of Economics
University of Hyderabad

Dedicated to and in loving memory of Professor Angara V Raja

Acknowledgement

Any academic work cannot be an individual endeavour alone. This is especially true for a massive project such as a doctoral thesis. And like any other academic work, mine is no different in this regard. The thesis from its inception to its final form has been a result of contributions and support of many individuals, perhaps too many to mention. I therefore take this opportunity to express my deep gratitude to all those who helped me finish this project, a project which at times felt would never finish. All these people have made a massive difference in my life and will remain in my heart forever.

First of all, I would like to acknowledge my supervisor Professor R. Vijay, who took me under his supervision at a very difficult time and no words can truly describe how grateful I am for everything he has done for me. In spite of the fact that my research area was different from his own area of expertise, Professor Vijay persevered with me and provided countless incisive comments and suggestions which greatly helped my work. Most of all, he provided a definite direction to the research work and helped crystallize research objectives and ideas, which in the beginning were pretty vague and formless. I will deeply and forever cherish his mentorship as well as his friendship.

Before I move on and acknowledge other people, I must mention and acknowledge the person, contributions of whom are too great and many not just for this thesis but also in my life. And that person is late Professor Angara V Raja. Having completed M.Phil under his supervision, I started this doctoral thesis project under his guidance. It was under his mentorship that the idea of this work took birth. Countless hours of discussions and debate in his chamber were a regular event which allowed us to formulate the broad research themes and objectives. Due to his unfortunate and sudden demise this wonderful experience came to an abrupt end. He was not only a great mentor and a teacher but also a great friend. His passing away left a big hole in my life and to this date I feel his absence. I can only hope that the work that I have done in the thesis is something that he can be proud of.

I am also profoundly grateful to the faculty of the School of Economics, both currently serving and retired, for their concerns and inquiries regarding the progress of the work and helpful comments that they made during work in progress seminars. I would like to especially mention my Doctoral Committee members - Professor R. V. Ramanamurthy and Dr. G. Vijay, who have been very generous, supportive and encouraging. In spite of their personal busy schedule they always took time out to listen to my ideas and provided suggestions that greatly enhanced the finer points made in the thesis. Also I would like to acknowledge Professor Vathsala Narasimhan who acted as a member of Doctoral Committee member halfway through the research period. A special thanks also goes to the non-teaching staff of School of Economics for making official works such as registration or those regarding the fellowship much smoother.

Finishing a Doctoral thesis can be a very painful experience, if not for the presence of friends. It has taken me roughly seven years to complete the thesis which is a long time. Seven years is a long time and over those years I have made many friends who have blessed me with their love and care. First and foremost, I would like thank my dearest friend Athili Lolia, who over the years have stood by me through thick and thin and has been a real pillar of strength and inspiration. Without her support this journey would have been very difficult. I would also like to mention my friends, Archana Jamatia, Anu Mariam Philipose, Hakani Laloo, Rongsenzulu Jamir, Imliakum Pongen, Merenmeso Pongen, Pratik Chikhaliya, Prantarati Bhanjan, Manish Sharma and many more for making my life at the campus joyous and exciting. I would also like to thank my batch mates Juliet Fanai, Mamata Waiker and YN Raju who over the last year became very good friends and were so helpful.

Lastly, I would like to thank my family – Dad, Mom and Sister Rituja for believing in me and supporting me throughout in every imaginable way. Without their encouragement none of this would have been possible. All three of them have taught me not to give up in the face of adversity and fight your way through. They all are a source of inspiration to me.

To those individuals whose names I may have inadvertently missed, my sincere apologies. I wish to convey to them that their contribution is as valuable and equally significant. Lastly, it would be my sole responsibility if any misrepresentation and misappropriation accruing out of this research work; I fully own and accept any omissions and errors committed in this thesis.

Suyog Dandekar

June 2021

Abstract

In any human society one could observe complex political and economic systems. They generally comprise of basic guaranteed rights, duties and rules and regulations of behaviour. These systems whatever their features, essentially evolved as a mechanism for avoiding or resolving situations of conflict. Increasing social welfare often involved finding solutions to coordination or market failures. In the Neoclassical paradigm cooperative solutions to coordination problems are uncommon and therefore an institutional perspective is better suited for this matter. The thesis makes an argument that solutions to coordination failures can be understood in an institutional framework. This is because cooperative solutions often take the form of institutions – formal or informal. In the thesis it is argued that institutions are instruments that allow a movement from one particular configuration to an improved or better configuration. This movement is not possible without reaching an agreement on which particular actions are to be taken and which ones are to be avoided. Reaching this agreement is only the first step. Once it is reached a significant number of individuals must undertake actions which conform to the agreement. In case this does not happen the society does not move to a better social outcome. Therefore, the overarching theme of the thesis revolves around two ideas. First, the recognition and identification of actions that generate benefit in the society. Second, the choice of individuals to undertake that action.

Since the emergence of New Institutional Economics movement study of institutions have regained prominence in the field of economic studies. Based on the review of literature one could make an argument that there are two main tenets of institutional economics. First, institutions matter when it comes determining outcomes and they affect social welfare by guiding interaction among the members of the society towards socially desirable outcomes. Second, it has been observed some institutions have performed better than others. Given this, the broader theme of the thesis can be narrowed down to understanding or identifying the actual mechanism through which institutions improve social welfare and understanding how incentive structure of individuals change with their decision to comply or not comply with the requirements of the institution.

As far as the issue of identifying the mechanism through which institutions improve social welfare is concerned, conceptualizing a pre-institutional society is taken as the starting point for this analysis. A detailed review of literature on pre-institutional societies allowed us to understand essential features of a pre-institutional society and the nature of interaction among the individuals in that situation. The central assumption of this analysis is that nature of interaction between individuals will be different if constraints are introduced or imposed. This sharp contrast between these two scenarios helped enunciate the process of how institutions help in generating social welfare. The thesis then presents a formal model of the identified mechanism which is used to derive efficiency conditions for any institution. This framework allows us to better demarcate efficient institutions from inefficient ones. Furthermore, the analysis suggests a hypothesis for compliance which can be stated as: *The tradeoff between the cost of following an institution and the indirect benefits obtained through generation of positive external effects acts as a major motivation for compliance or non-compliance. If the perception that the indirect benefit through positive external effect will outweigh the direct cost of following the institution exists then one can observe compliance and if the indirect benefit through positive external effect does not outweigh the direct cost of following the institution then non-compliance will be observed.* This hypothesis is compared with other hypotheses based on various theories of compliance respectively.

Thus, the second overarching theme of the thesis, which is the choice of individuals to comply or not comply with specific rules and regulations, is dealt by comparing how each theory/hypothesis compares relative to one another under different circumstances. Essentially, the thesis focuses on developing a methodology that will allow us to gauge the attitudes of individuals in the society towards different regulations. While the structure of any two institutions may be same, a direct comparison of one institution with the other becomes problematic given how the nature of costs imposed and benefits through positive external effect could differ widely. The methodology involved employing an experimental study which involved hypothetical scenarios regarding traffic regulations (drunken driving situation and overspeeding/jumping red light situation) and copyright regulations (purchase of software situation and subscription to legal streaming service situation) where the cost of following the institution was same. This helped in directly measuring their willingness to comply. The study was designed in such a way as to understand which motivation acts as a primary influence for making that decision by asking respondents to rank various reasons for taking a particular action. Also, the study involved identifying a pattern of choice based on gender and income level of respondents. The study was conducted through conducting online surveys. The platform SurveyMonkey was used to collect the data. Two separate surveys – one for situations involving traffic regulation and the other for situations involving copyright regulations - were launched to collect responses of individuals under different scenarios.

Broadly speaking, some major findings of the results can be summarized in this way. The first thing catches our attention is the fact that attitudes of individuals in different regulatory settings differ. Results showed that compliance levels for the two traffic related scenarios was lower than compliance level for the two copyright regulation scenarios. This difference was also found to be statistically significant. This was mainly because presence of positive inconvenience costs in compliance action in traffic regulation scenarios and positive inconvenience costs in non-compliance action in copyright scenarios. The other important revelation of this study was regarding the question of which motivation acts as a primary influence of decisions about compliance and non-compliance. Results indicated that trade-off influence was primary influence of compliance or non-compliance decision in all four different scenarios with few exceptions. Lastly, as far as identifying a pattern of choice based on gender and income level of respondents is concerned, the study showed a significant difference between choices made by male and female respondents only in drunken driving situation whereas no clear cut pattern emerged when taking income differences into account

Thus, based on the results the thesis suggests some policy recommendations regarding increasing compliance. Given that inconvenience costs incurred while taking an action seemed to be a more dominant factor, to deter individuals from breaking traffic rules especially the drunken driving behaviour, fines and punishments should be designed in a way that it would include significant time cost penalties as well. And in the case of reducing piracy making original content legally available in short span of time alone should be sufficient.

TABLE OF CONTENTS

List of Tables

List of Figures

ANALYZING COOPERATION IN INSTITUTIONAL SETTINGS: ILLUSTRATION OF TWO INSTITUTIONAL ARRANGEMENTS

Chapter I: Introduction

1 Rationality, Inefficacy and Cooperative Solutions

Humans interact with nature in many ways to fulfill their desires and needs. They perform actions which change a given natural state and through these changes they achieve their objective of survival. These actions are mostly related to production, consumption and distribution or any combination of the three which to a large extent form the main crux or subject matter of economic sciences. Theorizing human actions and behaviour thus becomes the core subject matter of economic sciences. Theorizing activities related to production, consumption and distribution begins with forming assumptions and creating a methodology to understand human nature. Naturally, the results of an economic enquiry will depend on the assumptions that have been made and the methodology that has been employed. As a result of this different frameworks for analysis can simultaneously coexist. The most prominent and oldest of these frameworks is the classical or neoclassical framework and it would not be an understatement to say that this framework has largely dominated the field of economics for over two centuries and has often been referred to as the mainstream economics.[1]

One of the central tenets of the classical or neoclassical framework is the assumption of optimizing rationality. The assumption of optimizing rationality with respect to any action suggests that individuals will undertake those actions which will be most beneficial to them. In the classical and neoclassical framework such a behaviour would lead to the best possible outcome at any given time. This is known as the efficiency axiom of the neoclassical approach. The efficiency axiom forms the basis of welfare theorems in economics.[2] The first of these welfare theorem states that under the conditions of complete markets and complete information, the market mechanism will generate a Pareto optimal outcome. The results of the First Welfare theorem hold true only when there are no

[1] The question of what constitutes as mainstream economics is not a settled one. For example, see Dequech (2007)

[2] For more on Welfare theorems see Maskin and Roberts (2008); Tadenuma and Xu (2012)

externalities, agents have perfect information and no agent has any kind of market power, that is both buyers and sellers take prices as given. While the theoretical possibility of the existence and achievement of this best possible outcome cannot be denied, it can be argued that one rarely sees this possibility actually materializing in real life. This is because the conditions under which the results of First Welfare theorem hold true is rarely observed in reality. In the presence of externalities, information asymmetry and possibility of market power for either buyer or seller it can be seen that rational behaviour may not lead to the best possible outcome.

2 Strategic Situations and Coordination/Market Failures

One can understand this better under the context of strategic situations. In simple words, a strategic situation is a situation in which the outcome of an action not only depends on the action of a particular individual but also the actions undertaken by other individuals.[3] Several different kinds of strategic situations exist and is widely described and employed in the field of Game Theory. Strategic situations typically either involve situations of mutual interdependency or situations where self-interested actions of an individual lead to a direct harm/benefit to other individual. For an example of a mutual interdependency situations one has to look no further than a typical market exchange. A market exchange can be described as a scenario where person A undertakes a costly act X for the benefit of person B who then undertakes a costly act Y for the benefit of person A. Each participant in this market exchange relies on the other individual to hold his/her end of the deal. If any individual defects the objective of at least one individual would remain unfulfilled. On the other hand forcibly acquiring another individual’s possessions through theft or robbery is an example of self-interested actions leading to a direct harm to others. In such cases gain of one individual necessarily becomes loss of one or more individuals. The very act of

[3] Non-strategic situation on the other hand are those situations in which an action taken in the process of fulfilling a particular objective benefits the individual without any consequence to others. An example of this could be a Robinson Cruesoe type of individual stranded on an island who cuts down a tree to build a house. The act of cutting down the tree benefits this individual but is of no consequence to the rest of the world.

refraining from such activities generates benefit for the other. Given that humans are a social animal most human interactions are likely to be similar to the ones that have been described above. Under these situations the assumption of optimizing rationality does not automatically guarantee an efficient or optimal outcome. This happens usually because rational behaviour under certain set of condition or circumstances lead to market failures[4] or coordination failures[5] which ends up harming the individuals. Thus, one can see clearly that even if human behaviour and actions are guided by the principle of rational self-interest the end results may not be desirable. From a social welfare point of view avoiding or resolving such situations of conflict or finding solutions for market or coordination failures results in a better outcome for all the individuals involved.

In the Neoclassical paradigm cooperative solutions to coordination problems of situations of conflict would be uncommon. However, this is not the case at all. We observe humans cooperating with each other on a regular basis against their narrow self-interest. Given this an institutional perspective on cooperative solutions becomes necessary. Humans in almost every society have been able to avoid coordination failures and situations of conflict by devising mechanisms which ensure that they reach a better social outcome. For example, Melis and Semmann (2010) assert that humans were able to evolve strategies and psychological mechanisms that allowed them to cooperate and control free-riders with great flexibility, leading to large scale cooperation between unrelated individuals in a great variety of situations. They argue that complex and wider range of enforcement mechanisms such as punishment and rewards[6], shunning[7] and reputation building[8] play a pivotal role in sustaining and stabilizing cooperation at large scale. Furthermore they identify proximate mechanisms such as cognitive ability to keep track of level of contribution made by other members and capability of gathering and transmitting information regarding social behaviour, which have helped in making enforcement mechanisms more effective thereby making large scale cooperation possible. Tomasello (2014) argues that humans became

[4] Market failure refers to a situations where free markets lead to an inefficient distribution of goods and services.
[5] Coordination failure refers to the failure of coordinating actions or strategies leading to Pareto optimal or superior outcome.
[6] See Mathew and Boyd (2011); Rand et al. (2009)
[7] See Sasaki and Uchida (2013); Sääksvuori (2014)
[8] See Suzuki and Akiyama (2005); Ahn et al. (2009)

interdependent with one another in a way which changed both their social behaviour and cognitive processes. As a result of this interdependency, the author points out, humans showed commitment and obligation. He concluded by describing humans as not only social but ultra-social animals.

It is under these circumstances that a social contract[9] emerges which leads to the formation of a civil society or a sovereign state. Also note that if a social contract is to ever emerge it can only happen through cooperation among the members of the group. The basic idea behind the emergence of governments is the idea that an individual could accept any restriction on his/her behaviour as long as the emerging sovereign government/state minimizes or annihilates any threat to the rights that the individual would want to retain and protect. Large scale cooperative behaviour and ultra-social nature of humans have led to formation of complex political and economic structures or systems in the form of basic guaranteed rights, duties and rules and regulations of behaviour, all of which are designed for generating social welfare. These rights, duties and rules of behaviour can be clubbed together as a set of actions that an individual may or may not be allowed to undertake. History of mankind suggests that these political and economic systems have manifested in various forms and that they continue to evolve. One can argue that political and economic systems, whatever their features, essentially evolved as a mechanism for avoiding or resolving such situations of conflict. In other words, the complex political and economic systems, which are nothing but a social contract, are a result of cooperative solutions to the problems present in situations of conflict.

3 Objective of the study

The above analysis leads to two more important issues. First is the recognition and identification of actions that generate benefit in the society. It is possible that a sovereign state or a governing body may make a mistake in recognizing or identifying welfare inducing actions and as a result of that it may introduce restrictions which may not be

[9] The idea of Social Contract will be discussed in great detail in a subsequent chapter.

acceptable to general public. The public could feel that the newer restrictions take away too many of their rights and not delivering decent benefits. From the social welfare point of view such situations need to be avoided. The second issue is related to the choice of individuals to undertake that action. It is important to note that mere existence of a mutually beneficial action does not guarantee that it will be necessarily undertaken by individuals in a society. This issue becomes important because individuals may not have a genuine incentive to act in accordance with the terms of agreed upon rules due to other unforeseeable factors. These factors that have an effect on their incentives need to be carefully examined. From an institutional perspective these two issues need to be carefully examined. The main objective or the central theme of this Thesis is to shed light on the issues regarding what constitutes as socially welfare improving actions or institutions and the issues regarding motivations or incentives of individuals to cooperate. To be precise, the thesis focuses on how institutions act as instruments of welfare by identifying the mechanism through which an institutions brings about a change in social configuration. The thesis also delves into the subject of why this link between institutions and welfare gets severed and identifying conditions under which this happens. Furthermore, the thesis focuses on how attitudes of individuals determine whether a particular institution succeeds or fails in achieving its stated objective by understanding how incentive structure of individuals change with their decision to comply or not comply.

4 Method

For the first issue an alternative framework for analysis is developed which is different from the standard transaction costs framework. The transaction costs approach has now become a major part of institutional approach. It will be argued that transaction costs approach does not provide satisfactory answers. The transaction cost approach relies on the idea that uncertainty exists and the possibility of market transactions taking place gets destroyed as the uncertainty eats away the cooperative surplus. Institutions play the role of reducing transaction costs so that mutually beneficial market exchanges can take place between agents. The increase in social welfare happens when these market exchanges take place. In this framework the important thing to note is that existence of cooperative surplus is not given any justification and is simply assumed to exist. As we shall see this framework is not particularly suited for some situations and contexts. The alternative framework is built around the idea that certain actions have either external or spillover effects which can either positively or negatively impact not only the individual who takes the action but also other members of the group or society. This positive external or spillover effect then forms the basis of increasing individual or group utility thereby increasing social welfare. It is to be noted that the new framework does not act as a supplement to the transaction costs framework but rather complements it. As far as second issue regarding compliance is concerned tt is well established that compliance behaviour is a complex phenomenon with a multitude of factors influencing the decision. It is expected that the new framework can provide some decent insights in terms of testable hypothesis regarding motivations to comply and comparing different institutions with each other.

5 Outline of Chapters

The outline of the thesis is as follows. The thesis is divided into five main chapters excluding the introduction and conclusion. The first two chapters will deal with the first issue that was raised and the subsequent chapters after that will focus on the second issue. Chapter II will first provide a discussion on history of institutional movement and the major themes of institutional economics. A detailed review will reveal how institutional approach differed from neoclassical approach in understanding human behaviour. It will also shed light on how the institutional approach challenged the neoclassical paradigm and enriched our understanding of economic sciences. Having gone through an extensive literature review of major themes in institutional economics the chapter proceeds to highlight some theoretical gaps that exist in the literature in the context of the first issue. In simple terms the gap that we identify and seek to fill up is regarding the exact procedure through which an institution, understood here as an identified action that is either prescribed or proscribed, increases the overall social well-being of the members of a group or community. Enunciating the mechanism of how institutions work will also help us in understanding how or why certain economic systems, rules and regulations have work better than others in terms of achieving the stated objective which is usually expressed as some notion of welfare such as wealth, quality of life, etc. Chapter III then addresses these questions

The main focus of Chapter III is to enunciate the process through which institutions allow movement from a particular state or a configuration towards a preferred state or configuration. The chapter begins with a discussion on the starting point for this analysis. It is argued with justification that a hypothetical setting where no institutions exist proves to be a good starting point for the analysis. The literature review on and about this hypothetical state will reveal essential features of this state. The review contains a detailed discussion on Social Contract theory literature and Anarchy models in Pubic Choice literature. The review allows us to identify and enunciate the mechanism of how institutions work. Based on this a formal model is built which then provides us with a framework for differentiating between efficient and inefficient institutions. The framework in this chapter also discusses certain implications of the model regarding motivation of compliance and comparison between different institutions. The two sets of institutions relate to traffic regulations and copyright regulations.

Chapter IV will provide a discussion on already existing literature on issue of compliance which is the focus of second issue pointed above. The chapter first provides a review of different theories of compliance. These are deterrence theory, legitimacy theory, focal point theory, social norms and pressures theory, etc. The chapter provides a critical discussion on these theories highlighting where these theories are decent or weak explanations for compliance phenomena. The chapter contains a review of literature on two different sets of institutions which provides a basis of comparison between the two. The discussion provided in this chapter raises two questions – (1) what is the primary motive of an individual when it comes to decision to comply or not comply? and (2) under which contexts can we expect higher levels of compliance?

Chapter V will address the question that have been posed in the previous chapter. The main purpose of this chapter is to understand which motivation for compliance is dominant and under what circumstances since compliance behaviour is a very complex phenomena. The methodology used to study these aspects was based on a hypothetical experimental study and the data was collected through survey launched from an online survey platform called SurveyMonkey. The advantages and disadvantages of doing an experimental study are also mentioned. The chapter then provides the results of this study based on which certain patterns of compliance based on different situations, gender and income group can be identified.

Chapter VI mainly focuses on testing for significance of the results obtained from the study which are presented in the previous chapter. The chapter provides a discussion on which tests of significance were used and the reason for choosing them. Most of the data that was collected was categorical in nature and therefore there was a case for using either the **two-proportion z-test** or **Fisher's Exact Test** depending on conditions which had to be met before performing the test. The results of significance will also be presented in this chapter. The implications of these results are discussed in the concluding chapter.

Chapter II: Literature Review of Major Themes in Institutional Economics

2 Introduction

Institutions are ubiquitous and pervade several different aspects of our life. The overall objective of this chapter is to understand the development of economics of institutions and identify some of the major contributions in this field. As we shall see Institutional Economics has gone through several different phases. Compared to some other standard economic framework especially classical/neoclassical framework the academic importance of looking at social, political and economic aspects through the lens of institutions had seen several ups and downs. A detailed review of movements within Institutional Economics will reveal important contributions made in the field of Economics especially in our understanding of human behaviour and activities. This endeavor should also help us to identify gaps in our understanding of what institutions are and how institutions work assuming that the gaps exist to begin with. As such this chapter will have sections on history of Institutional Economics, the major movements associated with Institutional Economics, the features and main focus of these movements along with their shortcomings.

2.1 An Introduction to Institutional Economics

The Handbook of New Institutional Economics defines institutions as "the written and unwritten rules, norms and constraints that humans devise to reduce uncertainty and control their environment". In simple words institutions can be described as 'rules of the game'[10] that give clarity on what actions humans may or may not take. Intuitively the meaning of '*institutions*' is easy to grasp but still there exists no uniform definition of it. Hodgson (2006) goes deeper into the controversy of defining key terms such as *'institutions'*, *'organization'*, *'convention'*, etc. and provides a reasonable degree of clarity on these terms. He himself defines institutions as systems of established and prevalent social rules

[10] The term rules of the game was first used by Douglas North as a definition for institutions. See North (1991)

that structure social interactions. There are various ways in which economists have explained the term ‘institutions’. However, a broad understanding of what economists mean by ‘institutions’ is sufficient for our purpose. Usually institutions come in the form of laws, regulations, social norms and culture, etc. A framework of understanding the role and impact of institutions in our socio-economic life is given by Williamson (2000). In this article he provides a four level analysis of institutions and explains how these levels of institutions are interrelated. According to him the top level is the social embeddedness level where norms, customs, traditions, etc. are located and where religion plays an important role. Changes in institutions at this level are very slow usually taking centuries to change. At the second level we have institutional environment where formal constraints on human behaviour get introduced. Establishing well defined property rights and its enforcement through a well- functioning judiciary and bureaucracy happens at this level. Institutional change at this level usually happens over a decade. Below this we get the third level where institutions of governance are located. At this level contractual relations become the man focus of analysis. Change in institutions of governance occurs more quickly usually within a decade. And finally at the bottom level we have maximization behaviour of economic agents whether they be firms or individuals. This is the level at which neoclassical framework operates. Changes are continuous since adjustments to price and quantity happen regularly and are very frequent. The interlinkage between each level is such that the top level institutions impose constraints on immediate level below. At the same time lower level institutions provide a feedback loop towards the top level institutions. Given the importance of institutions it is only natural that literature discussing and studying institutions is vast and is continuously growing. The existing literature highlights various themes which have become an important and standard part of economic analysis. Subsequent sections will discuss and explore these ideas.

2.2 History of Institutional Economics

Before we delve into the major themes in institutional economics in current times a quick look at the history of institutional approach may prove to be useful as it will not only enrich our understanding of institutional approach but also help in clearly understanding the differences between institutional and classical/neoclassical approach. Chavance (2009) provides a detailed account of evolution of institutional ideas ranging from German historical school to Veblen to contemporary thoughts on institutions. Here we will present a short summary of different ideas and theories which are associated with institutional economics. The earliest body of work or thought that promoted the idea of importance of institutions was the German Historical School which emerged in late 19th century. It should be noted that the term 'German Historical School' is a designated classification used by economic historians to include wide ranging thoughts and ideas relating to methodology, economic policies, etc. of many different scholars. It is common to group the members of this school into three groups – older, younger, and youngest. Some leading names associated with this school are Wilhelm Roscher[11], Bruno Hildebrand, Gustav von Schmoller, Werner Sombart and even Max Weber. While there are divergence in thoughts and ideas among the members of the German Historical School, there are enough similarities to club them together under one large body of thought. The core ideas of the German Historical School of economic thought are that history is the true source of knowing the actions taken by humans. Economic activities can be largely understood as a cultural phenomenon. They rejected the idea of universalization and generalization of economic activities in a mathematical model and preferred to study economic activities from empirical, historical and sociological point of views. In other words, Historicists favoured inductive approach as opposed to the deductive approach of the Classical economists. The school stood in sharp contrast to the ideas encompassed as Classical economics and was a severe critique of Classical approach to studying economics. There was a similar movement in England too known as the English Historical School, though it was not as popular and well-known as the German version.[12] The Historical school's popularity started to decline by 1920s and had completely waned in the post war era and was largely forgotten. Having been forgotten for so long the core ideas of Historical approach have made a comeback. Senn (2005) argues that several of the things that German Historicists propounded have become a part of the mainstream economics. Ikeda (2008) provides a summary of recent work done by contemporary scholars who review the

[11] Often considered as the father of Historical School.

[12] For more on differences between the German and English traditions of Historical School and explanations on their developments based on specific institutional context see Tribe (2002)

contributions made by leading figures of this school. Dorfman (1955) discusses influence of German Historicists in shaping American economic thought. He concludes that German thought greatly contributed to development of statistical studies in America. He also concurs that many of the German trained American scholars were impressed by the systematic treatment of public finance, which was much neglected by English economists, as well as the work dome on national economy by figures such as Roscher and Wagner. Perhaps the most important legacy of the German Historical School was the impact that it had left on American scholars many of whom had studied in Germany for their doctoral programs like Richard Ely, Edwin Seligman and John Bates Clark. These scholars along with some others led an intellectual movement which later came to be known as American Institutionalism.[13]

Thorstein Veblen is regarded as the foremost contributor to the rise of Institutionalism in America through his works. Other economists whose works have been influential for the early development of Institutionalism as a movement are Wesley Mitchell, Walton Hamilton, and John Commons. The core ideas of Institutionalism in this era were somewhat similar to the German Historical School but had more theoretical rigor. The theoretical rigor came from many fields especially evolutionary biology as well as that of psychology. Developments in the field of psychology like John Watson's "Behaviorism"[14] and social psychology generated a considerable excitement at the time for it provided a solid foundation on which a realistic economic theory could be built. The idea that the behavior of economic agents often depend upon the cultural or social environment that the agents find themselves in started to take proper shape. At this point of time the scholarship on institutions recognized two important points. First, it was recognized that it was not necessary that institutions always led to a better outcome. And second, it was recognized that institutions could only constrain certain human activities. The methodology also involved using empirics to substantiate or test the validity of the propositions. Mayhew (1987) and Rutherford (2001) provide an account of beginning of institutionalism in America. Mayhew argues that rapid industrialization which led to changes in socio-economic conditions in the society became the main substance of their economic analysis.

[13] Richard Ely and Edwin Seligman also founded the American Economic Association.
[14] See Watson (1913)

She confirms that the method of analysis followed by early institutionalists reflected Darwinian thought abandoning the idea of natural laws governing human actions. Rutherford on the other hand provides an overall picture of formation of American Institutionalism movement discussing the contributions made by several prominent scholars, the economic literature that flourished in that era, the impact of the scholarly work and literature on society and causes of eventual decline of Institutionalist thought. He describes Veblen's overall framework as the one which describes nature of institutions as being cumulative and path-dependent. Veblen, however, did not believe that institutions always performed the function of promoting social benefit. According to him an institution would stop performing the function of social benefit when changing technology makes the institution outdated. He also criticized the use of assumption of rationality in Marshallian approach and favoured a habit or an instinct based approach. Rutherford further discusses the contributions of John Commons, who was a student of Richard Ely, in developing the idea of 'transactions' and role of legislation in bringing about social change as well as that of Wesley Mitchell who combined the ideas of Veblen on institutions of the money economy with quantitative and statistical approach.[15] The methodology of institutional approach was empirical or statistical based on collection of data or case studies and combining it with theoretical underpinnings from the field of psychology. Hodgson (2000) provides a discussion on what constitutes as the essence of institutional movement. He summarizes the main features of institutional economics into five main propositions which can be stated as – (1) Institutional economics is not defined in terms policy proposals even if institutional economists want to give theories practical relevance, (2) Institutional movement is interdisciplinary using ideas and data from various fields such as sociology, psychology, etc., (3) Institutions can be regarded as key elements of an economy and therefore the importance of studying institutions and the processes of institutional conservation, innovation and change cannot be neglected, (4) The economy as a system is open and evolving subject to technological changes and is embedded in social, cultural, political aspects and relationships, (5) Inadequacy of the notion of utility maximizing

[15] For a detailed analysis of institutional economics developed by John Commons see Kaufman (2006), where he argues that Commons' theory have the feature of acting as both a complement as well as a substitute to neoclassical framework, and for a detailed discussion of works of Wesley Mitchell see Moore (1978), in which he discusses the legacy and impact of Mitchell's work.

individual. Having identified the main features of institutionalism the author argues that the single most important feature that separates institutional movement from other schools especially neoclassical school is the emphasis of institutional movement on proposition that individuals cannot be taken as utility maximizing agents and that their preferences are shaped by multitude of factors such as the social, cultural and political setting that they find themselves in, all of which have to be taken into account.[16]

It is not an understatement to say that during the interwar period not only was Institutionalism growing but it was also becoming the dominant school of economic thought. Institutionalism or as we call it the Old Institutionalism could not sustain its dominance for long. This happened due to myriad of reasons. Economists had begun to realize the deficiencies in the applicability of institutional approach. Paul Joskow in the introductory chapter of the book *New Institutional Economics A Guidebook* summarizes why Institutional approach started to wither away in post-World War II era. He asserts that institutional economics was lacking in a rigorous and systematic theoretical foundation. The human psychology based foundation was found to be vague and quiet often did not have a proper direction. A further assertion is made that empirical analysis itself was not comprehensive enough and that there was practically no generalization of ideas. Colander (1996) compares and contrasts the approaches of institutionalism and neoclassical economics. He writes "Institutionalist economists were seen as anti-theoretical and anti-mathematics. Neoclassical economists were seen as theoretical; mathematical neoclassical economists portrayed economics as a predictive science that involved specifying a theory and empirically testing that theory. Institutionalism presented economics as a policy-driven combination of the study of institutions and empirical facts about the economy, with no formal theory and no definitive empirical tests." The implication of the above quote being that it was obvious why neoclassical approach would trump the institutional approach.

New institutional movement, in sharp contrast to its predecessors – German Historical School and Old Institutional Economics, does not act as a substitute to neoclassical

[16] In this article the author has also argued that the primary difference between old and new institutional economics also lies in proposition (5). As we shall see later old institutional movement sought to completely abandon and replace rational utility maximizing agent assumption whereas new institutional movement only sought to extend or modify rational utility maximizing framework.

economics. Rather it often complements it. New Institutional framework does not outright reject the theoretical foundations of neoclassical paradigm but builds upon it and strengthens it. It does that by drawing academic insights from various disciplines such as history, anthropology, law, psychology, political science, sociology, etc. while retaining the basic analytical tools of neoclassical framework, in particular mathematical modelling and econometric techniques. New institutional economics recognizes the limitations of the 'rational man' of neoclassical framework and accepts that there exists certain cognitive limitations which leads to behavior other than what the neoclassical framework predicts. North (1993) provides a brief summary of the ways in which new institutional approach extends or modifies neoclassical framework. In this essay it argued that new institutional economics, while retaining assumption of scarcity and therefore competition from neoclassical framework, diverges from it in the sense that a heavy emphasis is put on explanation of inefficient markets and diverse performance of economies through incorporation of ideas such as modification of rationality assumption, positive transaction costs and modelling political processes. A popular conceptualization of cognitive limitation is the idea of "bounded rationality" introduced by Herbert Simon in his article "A Behavioral Model of Rational Choice" (1955), wherein, he argues that rationality is limited by constraints such as availability of time and information to take make decisions.

It should be noted that a comparison of original and new institutional movement will reveal that in spite of major differences some commonalities between the two exist. Understanding the exact nature of similarities as well as differences between the two has also been a subject matter of research. Several scholarly works such as Rutherford (1995); Dequech (2002); Spithoven (2019) have tried to do precisely that. The argument that is put forth in these scholarly works is that both movements recognize the fact that behaviour and actions of individuals are affected by forces outside of rational thinking. Furthermore, both movements focus on developing a theory for evolution or change in institutions. The major differences between the two are regarding methodology and normative stance. New institutional movement, unlike the Old movement, seeks only to modify the inadequacy of neoclassical approach rather than completely abandoning it. The methodology employed by New Institutional scholarship is methodological individualism whereas the Old Institutional scholarship applied a holistic approach towards understanding economic activities. Also, new institutionalists argue that institutions develop and change in ways broadly consistent with economic efficiency and social advantage but old institutionalists largely disregard this aspect. On the normative front, new institutional movement focuses on efficiency whereas old institutional movement focuses on social reform.

From the above discussion one could say that institutional approach – whether old or new – has at the least, provided an alternative way of looking at socio-economic aspects of human life which has certainly enriched our understanding of human behaviour and choice of activities. [17]

2.3 Focus of New Institutional Economics

Given the historical context of institutionalist movement we will now go deeper into understanding what makes New Institutionalism different from its predecessors. Our main focus will be on why and how institutionalism made a comeback and which features of the new movement contribute to its continued popularity in mainstream economics. The common understanding among the economists is that new institutional economics as a proper movement in academia or even as a field of study roughly began in 1970s. It was during this time certain conceptual ideas began to take concrete form which eventually became the building blocks of the new movement. These conceptual ideas are – transaction costs, property rights and contracts. The origins of the concept of transaction costs can be traced back to Ronald Coase, who in his seminal paper "The Nature of Firm" had used to answer the question of why firms exist. Coase suggested that firms exist because there are costs incurred in a market transaction. A firm then, is an organization that reduces these

---

[17] In spite of this, some scholars have pointed out certain flaws in institutional approach as well. The flaws that have been pointed out relate to the methodology involved. For a critic on methodology employed in New institutional Economics movement see Rutherford (1989). In this article the author, while focusing especially on the works of North, questions the appropriateness of reductionist approach of new institutional movement in explaining institutions as the outcome of individual action. Such an approach, the author asserts, ignores or denies the reverse line of causation from institutions to an individual's actions and even to his preferences and values. Similarly for a critic on methodology of Old Institutional Economics movement in particular Veblenian ideas see Langlois (1989). In this article the author argues that old institutional movement was lacking with regards to methodological consistency and overall persuasiveness. This is because the movement especially ideas and theories developed by Veblen relied too heavily on philosophy of pragmatism and pre-conceptions associated with it. The author further asserts that due to this Veblenian ideas could not fully discredit the Neoclassical approach.

costs by putting in place a hierarchical structure which manages different activities of different factors of production. Much of organizational economics has as its backbone the concept of transaction costs. Works of Oliver Williamson have been particularly important in the development of organizational economics.[18]

The theory of property rights is the study of range of activities that a person may take with respect to economic resources or goods and services. Legal conception of property is that it is a bundle of rights.[19] Looking at property as a bundle of rights changed the way how we see market transactions. From a legal point of view an exchange in market is no longer seen as an exchange of commodities from one hand to another, rather it is seen as an exchange of rights that are attached with the commodities. The theory is primarily concerned with the question of achieving efficiency in the use of resources and how property rights can ensure that. There has been a substantial work done on theory of property rights since 1970s which have led to emergence of several key insights. The works of Ronald Coase, Harold Demsetz and Elinor Ostrom are worth mentioning here. The most important insight on property rights and its role comes from what is now known as Coase Theorem. Coase Theorem was the key result or insight of the article “The Problem of Social Cost” written in 1960 by Ronald Coase. The theorem states that in the presence of externalities and zero transaction costs bargaining among the concerned parties will always lead to a Pareto efficient outcome irrespective of how the property rights are assigned. This theorem has been interpreted in many different ways but the interpretation that Coase insisted on was that since transaction costs are never zero initial assignment of property rights becomes important. Harold Demsetz (1967) provides a theory of property rights in which he explains the conditions under which property rights emerge. He asserts that the main allocative function of property rights is the internalization of beneficial and harmful effects and that the emergence of property rights can be understood in terms of incentives to internalize these beneficial and harmful effects. It is argued that property rights arise when it becomes economic to internalize these beneficial and harmful effects. He further examines and compares different forms of property rights regimes and concludes that private property rights regime is the most efficient as it provides the perfect incentives to

[18] See Williamson (1971); (1975)

[19] For more see Cooter & Ulen (2012) Chapter 4

economic agents for proper usage of economic resources. Elinor Ostrom (1990) reviews a body of empirical studies on common pool resource management and arrives at a key finding that no type of property rights regime works efficiently in all types of settings. This finding was revolutionary in the sense that it goes against the widely and long held belief that private property rights regime is the only regime capable of providing the right incentives for efficient use or management of a resource. That is, according to her, property rights regimes other than private property rights regime under certain circumstances can also solve the problem of '*tragedy of commons*'[20]. She then proceeds to identify the features and/or conditions under which common property rights regime emerges as the efficient form of property rights regime.

The theory of contracts is the last building block of the new movement. In simple terms, contracts may be defined as an agreement between two or more parties requiring each party to perform a particular task. A contract essentially is a tool which formalizes the idea of a promise made by people to one another. By formalization we mean making the promise enforceable. This does not mean that any or all promises can qualify as a contract. Economic theory of contracts specifies what features are essential for a promise to be enforceable. Firstly, a promise must have an offer which involves an exchange of something valuable between the contracting parties. The exchange can be of anything like, payment, goods and services or even a promise. Secondly, there must be acceptance of the offer by each party involved.[21] It is now well understood that contractual arrangements mitigate to a certain degree conflicts of interest between the parties and allow them to reap benefits from cooperation. In simple terms, contracts allow voluntary exchanges to be made between parties which leads to expansion of trade and commerce which foster growth and development. Given the importance of contracts, it is of no surprise that institutionalist have made theory of contracts a major focus of their study. The literature on contract theory can be sub-divided into theory of complete contracts and theory of incomplete contracts.

[20] Tragedy of commons is a theory in economics which suggests that individual self-interest in a shared resource setting will always lead to overexploitation or depletion. It was first introduced by Garett Hardin in a 1968 article in the journal *Science*.
[21] For more on this see Cooter & Ulen (2012) Chapter 8.

Economists define compete contracts as those in which parties to a contract can specify the rights and duties of each party in every conceivable future state of the world. The focus are of research in complete contract theory has been incentives for performance. The principal-agent theory, also known as agency theory, is a central theme in complete contract theory. The two associated problems of moral hazard[22] and adverse selection[23] also comes under the ambit of theory of contracts. Research work has also included the use of mechanism design. The basic objective of complete contract theory can be stated as designing contracts specifying rewards for actions in such a way that the incentives of the agents get aligned with that of the principal. The insights obtained over the years from this line of research has had a lasting impact in study of labor relations, management studies, public provision of goods, corporate governance, etc. [24]

The idea of incomplete contracts was first introduced through the works of Sanford Grossman, Oliver Hart, and Roger Moore.[25] Incompleteness in relation to contracts is understood by economists as impossibility of specifying what actions are to be taken in every possible contingency. Incompleteness arises either because the information is too costly or it is unavailable. The proponents of this theory have argued that given the impossibility of writing elaborate and complex contracts renegotiating contracts at different stages becomes essential. Furthermore, the incomplete contracting approach emphasizes the role of allocation of decision rights. Due to the significance of property rights, the approach has also come to be known as property rights theory of firm. Incomplete contract theory has been subject to a vast amount of literature since its conception, but still remains less developed and has also come under severe criticism. The criticism has mainly been on the assumptions which have been considered as arbitrary as well as lacking a strong theoretical foundation.[26] In spite of the controversy the validity of

[22] For some earlier results on moral hazard see Arrow (1963); Pauly (1968); Mirrlees (1976); Holmström (1979)

[23] See Akerlof (1970); Spence (1973); Stiglitz (1975) for some important results

[24] A detailed account of research work that has happened so far is outside the scope of this work and as such has been left out. Interested readers may refer to Bolton and Dewatripont (2005)

[25] See Grossman & Hart (1986); Hart & Moore (1990)

[26] See Nöldeke and Schmidt (1995); Tirole (1999); Maskin and Tirole (1999). For a rebuttal of these critics see Hart and Moore (1999) and Aghion and Holden (2011)

incomplete contract theory, it can be argued, has assumed a significant role in new institutional economics.

2.4 Major Themes in Institutional Economics

Having discussed the history of Institutional approach, the transition from Old to New Institutional movement, the features and building blocks of New Institutional movement, we can now turn our attention towards discussion on major themes in New Institutional Economics.

2.4.1 First Major Theme: Institutions Matter and they affect Social Welfare

As was mentioned in previous sections New Institutional Economics emerged as a major field within the realm of economic studies roughly around 1970s. This new field gave new direction and a fresh insight into analyzing and to certain extent even predicting economic phenomena. The theoretical contributions made in the microeconomic and macroeconomic studies with the help of econometric techniques had begun to reach saturation point and could no longer fully explain the inner workings of the economy. For instance, it was felt that macroeconomic and /or microeconomic models of growth and development alone could not explain the actual incidence of economic growth and development that was witnessed following the decades after World War II. At best economic growth models could only explain proximate causes[27] or determinants of growth and not the real ones. New Institutional Economics started to fill this gap left behind by traditional neoclassical economics with its emphasis on institutions and institutional arrangements as real causes of economic changes.[28]

The basic argument put forth by institutional economists is that neoclassical paradigm largely neglected or rather assumed away the role of social and political arrangements that were essential for proper functioning of a market economy. Institutionalists have advanced

---

[27] Some proximate causes which have received attention are human capital, physical capital and technology.

[28] Constantine (2017) provides a critique of the institutionalist argument asserting that new institutional economists ignore the role of economic structures. Economic structure refers to the productive structure which is the aggregate representation of its technological capabilities.

the argument that poor economic performance is linked to poor institutional structure. The argument put forth is not a new one. This idea can be traced back as far as to the writings of Adam Smith as well. Smith writes in '*Wealth of Nations*'[29] that "*where there is tolerable security, every man of common understanding will endeavor to employ whatever stock he can command in procuring either present enjoyment or future profit*." He further adds "*In those unfortunate countries, indeed, where men are continually afraid of the violence of their superiors, they frequently bury and conceal a great part of their stock, in order to have it always at hand to carry with them to some place of safety, in case of their being threatened with any of those disasters to which they consider themselves as at all times exposed.*" What these words describe is the fact that investors will have an incentive to invest only when they feel that their property is secure to a reasonable degree. If that security is not present, the incentive to invest will be low.

In contemporary times North (1991) elaborates on the role of institutions in economic performance based on analysis of historical events. He explains how institutional arrangements evolved in stages to solve problems relating to high transaction costs leading to expansion of trading activity from small closely knit groups to large anonymous markets thereby helping in capturing larger gains from trade. He further asserts that at no particular stage it is necessary that conditions which will allow movement from one stage to another will emerge citing cases of existing primitive forms of exchanges. Moreover, the emergence of these arrangements was not a given fact, as assumed in neoclassical framework, rather, it has history of development over a period of centuries. In fact the process could be described as being so complex that several factors play a role in its emergence or in some cases its non-emergence. It is a well-known fact that majority of countries across the world have been unable to develop these institutions. The importance of developing the relevant institutions for growth and development is well captured in Mary Shirley's word "Developed countries are the exception, not the rule."[30] Shirley provides an excellent survey of literature on factors which institutional economists over the years have

[29] See Wealth of nations book II Chapter I

[30] See Handbook of New Institutional Economics Chapter 24

identified as reasons of why institutions which foster growth and development did not emerge.

To sum up, institutions determine outcomes by shaping interactions between members of a society. Given that the institutions matter in shaping behaviour, one can say that there exists a definite link between the level of Social Welfare in any society and the institutional arrangements that are prevalent there.

2.4.2 Second Major Theme: Some Institutions perform better than other Institutions

Following North several studies have showed a strong correlation between institutions and economic growth and development. These studies show a lot of variation in terms of which institutions they use as explanatory factors of high economic activity. For example, Hall and Jones (1998) attribute differences in output per worker not to differences in physical capital and educational attainment, rather they assert that these differences are primarily caused by differences in institutions and government policies. Rodrik et al. (2002) in their work have estimated the relative importance of institutions, geography, and trade in determining income levels of countries across the world. One key result that emerges from their study is that institutions come out as the most important factor. Acemoglu and Robinson (2008) also argue that main determinant of differences in economic prosperity across countries are differences in economic institutions which in turn depend on political process. They find that the economic institutions of a society depend on the nature of political institutions and the distribution of political power in society. Knack and Keefer (1995) study the link between social capital and economic activity based on indicators of trust and civic norms from the World Values Surveys for a sample of 29 market economies. They conclude that trust and civic cooperation are associated with stronger economic performance and that trust and norms of civic cooperation are stronger in countries with formal institutions that effectively protect property and contract rights, and in countries that are less polarized along lines of class or ethnicity. Mauro (1995) studies the effect of corruption, which can be considered as an indicator of inefficient institutions, on economic growth and comes to the conclusion that there is an inverse relationship between corruption and economic growth. DeLong and Schleifer (1993) study on medieval Europe provides evidence that government regimes which can be characterized as ‘absolutist’ were associated with lower economic growth than those which were not. Absolutist states, in their work, were characterized by the subjection of the legal framework to the prince's will. Non-absolutist regimes meant three things – constitutional monarchies where prince was bound by law, city-state-based rule by merchant oligarchies and feudal governments. This study provides an example of link between good governance and economic performance. The literature linking institutions and growth and development is ever growing. A cursory understanding of studies linking institutions and growth would reveal that several institutional factors such as government policy, trust and cultural values, good governance or good government policies, well-defined and well-protected property rights along, better law enforcement, etc. all play an important role in fostering growth and development. Among them too enforcement of contracts and well-defined and secure property rights have gotten a higher attention. This has led to an understanding that in order for economies to walk the path of economic prosperity a set of institutions will have to be adopted. World Bank and International Monetary Fund (IMF) have taken an active interest in promoting such institutions and have pushed this agenda with vigorous passion. Chang (2005) calls these institutions as global standard institutions (GSIs). Some of those GSIs as described by him are as follows : (i) laissez faire industrial policy, with a welcoming attitude towards foreign investors; (ii) a small public-enterprise sector, supervised by politically independent regulators; (iii) a developed stock market with easy M&As (mergers and acquisitions), which will ensure that the best management team available runs each enterprise; (iv) a regime of financial regulation that encourages ‘‘prudence’’ and ‘‘stability’’, including a politically-independent central bank and the strict observance of the BIS (Bank for International Settlements) capital adequacy ratio; (v) a shareholder-oriented corporate governance system, which will ensure that the corporations are run for their true owners; (vi) a flexible labour market to allow quick re-allocation of labour in response to price changes. Chang further critically examines the said GSIs with respect to its characteristics of global in nature and its superiority over other institutional arrangements. He also provides a discussion of these institutions may not be suitable for developing economies. Bardhan (2005) also criticizes the narrow focus of current the current institutional economics literature in development on the institutions protecting individual property rights and suggests a broader outlook on institutional arrangements which would include democratic participation, state antiquity, etc. While there may be disagreements on which institutions matter for growth and development, the fact that 'institutions matter' and that they can have a causal effect on economic performance[31] is no longer questioned in mainstream economics discourse.

To sum up, identifying which institutions actually cause social welfare to improve is very important. Not all institutions work. That is they do not improve welfare irrespective of how the welfare is described, as in terms of growth or improvements in living condition. If the main objective of institutions is improvement social welfare then one can also assert that some institutional arrangements have worked better than others.

2.5 Conclusion/Theoretical Research Gaps

Regarding the first part of the first major theme – institutions matter, there is little reason to raise objections or questions unless one is operating under classical or neo-classical framework. Under classical framework institutions do not matter. This is mainly because under that frameworks agents have perfect information and there are negligible transaction costs which allows attainment of best possible outcome. Since, the conditions prevalent in the classical and neo-classical framework are rarely seen in the real world one can ignore the theoretical implications of those two frameworks. The second part of the first major theme – institutions affect social welfare, does raise an important question. Given that institutions can act as instruments of welfare, what is the exact procedure through which institutions improve welfare? In other words if institutions act as instruments of welfare then it means that institutions allow or rather ensure movement from a configuration to a new configuration wherein the new configuration is seen as better than the previous one by the members of the group or society. This mechanism of movement from a particular configuration to a preferred configurations needs to be properly enunciated or laid out. Economic theory including institutional theory has focused on this issue in a limited way. For example, the theory states that institutions allow individuals to exploit the cooperative

[31] For a critical view on this see Chang (2011). Chang argues that causality could run the other way, that is, from economic development to good institutions.

surplus which allows them to move towards Pareto superior outcome. This point is well illustrated in the book *Institutions, Institutional Change And Economic Performance* written by Douglas North.[32] In this book he argues that institutions whether they be informal or formal play the role of reducing uncertainty. He further asserts that uncertainty in human interaction leads to high transaction costs which destroys the possibility of mutually beneficial trade among individuals. Institutions are essentially tools or mechanisms through which these transaction costs are minimized thereby allowing possibility of complex interactions and contracting. The theory just assumes that cooperative surplus exists without any justification and also without explaining how the cooperative surplus emerges in the first place and what factors could affect the cooperative surplus. Exploiting the cooperative surplus may not be the only way through which a Pareto superior outcome is attained.

Furthermore, the second major theme - some institutional arrangements have worked better than others also raises an important question. That question being, why certain institutions work and others do not? Alternatively one can ask which institutions are efficient while others are inefficient. On the surface it may appear that this question may have an easy answer but it is not so. For one, any policy maker or legislator cannot know beforehand that the proposed institutional arrangement or a change in existing institutional arrangement will work or not. And secondly, there is no clear line that demarcates efficient institutions from inefficient ones. The theoretical grounds on which a distinction is possible is blurry at best. This is because success of an institution depends on many factors. It is entirely possible that institutional arrangement which works well in the current period and therefore may seem as being efficient may not work well in a future time period thereby making it inefficient or even extractive.

The next chapter tries to address the issue of what is the exact procedure through which institutions improve welfare and why certain institutions work and others do not. To help us with this objective it will be useful for us to take the starting point of analysis as a state of the world where no institutions exist, that is, a state where no actions are constrained. The reason why this state may prove to be useful is because we can introduce a rule or

[32] See North (1990)

arrangement and look at how individuals in the previous state fared compared to how they will fare in the new state. In the next chapter we will discuss how this hypothetical state has been described in existing literature. This will help us in understanding some essential features about this particular state. This in turn will allow us to have a foundation on which further analysis can be done.

Chapter III: Institutions as Instruments of Welfare

3 Introduction

The previous chapter dealt with major themes of Institutional Economics and tried to identify some research gaps in our understanding of what institutions are and how they function. To be precise, the issue of what is the exact procedure through which institutions improve welfare and why certain institutions work and others do not, were recognized as main questions that were to be dealt with in this chapter. The previous chapter concluded by suggesting that if an understanding on how institutions work or to be more precise how institutions improve social welfare is to be gained, a good starting point could be to imagine a society where human actions are not constrained at all. It is very likely that behaviour of individuals in a pre-institutional society will be much different from that in a society with enforceable institutions. This chapter will mainly focus on how academicians have dealt with the idea of a pre-institutional society. A detailed review of these concepts will allow us to understand essential features of a pre-institutional society and the nature of interaction among the individuals in that situation. Naturally, the nature of interaction among individuals will be very different if somehow their actions were constrained. The sharp contrast between these two scenarios should help us in enunciating the process of how institutions help in generating social welfare. This will be shown with the help of a formal model.

The chapter is divided into several subsections. The first few sections will discuss literature regarding conceptualizing pre-institutional society. In these sections ideas such as social contract, state of nature and anarchy are discussed and reviewed. The middle sections then discusses the inferences from the anarchy models which is then used for identification of process through which institutions alter a given configuration or state. A formal model is then presented in the next section. The efficiency conditions for institutions are discussed in this section. The efficiency conditions help in distinguishing efficient and inefficient institutions. Last sections are devoted to discussion on institutional or policy failure and implications of the model.

3.1 Conceptualizing Pre-Institutional Society

Given the fact that institutions are ubiquitous and pervasive, it is difficult to imagine a society where institutions – either formal and/or informal do not exist. Nevertheless, conceptualizing a society with no binding restrictions on an individuals has been a subject matter of particular interest to philosophers, political scientists and economists. There exists a vast literature which precisely deals with issues such as what pre-institutional stage looks like, how individuals behave when no action is restricted in any way, etc. Generally speaking, the idea of a society with no institutions, in the field of political philosophy, is conceptualized in Social Contract framework where the "state of nature" acts as the starting point of the entire social contract theory. Later, in the field of economics, the idea of Anarchy became popular subject of study among several prominent economists especially in Public Choice subfield or tradition. In the next section a detailed review of these concepts will be presented.

3.1.1 Social Contract and State of Nature

The idea of Social contract is an old and prominent concept in the domain of political science for a very long time now. The ideas which form the part of the theory have also influenced ideas related to ethics especially business ethics[33] as well as influenced research in organizational theory[34]. The theory of Social Contract has seen a number of contributions by various philosophers over several centuries going back as far as to Greek philosophers to 17th and 18 century philosophers like Hobbes, Locke, Rousseau and Kant and more recently Rawls and Gauthier. Ritchie (1891) and D'Agostino et al. (2017) provide a detailed account and a comparison of various ideas that form the core of social contract theory. The basic idea of a social contract is simply that it is a contract between the rulers and the ruled where the rulers and the ruled trade rights and privileges. This contract emerges when members of a group in order to protect certain rights or privileges give up

[33] For more information see Dunfee and Donadson (1995); Graaf (2006); Wempe (2008)
[34] See more information see Keeley (1980); Keylee (1995)

some other rights and privileges to a governing body which can come in many different forms. This theory is also an explanation of how civil governments come into existence.

Social Contract theorists have used the term "*State of Nature*" to describe the state before the emergence of the social contract. The need to create a social contract through cooperation comes from the conditions that are present in the *State of Nature* itself. If it was possible to protect certain preferred rights and privileges of members of the group then there would not have arose a need for the emergence of social contract and consequently a civil government or a nation state. The question then arises what is it about *state of nature* that prevents or makes it difficult for individuals to protect their preferred rights and privileges. Different social contract theorists have given different interpretations of how the *state of nature* would look like. The differences in interpretations are mainly due to differences in how the nature of humans is conceptualized and due to differences in which rights are considered as inalienable to humans.[35]

A simple description of *State of Nature* would be a state where human behaviour and actions have no constraints put on them. In this state each individual member of the group is free to do as he/she pleases. Humans interact with nature in many ways to fulfill their desires and needs. They perform actions which change a given natural state and through these changes they achieve their objective of survival.

One way of making sense of this is to categorize the actions based on how they affect the individual who is undertaking them as well as the affect those actions may have on other individuals. For instance, one category of actions will be those where the action taken in the process of fulfilling a particular objective benefits the individual without any consequence to others. An example of this could be a Robinson Cruesoe type of individual stranded on an island who cuts down a tree to build a house. The act of cutting down the tree benefits this individual but is of no consequence to the rest of the world. The second category of actions would be those where there is some sort of mutual interdependency. Fulfillment of the objective in these cases not only depends on one's own action but it depends on actions of others as well. A typical market exchange is an example of that. A

[35] For a detailed discussion see https://www.britannica.com/topic/state-of-nature-political-theory

market exchange can be described as a scenario where person A undertakes a costly act X for the benefit of person B who then undertakes a costly act Y for the benefit of person A. Each participant in this market exchange relies on the other individual to hold his/her end of the deal. If any individual defects the objective of at least one individual would remain unfulfilled. A third category of actions would be those where self-interested actions lead to a direct harm to other individual. Forcibly acquiring another individual's possessions is an example of this. In these cases gain of one individual necessarily becomes loss of one or more individuals. The very act of refraining from such activities generates benefit for the other.

Given that these freedoms exist one can reasonably assume that an individual may not necessarily know what actions the other individuals may undertake. In this state some of the actions that an individual may undertake would result in a situation of conflict. It can be seen that actions which fall under second and third category are what is meant by actions which would result in a situation of conflict. In this state it becomes very likely that an individual's preferred rights or privileges may get trampled upon by actions of other individuals since that individual may not have the ability to protect those rights on his/her own.

3.1.2 Criticisms of Social Contract Theory

Before we explore the usefulness of theory of Social Contract it is necessary to mention and discuss some of the criticisms levelled at the theory. The theory is far from perfect and has seen several criticisms on several grounds. One of the most prominent critic of the theory involves the idea of consent of the governed. It is also one of the earliest critic and is found in the works of David Hume[36]. The argument presented in this critic is that the consent to form the social contract is a mere assumption and not an undisputable fact. The first line of attack is the lack of evidence of an original contract ever taking place. The second line of attack relates to the difficulty of knowing the actual contents of the contract.

[36] See David Hume's essay *Of the Original Contract* in David Hume, *Essays Moral, Political, Literary (LF ed.)* [1777]. https://oll.libertyfund.org/titles/hume-essays-moral-political-literary-lf-ed

And finally the third line of attack relates to the problem of acknowledging binding nature of the consent overtime including inter-generation consent. McCormick (1976) has dealt with the problems related to consent. In this article the scholar first described the syllogism that is paradigmatic of social contract as follows: (a) man can be bound only by his own (freely given, (b) this man has consented, and (c) therefore, this man is bound (obligated) to obey. He then proceeds to offer an alternate way of describing a contract based on imputed consent. The alternate paradigm that the author suggested look like this: (a) man can be bound only by his own consent, (b) social form x is such that we know a man is obligated (or, more weakly,"should be obligated") and finally (c) therefore, being rational, he must have consented (or, more weakly, "should consent"). Having presented this alternative the author argues that alternate presentation resolves the issues of consent described above.

Second major criticism of the social contract theory is that the logical grounds on which the theory is based can easily be dismissed and therefore rendering the entire theory as defective. Scholars have pointed out a logical fallacy leading to a paradox in the working of the social contract theory. The paradox can be described as follows: rational and social men would not find themselves in the *State of Nature* and irrational men if in *State of Nature* will have no ability to come out of that state. This criticism was first enunciated by philosopher George Sabine in a chapter on Thomas Hobbes in his book *A History of Political Theory*. He writes

"Before the institution of society the natural man is represented as almost non-rational; in instituting and conducting the state he shows preternatural powers of calculation. In order to be social he must be the perfect egoist, and egoists of this sort are rare. The result is a paradox. If men were as savage and anti-social as they are at first represented, they would never be able to set up a government. If they were reasonable enough to set up a government, they would never have been without it."

This paradox provided a great challenge to the contractarian ideology. There are however counterarguments against this seemingly difficult paradox to resolve. Claude Ake (1970), for example, has provided a defense of political theory of Hobbes and has reasoned that the Hobbesian theory does not break down due to the aforementioned paradox and that the Hobbesian account of the transition of man from the state of nature to political society is perfectly intelligible and coherent.

The third major criticism of this theory casts doubts over the theory's explanation of presence of sovereign state/government. An alternate explanation of presence of sovereign state/government is given by predatory theory[37]. According to this theory the sovereign state is a result of self-interested actions of a few agents who have a relative advantage in using force compared to the rest of the individuals in the group. When this group of individuals are able to establish a monopoly over use of force and violence a sovereign state emerges as a natural consequence of that monopolization. The core ideas of this theory are found in the works of Mancur Olson.[38] He writes "government for groups larger than tribes normally arises, not because of social contracts or voluntary transactions of any kind, but rather because of rational self-interest among those who can organize the greatest capacity for violence." While it is true that many nation states even today have the features of a predatory state, this fact alone is not sufficient to negate the usefulness of social contract theory. One could argue that these two theories occupy two extreme points and truth lies somewhere in between.

Thus, one can see that the theory has its fair share of critics and has remained controversial for a long time. In spite of the controversy and criticisms of the theory it can be said that it still has some utility as the theory at least provides a window through which we can look at economic, political or even cultural aspects of human life.

3.2 Anarchy in Public Choice Tradition

In the field of Public Choice during 1970s, the idea of Anarchy became popular subject of study among several prominent Public Choice theorists. The reason why such questions or rather the research in Anarchy became popular is because it allows an understanding into how the society will end up looking when governments fail. Understanding anarchy can provide a window through which one can understand behaviour of individuals in a failed state. Another reason why understanding anarchy gained further traction is because of an already existing political philosophical movement known as Anarchism. This school of

[37] See Vahabi (2020); Block and DiLorenzo (2000)
[38] See Olson (1993)

thought holds the position that States lack moral legitimacy and calls for rejection of all hierarchical structures because the belief is that any hierarchical structure is bound to be involuntary and coercive.[39]

Before discussing literature a basic understanding of the term 'anarchy' is required. In simple words anarchy can be defined as a state of the world where institutions either do not exist or are so weakly enforced that they play no role in shaping the behaviour of individuals or the resulting outcome of the interactions among the individuals. Since one of the objectives of the thesis is to theorize how institutions work as instruments of welfare, anarchy may prove to be very useful as a starting point of the analysis. A related concept to anarchy is *amorphy*. *Amorphy* refers to state of the world where the possibility of storage is very low and due to which the resources are always consumed quickly while moving. The main difference between anarchy and amorphy is that under anarchy successful defense of resources is possible and therefore it becomes worthwhile for individuals to invest their time and effort in developing such defensive mechanisms. An amorphic society is even more basic or primitive than the anarchic state. Hirschleifer (1995) provides an analysis of anarchy wherein he argues that anarchic situations are not chaotic and can constitute a stable system. The stability or sustainability of anarchic system is only possible when there exists strong diminishing returns to predatory effort. Furthermore, the author concludes by asserting that anarchy can still be fragile and is susceptible to falling into either an amorphic situation or it will make way for an organized hierarchy. Baker et al. (2010) analyze development trajectories of early civilizations and chart out human societal progression from amorphic state to anarchic state and then towards hierarchical state. According to the authors the relevant state of affairs for most of mankind's history has been mobile hunter-gatherers (amorphic state). Anarchy could only prevail once organized farming and other technological innovations made it possible to produce and store surplus. They then derive conditions under which such societies optimally progress from anarchy to hierarchy. Given that humans have acquired technical knowledge to engage in successful

[39] For more on Anarchist School of Thought see Yarros (1936); Wall (1978) McIntosh (1978); Rutten (1999); Dagger (2000)

defense of surplus or resources anarchistic scenarios are more relevant for analysis than amorphic scenarios.

Powell and Stringham (2009) provide an excellent and detailed review of early developments in the research of anarchy. They highlight the important contributions made by scholars such as Gordon Tullock, James Buchanan, Robert Nozick, DeJasay, etc. Their article suggests that public choice scholars sought to provide insights into questions such as: what would an anarchistic equilibrium look like, to what extent cheating and predation will prevail, how cooperation among individuals can be encouraged without a functioning government, how individual parties interact with one another and under what circumstances are they able to form a private mechanism of solving coordination problems and so on. The answers to these questions provide further insight into nature of anarchy. For example, anarchy can either be ordered or chaotic. Anarchy can also be either stable or unstable. Naturally, academic interest lies in modelling behaviour of individuals in the state of anarchy and finding answers to the above questions. In the next section we will review a few models of anarchy to get insights and draw some inferences from it for our purpose.

3.2.1 Anarchy Models

One of the earliest models of anarchy was presented by Winston Bush in 1972 in an article titled "Individual welfare in anarchy".[40] In this article he proposed a simple model wherein the conditions for an equilibrium income distribution under Hobbesian anarchy derived. In its simplest form the model uses the assumption of two individuals and one all-purpose consumer good. The author defines two distinct distributions of income (all-purpose consumer good). Initial distribution of income is the distribution that exists before appropriation/stealing takes place. A redistribution of income can occur through appropriation/stealing and this modified distribution is called as natural distribution of income. The movement from initial to natural distribution is not costless as

[40] See Chapter 2 of Anarchy, State and Public Choice edited by Edward Stringham

appropriation/stealing requires effort which is considered as economic bad for both individuals. Under these assumptions the model shows that natural distribution of income will be stable positive amounts of effort are expended by individuals. The model further shows it is possible to achieve a Pareto superior move if both individuals can come to agreement to discontinue their effort (an economic bad) to take income away from one another. However, the model cannot determine the actual distribution of income under this Pareto superior move. The main conclusion of this work was that given individuals' preferences, ability, and initial income-wealth, rules defining property rights could emerge in which both individuals discontinue expending unpleasant effort. A more mathematically rigorous version of this framework has also been given in Bush and Mayer (1974). This extended model uses more than two person society framework where individuals live in a pre-constitutional state in which there effective and costless enforcement mechanism does not exist. This model establishes the existence of natural equilibrium but is silent on the stability of the natural equilibrium. Okuguchi (1976) provides a dynamic analysis of the Bush-Mayer model to explore the stability of natural equilibrium under Bush-Mayer framework. According to the author a stable and orderly anarchistic allocation involving zero theft or predatory activity by individuals will depend on characteristics of utility functions of individuals as well as the number of individuals in the society.

James Buchanan has elaborated this link between social welfare and emergence of an agreement between individuals to curtail some of their activities in his book *The Limits of Liberty: Between Anarchy and Leviathan*.[41] In this work he introduces the concept of anarchistic equilibrium to describe an income distribution among the members of the society that would exist prior to emergence of rules that would constrain human actions. In this framework the anarchistic interaction is built upon the assumption that individuals live in a world of scarcity where mutual exploitation of resources or natural environment ensures that for each individual there exists a reciprocal externality relation. Just like the framework presented in the works of Winston Bush the anarchic interaction between individuals is presented in Hobbesian framework. The theoretical model that he builds starts with the assumption that each individual acquires goods according to his/her

[41] See Buchanan (1975)

production function independent of each other. This initial point is both arbitrary and unstable since both individuals have an incentive to start a conflict, that is, engage in predatory and/or defensive activities. This incentive to appropriate eventually brings the individuals to a new equilibrium where both engage in predatory-defense activities. This equilibrium is stable since after reaching this point no individual has any incentive to either increase or decrease predatory-defensive effort. According to Buchanan this stage is called pre-constitutional stage of social order and it is only after reaching this stage can the possibility of contract involving mutual disarmament exist. *He then proceeds to show that mutual gains become real when the two individuals accept limitations on their freedom of action, to be precise, their freedom to engage in predatory activities.* He further discuss the mechanisms and conditions through which attaining this better configuration is possible. These mechanisms or conditions not only involve agreement on terms of disarmament but may also include direct transfer of resources from one individual to another. Such transfers become more likely if the two individuals are vastly different from one another in terms of production capabilities or predatory capabilities.[42]

Schmitz-Trenz (1989) improves upon the work of Buchanan by adding Nash Bargaining theory to explain which specific agreement satisfying the Pareto criterion will be reached. In this work the author makes a distinction between several stages of state of nature. The first stage is called Chaos where the individuals are ignorant about gains from cooperation. In the Pre-constitutional stage individuals equilibrate their actions which allows spontaneous order to arise. This is the stage where natural equilibrium prevails When the knowledge about gains from cooperation are perceived by individuals we enter the constitutional stage. The knowledge of gains from cooperation in constitutional stage shifts the natural equilibrium because expectations about the outcome of contract negotiations will influence behavior in the state of nature. This is where the author Nash Bargaining strategy gets introduced. Finally the fourth stage is Post-constitutional stage where the contract between individuals gets executed. The author presents a model of anarchy based

[42] Buchanan describes three reasons for why individual may differ from one another. The first is due to difference in natural capacities or skills. The second is due to differences in natural environment situations. And finally third reason is due to differences in moral inhibitions among the individuals regarding predatory actions such as theft, robbery, etc.

on Hobbesian state of nature where individuals have the choice among several combinations of these activities – (a) production, (b) attack, and (c) defense. It can be seen that this model is different from the earlier works of Bush as well as Buchanan in the sense that production is taken explicitly and that attack and defense are two separate actions. Each individual has the choice of expending his/her resources in these three activities in any way he/she wishes. As such an individual's consumption is a function of his/her ability to produce, the ability to successfully defend stock and the ability to successfully attack and appropriate the stock of the other individual. Given this framework the social setting becomes of a two-person several- strategies game resembling a Prisoner's Dilemma. This implies that if one agent refrains from attacking, the other agent has a strong incentive to attack. This feature prevails even after entering into Post-constitutional stage. Note that in the previous models that have been discussed above this feature is implicitly present. There is no real incentive for any individual to act according to the contractual agreement if the other has already done so.[43]

3.2.2 Inferences from Anarchy Models

First major inference that can be drawn from reviewing above models is that most anarchy situations are described a Hobbesian framework. In this framework each individual acts to maximize his/her utility and has the freedom to undertake any action and adopt any strategy including those which could result in harm or injury to other individuals. The models that were discussed above are individual centric. Of course it is not necessary that anarchy models be presented in an individualistic framework. Some scholars have in fact proposed that cooperative groups or organizations can exist even in Hobbesian state of nature. Gordon Tullock in an essay titled "The edge of the jungle" in Anarchy, State and Public Choice theorizes that it is possible for individuals of similar ability to band together and

[43] This is where the problem of enforcement of contractual agreement comes into play. Without an effective enforcement mechanism any contractual agreement among individuals may prove to be unstable bringing all individuals back to the state of natural equilibrium. Several scholars have dealt with this problem offering important insights especially regarding emergence of governments or States but given the objectives of this thesis a discussion on that is not necessary at the moment. Interested readers however, can see Konrad and Skaperdas (2012); Briggeman (2009)

control or dominate other weaker individuals. He writes "A group of ten could organize among themselves according to the pure Bush–Hobbesian model; but with respect to another group of 100 slaves, they might be able to exert a great deal more control than any individual within the ruling elite can exert over the remainder of the elite." The essay further explores the set of conditions under which the dominant class could establish an effective system of governance to efficiently exploit the remainder of the population. Usher (1989) in his analysis of dynastic cycles which he defines as a periodic alternation of society between despotism and anarchy, also uses the framework where individuals form different groups such as farmers, rulers and bandits. The author argues that there are similarities between Bush framework anarchic situation and the one that is employed here, with differences only in assumption about division of labour. In the Bush model each individual can divide his/her time into the three activities - production, predation and defense. In this model individuals can devote time only to one of the three activities. It should be noted that this framework also has its advantages but a more complete model describing behaviour of individuals in anarchic situations and a description of a natural equilibrium is presented in Bush/Buchanan framework and that is why it is considered as the standard framework.

The second major inference that can be drawn from the standard anarchy models is that the state of affairs in the natural equilibrium is Pareto inferior in terms of social welfare. We have seen that under natural equilibrium conditions of anarchy a significant and large portion of the resources get devoted to predatory and defensive activities which are unproductive in nature. It is argued that these resources are better spent on productive activities since production directly increases the utility of individuals. It is due to this fact that many scholars are of the opinion that anarchy is inefficient. A contrary viewpoint to this is given in Leeson (2006). In this article author argues that in some cases it is possible that wealth-maximizing individuals may rationally choose a stateless society. Anarchy becomes efficient mode of social organization if markets are thin and formation of government is too costly. A thin market implies that total social wealth under low levels of trade are not significantly lower than social wealth under higher levels of trade generated through government formation. If the costs of government formation outweigh the benefits of higher trade volume then anarchy comes out as a better mode of social organization. The author justifies his point by citing examples of primitive stateless societies and anarchy that prevails at global level. While it is true that the article makes a compelling argument for statelessness it should not be forgotten that establishment of state/government seems to be more common, which implies that a society moves to a higher level of social welfare or wealth through establishment of rules of conduct or simply put through institutions.

Third major inference that one can draw from the above models is that contractual agreement among the individuals that moves the society from the natural equilibrium under anarchy to a Pareto superior state of world comes at a cost to all individuals of the society. Mutual gains from trade or cooperation cannot be realized unless individuals accept limitations on their freedom to engage in predatory activities. These contractual agreements to limit predatory actions such as appropriation or theft is an institution as per the definition provided by Douglas North and others. It has already been mentioned that movement from natural equilibrium towards a Pareto superior state resembles a strategic situation involving a Prisoner's dilemma game. Under a Prisoner's dilemma strategic situation an individual can achieve a greater benefit by defecting on the agreement when the other individual chooses to cooperate. Each individual has the possibility of achieving a higher level of benefit at the expense of other individual. This problem is known as the problem of collective action.[44] Note that the contractual agreement/institution does not destroy an individual's incentive to cheat if we assume that proper enforcement mechanism does not exist. However, the contractual agreement/institution can help in creating a belief among individuals that each individual will choose to not engage in predatory actions.[45] Having this belief allows each individual from making unproductive expenses, in this case protecting the property, and free up those resources for better use. This is what causes improvement in welfare of individuals. Under this light one can define institutions as nothing but belief of an individual regarding actions of other individuals. Furthermore, it should be noted that improvement in each individual's welfare was caused by the other individual refraining from stealing. That is, it got generated through an action undertaken

[44] For more on this see Schofield (1985); Molander (1992)

[45] For the time being we will ignore the question of whether such a belief is sustainable given that enforcement mechanism have not been explicitly included in the analysis.

by the other individual and not through his own action. Improvement in welfare is the result of this indirect positive external effect.

3.3 Mechanism of Institutions

The above inferences provide a foundation on which a theory of how institutions generate welfare can be developed. But before we properly enunciate the theory of mechanism of institution we will take an example of such a real life scenario which will be analogous to the hypothetical models of anarchy discussed above. This will make the hypothetical anarchy models more relatable and understandable. One such example of a real life scenario is presented below.

3.3.1 Case of Brazilian fishermen:[46] An Illustration

The Brazilian fishermen catch shrimps in large plastic bucketlike contraptions. The fishermen not only care about their current expected income but also preserving the stock for future. Holes are cut in the bottom of the traps to allow the immature shrimp to escape, thereby preserving the stock for future catches. The institutional practice that has been evolved by these fishermen is to have larger holes in the contraptions. A fisherman can expect a higher expected income by using smaller holes in his contraption. Note that in the case where the institution of using larger holes does not get introduced or promulgated one can expect every fisherman to use smaller holes with no regard to future availability of shrimps. This scenario is analogous to the natural equilibrium in the anarchy models. The institutional practice of using larger holes imposes a direct cost on these fishermen. The difference between the expected income when using larger holes and expected income when using smaller holes is the cost that fishermen must incur if and when they decide to follow the institution. In this situation too using smaller holes is a dominant strategy for each fishermen. This again similar to how breaking the contractual agreement to not engage in predatory activity is a dominant strategy in the anarchy models. Once again note that

---

[46] This example is taken from Chapter 3 of the book *A Cooperative Species*: *Human Reciprocity And Its Evolution* by Samuel Bowles and Herbert Gintis

introduction of the institution of using larger holes does not destroy a fisherman's incentive to use smaller holes. It only creates a belief among fishermen that larger holes will be cut. The act of using larger holes improves social welfare by ensuring sustainability of the resource. When a fisherman chooses to use larger hole he contributes towards preservation of future stock not only for himself but for other fishermen as well. The future availability of the shrimps is an indirect benefit of following the institution for the fishermen which counteracts the loss of lower present expected income. The nature of this indirect benefit again is of positive externality. More the number of people who follow the institutional practice larger will be the future stock of shrimps which adds to welfare of the individual.

3.3.2 Process through which institutions improve Welfare

Based on the above analysis one can describe the process through which institutions improve social welfare as follows:

1. Institutions impose costs on individuals by forcing them to refrain from undertaking certain activities. The cost here refers to the possible reduction in utility that an individual may experience because of following the institution. This cost may be tangible in some case and intangible in others. Some examples will make this clear. When governments impose taxes on firms and individual it reduces their revenue/profits and disposable income. This reduction is direct cost of being subjected to taxes. Similarly, speed limit rule which comes under the ambit of broader traffic regulations restricts motorists from driving at very high speeds. If a motorist prefers to ride at a speed which is greater than the speed limit imposed then that individual will experience a loss or reduction in utility. This loss or reduction of utility is a direct cost on the individual. Nevertheless this cost should not be confused with the cost that a defecting individual may face in the form of fines and punishment or through feelings of shame or guilt. It only refers to the disutility caused by not allowing actions which have the potential of benefiting the individuals.

2. Institution creates welfare through positive external effects. These positive external effects accrue to all individuals who are members of the relevant group on whom the institution was imposed. These positive external effects have the effect of raising the utility levels of each individual. More the number of individuals who follow the institution larger is the magnitude of these positive external effects. Consider again the examples of public provision of goods through taxation and driving within speed limit rule. Every individual who decides to pay taxes increases the possibility of attaining a greater quantity and quality of public good for not only himself but for others as well. Similarly, a motorist who decides to follow the speed limit rule not only makes road travel safer for others but for himself too. The point that is being made here is that these positive external effects are enjoyed collectively.

Having identified the mechanism of how institutions work we will now proceed towards presenting a more generalized model of institutional mechanism which will be presented in the next section.

3.4 Formal Model

Let there be *n* individuals who come under the ambit of an institution. Let TU_i represent the total utility of i^{th} individual. From the previous section it is clear that an individual's total utility will depend on the choice of incurring the loss by following the institution and the resulting indirect benefit through positive external effect. Let L_i denote the absolute value of this loss in utility. Since it is a loss each $L_i \leq 0$. To be precise $L_i < 0$ when the individual follows the institution and $L_i = 0$ when the individual does not follow the institution. Further, we will consider a general case where each individual faces a different magnitude of loss in utility due to following the institution. This difference can be due to differences in preferences, differences in ability to perform the task, etc. An example will make this clear. Suppose that the maximum speed for speed limit rule is being considered. If it was left for each motorist to decide this maximum speed each motorist would prefer that the speed limit be set at the speed at which he/she prefers to ride. Since the speed limit is decided by the relevant authorities and not left at the discretion of each individual, individuals whose preferred speed is farther from the set speed limit will experience a greater loss in utility relative to those whose preferred speed is closer to the set speed limit given that they follow the rule. Of course, such differences in preferences or ability can originate from differences in age, gender, nature of occupation and so on. The idea that we are working with is that population is not homogenous. Let us designate individual with lowest loss in utility as individual 1, individual with second lowest loss in utility as individual 2 and so on. That is, $L_1 < L_2 < L_3 < \ldots\ldots < L_n$.

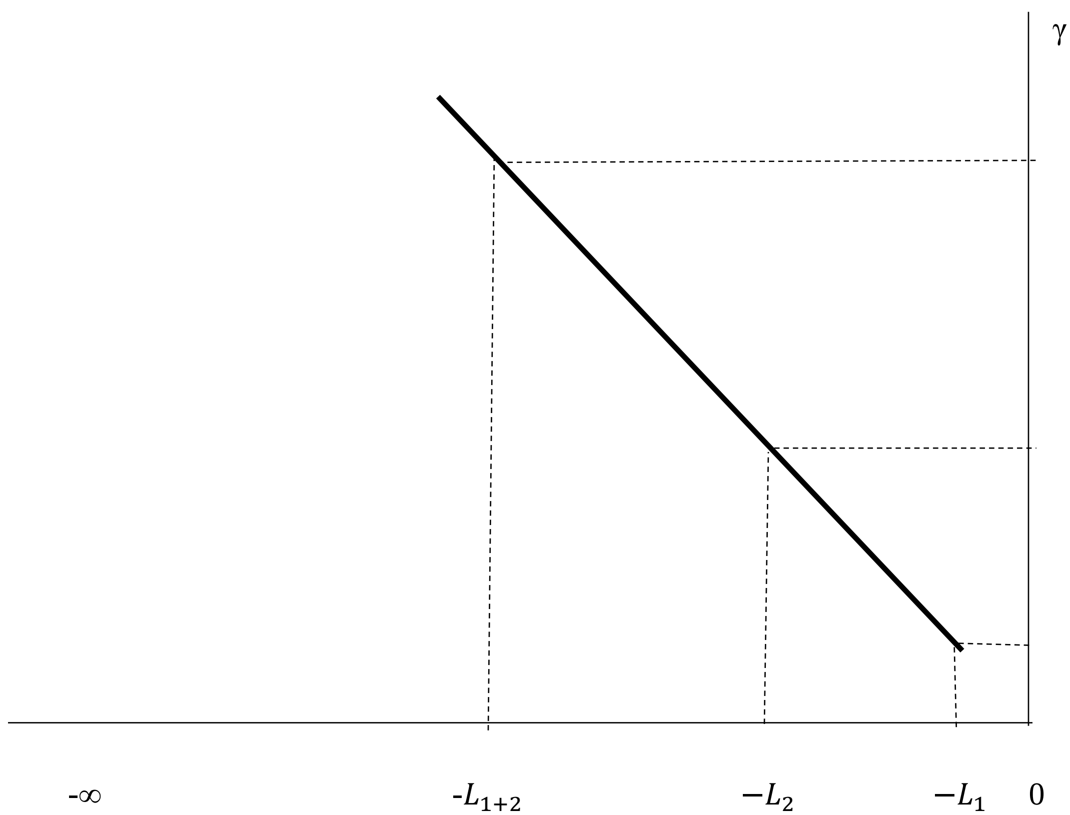
As was described in the previous section an indirect positive external benefit gets generated whenever individuals decide to follow the institution. Remember that the positive external benefit adds to the welfare of an individual. Let γ denote the addition in utility of an individual due to positive external benefit. Before we proceed any further the precise relationship between this positive external benefit and the loss in utility due to following institution needs to be described. The relationship between the two will be based on two basic presumptions. Firstly, the individual with the greater magnitude of loss generates a greater positive external effect than the individual who experiences a lower magnitude of loss. Secondly, larger is the number of individuals who follow the institution greater is the positive external benefit generated. If γ_i is the addition in utility experienced by all individuals due to the loss incurred by i^{th} individual then the above two presumptions can be presented in mathematical terms in the following way:

(1) If $L_i < L_j$ then $\gamma_i < \gamma_j$ given that both L_i and L_j are < 0 and

(2) $\gamma_i + \gamma_j > \gamma_i$ and $\gamma_i + \gamma_j > \gamma_j$

Given the relationship described above γ can be described as a function of $\sum L$ where $\sum L$ represents the total loss in utility due to following institutions. Note that $\sum L$ can take various values. The precise number of values that $\sum L$ can take is given by the formula 2^n. As such γ will also take the same number of values as $\sum L$. That is, $\gamma = \theta(\sum L)$. Figure 1 below shows the relationship between $\sum L$ and γ for $n = 2$.

Figure 1: Gain in Utility due to Total disutility incurred



Source: Author

On the horizontal x – axis total loss in utility ($\sum L$) due to following institution is measured. On the vertical y – axis gain in utility (γ) due to positive external benefit is measured.

Therefore, TU_i = $f(L_i, \gamma)$

Or TU_i = $f(L_i, \theta(\sum L)$)

A simplified way of representing i^{th} individual's utility then is TU_i = -L_i + $\theta(\sum L)$.Let $\underline{\gamma}$ represent the utility derived by each individual when no individual follows the institution or the institution does not exist.[47] That is, $\theta(\sum L = 0) = \underline{\gamma}$. Further, let $\overline{\gamma}$ represent the utility derived when all individuals follow the institution. That is, $\theta(\sum L = \sum_{i=1}^{n} L_i) = \overline{\gamma}$.

In order to establish efficiency of institutions we have to compare social welfare when everyone follows the institutions with social welfare that exists when the institution does not exist or no individual follows it. If we represent Social Welfare function, denoted by *SW*, as an additive function of individual utilities then *SW* can be represented as $SW = \sum_{i=1}^{n} TU_i$.

Social welfare when everyone follows the institution is

$$SW^n = \sum_{i=1}^{n}\left(-L_i + \theta(\sum L = \sum_{i=1}^{n} L_i)\right).$$

$$= -\sum_{i=1}^{n} L_i + n\overline{\gamma}$$

Social welfare when no one follows the institution or when the institution does not exist is

$$SW^0 = \sum_{i=1}^{n}\left(-L_i + \theta(\sum L = 0)\right).$$

$$= n\underline{\gamma}$$

$$SW^n > SW^0$$

$$-\sum_{i=1}^{n} L_i + n\overline{\gamma} > n\underline{\gamma}$$

$$n\overline{\gamma} - n\underline{\gamma} > \sum_{i=1}^{n} L_i$$

$$n(\overline{\gamma} - \underline{\gamma}) > \sum_{i=1}^{n} L_i \quad \text{.......(1)}$$

The term on the left can be interpreted as the positive change in utility that the institution brings for the society as whole. It indicates the gains made by the society as whole. The term on the right is simply the sum total of the disutility. This term indicates the total cost to the society. As long as gains made by the society as whole are greater than the losses incurred by the society due to imposition of institution then that institution can be considered as efficient. The above condition can also be shown as

[47] One can even take $\underline{\gamma}$ as zero implying no utility before emergence of institution.

$(\overline{\gamma} - \underline{\gamma}) > \frac{\sum_{i=1}^{n} L_i}{n}$

The term on right now represents the gain in utility through positive external effects made by an individual while the term on the right represents the average of the loss in utility.

This is first condition of an efficient institution.

So far we have considered only the two extreme scenarios – no one follows or the institution does not exist and everyone follows the institution. What happens when *m* out of *n* (*m* < n) individuals are following the institution? The satisfaction of above mentioned conditions ensure only that it is best for the society to have the institution and have everyone follow it to a situation where it does not exist or no one follows it. It does not ensure that Social welfare will be maximum when everyone follows it. The point that is being made is that it is quite possible for Social welfare to be maximum when *m* out of *n* individuals follow but (*n* - *m*) do not. How can one be sure that Social welfare necessarily falls when even one individual decides not to follow the institution? In order to derive the conditions under which Social welfare resulting from everyone following the institution is maximum, information on the rate at which positive external effect or rather the utility associated with the positive external effect increases as total losses incurred increases is required.

So far we have established that γ is an increasing function of $\sum L$ but we do not know the rate at which γ changes as $\sum L$ changes. It will be assumed here that γ is a linear function of $\sum L$. That is, the first derivative $\frac{d\gamma}{d\sum L}$ is constant and a positive real number and the second derivative $\frac{d^2\gamma}{d\sum L^2}$ is equal to zero.[48] When γ is a linear function of $\sum L$ every unit of contribution or the disutility improves positive external utility at a constant rate. That also means the reduction in positive external utility brought on by not following the institution also happens at a constant rate. And since $L_1 < L_2 < L_3 < \ldots\ldots < L_n$, one can express any L_i or even any $\sum L$ as a multiple of the lowest L_i, that being L_1.The property of linearity of γ together with the ability to express any L_i or even any $\sum L$ implies that increase or decrease

[48] The assumption of linearity is taken only for the sake of simplicity. The conditions for the other two cases – increasing at increasing rate and increasing at decreasing rate can also be derived.

in γ as a result of any L_i or any $\sum L$ incurred or not incurred can also be expressed as a multiple of change in γ caused by lowest L_i, which here is L_1. For example, suppose there are only two individuals, that is $n = 2$, with $L_1 < L_2$. Then the relationship between L_1 and L_2 can be expressed as $kL_1 = L_2$, where k is some positive real number. If we denote change in positive external utility brought by individual 1 and 2 by by ε_1 and ε_2 respectively then linearity assumption of γ allows one to express relationship between ε_1 and ε_2 as $k\varepsilon_1 = \varepsilon_2$, given that $kL_1 = L_2$.

This means that in order to derive conditions where in the Social welfare is maximum only when all individuals follow or alternatively Social welfare necessarily falls even when one individual decides to not follow requires deriving the condition where the individual with the lowest L_i not following causes a decline in social welfare.

We know $SW^n = -\sum_{i=1}^{n} L_i + n\overline{\gamma}$

Let the reduction in γ caused by individual 1 not following be given by ε.

So $SW_{-1}^n = -\sum_{i=2}^{n} L_i + n\overline{\gamma} - n\varepsilon$

If $SW^n > SW_{-1}^n$ then

$-\sum_{i=1}^{n} L_i + n\overline{\gamma} > -\sum_{i=2}^{n} L_i + n\overline{\gamma} - n\varepsilon$

This implies $-L_1 - \sum_{i=2}^{n} L_i + n\overline{\gamma} > -\sum_{i=2}^{n} L_i + n\overline{\gamma} - n\varepsilon$

Working out the above inequality we get

$n\varepsilon > L_1$……………………………………………………………………………………(2)

The term $n\varepsilon$ represents the total loss in positive external utility due to actions of individual 1. The term L_1 here now represents the gain in utility made by individual 1 as a result of his action. The above condition implies that the total loss in positive external utility has to be greater than gains made by any individual i. This condition is the second criterion of efficiency of institutions.

3.5 Examples of Institutional or Policy Failure

It will be argued here that for an institution to be considered as efficient it must satisfy at the least first condition. It is not necessary that every institution that is promulgated may do so. There are many cases where certain policies pursued by the government have failed drastically. Prohibition of alcohol as an institution or a government policy is an example of an inefficient institution. Alcohol prohibition has been tried at many places and at different time periods. In the United States when it was tried, it was called the "noble experiment". Mennell (1969) provides an account of how the movement for prohibition of alcohol gathered momentum as well as the rationale of prohibition. The basic argument goes that drunkenness was becoming a major social problem and it also led to more crimes. However, the link availability of alcohol with increased crime was weak. Mark Thornton in his book *The Economics of Prohibition*[49] provides an excellent account of why Prohibition failed in general. He argues that prohibition in contrast to its stated objective of reducing crime actually ends up increasing it. This is because of emergence of black market dealing in alcohol products which was often run by criminals which often resulted in gang violence. This does not mean that prohibition was a complete failure. Blocker (2006) has argued that during prohibition era consumption levels of alcohol did fall during prohibition era and Death rates from cirrhosis and alcoholism, alcoholic psychosis hospital admissions, and drunkenness arrests all declined steeply. Nevertheless, prohibition of alcohol is considered as a failed policy. Within the framework of the model developed one could argue that $(\overline{\gamma} - \underline{\gamma})$ was low since there was no strong linkage between crime and availability of alcohol. However, the affected population, that is the subsection who prefer and engage in drinking, experience a rather steep decline in their utility as a result of not being allowed to drink alcohol freely. This would imply that social welfare actually fell during prohibition era.

Prohibition of alcohol as an institution can be considered as efficient under special circumstances. If occurrence of deaths due to cirrhosis caused by consumption of alcohol was widespread or if a significant proportion of population was suffering from alcoholism

[49] See Thornton (1991)

then the merits of institution of prohibition as an instrument of welfare become more prominent. However, if the risk of death due to cirrhosis caused by alcohol consumption remains low or the proportion of population that can be considered as alcoholics is very small then it can be asserted that a blanket ban on alcohol is a definite example of an inefficient institution.[50] There are other examples too where institutional arrangements have failed to bring the desired effect.

James C. Scott in his book *Seeing Like a State: How Certain Schemes to Improve the Human Condition have Failed*[51] provides an insightful account of the logic behind the evident failures of many utopian social engineering schemes[52] pursued by the State such as scientific forestry, city planning schemes, ujaama villagization and Soviet collectivization. He makes a convincing argument for the role of practical knowledge, informal processes and improvisations and their indispensability for the success of any plan. This is especially true where social engineering schemes requires participation of individuals. For example, in the context of Soviet collectivization the State forcefully employed farmers in *kolkhoz* and *sovkhoz* thereby treating them more like factory hands than farmers which not only destroyed many of the skills possessed by the peasants but also reduced their incentive to work hard. This change was not beneficial to most farmers and they resisted collectivization program in many ways. [53] He concludes his analysis by asserting that high-modernist designs for life and production tend to diminish the skills, agility, initiative and morale of their intended beneficiaries. Diminishing the skills, agility, initiative and morale are all costs that are imposed due to implementation of such plans. These examples above suggest that institutions or policy fail simply because people do not cooperate as they have no real incentive to cooperate. Their non-cooperation turns the institution/policy into a failure.

---

[50] It is recognized that the question of whether or not the risk of death due to cirrhosis is low or whether or not the proportion of population suffering from alcoholism is small is very subjective and could differ across society.

[51] See Scott (1998)

[52] One can interpret social engineering schemes as nothing but changes in institutional setting

[53] Interested readers may refer to Sheila Fitzpatrick's book *Stalin's Peasants: Resistance and Survival in the Russian Village after Collectivization* for more information on resistance strategies that the peasants adopted to counter the State policy of collectivization.

Among the institutions that satisfy the first condition, it is very rare to come across an institution which would satisfy the second condition as well. Take traffic rules and regulations as an example. Following traffic rules like driving within speed limits do make road travel safer. But as Shavell (2012) suggest that lawmakers are unable to incorporate a variety of circumstantial factors relevant to social welfare into legal rules. There could be circumstances under which a few individuals not following the rule may in fact increase social welfare. He corroborates this point by giving an example of a driver who might decide that going through a stop sign would not be socially bad if the driver can see that there are no other nearby cars on the crossing road or if the risk is small and the driver is running late for an important engagement. In this particular scenario the increase in probability of accident caused by the driver's decision to not stop was not high enough to justify the costs that he would have to incur in terms of reduced utility. Even an efficient institution could become inefficient for a few individuals under special circumstances. Thus it can be seen that this framework can help us in understanding why some institutions work better than others. The lesson to be learnt from the above analysis is that changes in incentive structure of the affected population caused by a change in institutional arrangement has to be carefully studied and understood in order to assess whether there is any merit in that institutional change.

3.6 Implications of the Model

The above framework allows us to distinguish between institutions. Based on the above framework we can introduce a different terminology to categorize institutions. An institution can be characterized as inefficient if it does not satisfy first efficiency condition. If an institution satisfies first efficiency condition but not the second then it can be characterized as imperfectly efficient institution. And if an institution satisfies both first and second efficiency conditions then the institution can be characterized as perfectly efficient institution. Most institutions which are efficient are likely to be imperfectly efficient institutions. The reason for this has already been discussed above.

The other major implication of this model is regarding the issue of compliance with institutions. Based on the analysis done above one could infer that an institution works when not only it is set up in a society, but when members of the society follow the institution. We have seen so far that members of the society are motivated to follow the institution when the institution works in their favour. In other words following a particular institution should have the effect of improving their overall welfare. Members of the society are less motivated to follow any institution if they do not place a high value on the indirect benefit generated through positive external effects. An institution must at the least be imperfectly efficient if members of the society are to comply with it. If this condition is not met then an individual will not have any incentive to comply with the requirements of the institution. One can easily establish that when an institution is perfectly efficient it is also a self-regulating institution. Each individual will comply with the institution and there would be decent chance of observing a full compliance scenario. The analysis suggests a hypothesis for compliance which can be stated as: *The tradeoff between the cost of following an institution and the indirect benefits obtained through generation of positive external effects acts as a major motivation for compliance or non-compliance. If the perception that the indirect benefit through positive external effect will outweigh the direct cost of following the institution exists then one can observe compliance and if the indirect benefit through positive external effect does not outweigh the direct cost of following the institution then non-compliance will be observed.* This hypothesis indicates self-regulatory nature of an institution.

This tradeoff itself is dependent on many other factors. It has been established that benefit through positive external effect satisfies a certain want or need of an individual in a society. Since different institutions satisfy different needs the society may place a different value to each of these needs. It is fair to assume that a higher value may be assigned to a need that is more important or necessary. Institutions then can be classified according to the degree of necessity of the coordination good that gets generated. If the method of classification is degree of necessity then the nature of the coordination good can be classified either as a necessity or luxury. It is important to note that degree of necessity is a perception and can vary from individual to individual or from society to society. Maslow’s theory of hierarchy of needs gives us some insight on relative importance of different needs with each other. Maslow's hierarchy of needs is a theory in psychology proposed by Abraham Maslow in the year 1943.[54] The theory when it was first proposed divided human needs into five categories. Later the theory was expanded to include three more categories of needs. The basic premise of the theory suggests that these needs are organized in a pyramid structure where category of need is stacked on top of the other category of needs. The needs which are placed at bottom levels are more immediate. The theory suggests that in order to satisfy a higher level need bottom level needs must first get satisfied. Thus the coordination goods that the institution generates can be ranked relative to one another on the basis of the type of need that the coordination good satisfies. An argument can be made here that if the need that the coordination good satisfies is a bottom level need relative to the other need then the bottom level need can be considered as more necessary relative to the other need and therefore one can expect a greater impetus to satisfy a bottom level need through compliance. For ease of use the bottom level needs can be classified as necessary and upper level needs can be classified as luxury.

The framework that was developed also suggested that for coordination goods to get materialized costs must be incurred. Remember that these costs are potential losses in utility as a result of following the institution. These potential losses in utility can either manifest in monetary form or non-monetary form. For example, tax liability created through institution of taxation is a monetary cost as it results in direct decline in disposable income. These costs create a clear incentive not to follow the institution. The bigger these monetary costs are the greater is the incentive not to follow the institution. Institutions can also create a non-monetary cost in terms of inconvenience, energetic expenditure and time spent to take this action. These costs can sometimes be significant enough to actually influence the decision to comply or not comply. Raihani and Hart (2010) study incentive to free ride in a real world setting where monetary costs were relaxed. In this study the public good was cleanliness of kitchen sink and cooperation involved washing up used kitchenware, while free-riding involved dumping used items in the sink. The act of washing up involved slight time costs and were a significant factor in the study. Thus, an institution can be divided on the basis of nature of costs that it imposes on an individual. On the basis

[54] See "A Theory of Human Motivation" in *Psychological Review* and *Motivation and Personality* by Abraham Maslow.

of nature of costs the institutions can be divided into three types – (1) Monetary, (2) Non-monetary and (3) Both Monetary and Non-monetary. An institution with only monetary costs is more likely to be followed compared to an institution which imposes a non-monetary cost as well in addition to the monetary cost of similar value as the former institution. This means that this framework also allows us to compare different institutions in terms of attitudes towards compliance. This comparison will be a subject matter of subsequent chapters and will be dealt later.

3.7 Conclusion

This chapter discussed how a society without institutions would look like. The main points that emerged from this discussion were – (a) social welfare is not maximum in a natural state and (b) a contractual agreement among the individuals can move the society from the Pareto inferior configuration in a natural state to a Pareto superior state. The process of this movement from inefficient natural state towards a Pareto superior outcome then is clearly enunciated and a formal model based on that is described. Based on the formal analysis some important insights and implications were drawn especially related to compliance attitudes or behaviour. It should be noted that the above hypothesis alone cannot explain cooperativeness or decision of an individual to comply or not comply. Compliance can be a very complex behaviour and could be influenced by several other factors. In the next chapter we will review already existing theories of compliance to gain a comprehensive understanding of motivations that lead to compliance or non-compliance with rules.

Chapter IV: Motivations to Comply and Comparing Institutions

4 Introduction

It is now well known that good institutions are absolutely essential for growth and development of a country. The previous chapter dealt with what could potentially constitute as a good institution and with the help of a formal model derived some efficiency conditions which helps in description of a good institution. The chapter concluded by suggesting that institution works when not only it is set up in a society, but when members of the society follow the institution. Members of the society are motivated to follow the institution when the institution works in their favour. An institution must at the least be imperfectly efficient if members of the society are to comply with it.

In any society compliance with rules and regulations is not perfect. That is, there will always be some individuals who do not comply with the rules that have been imposed by the society. In fact, it is not an exaggeration to say that most, if not all individuals, have broken some rule, regulation or a law at some point in their lives. Understanding the motivations of individuals to comply with laws has been of much interest to governments, legal analysts, economists, etc. The experience of countries with compliance to a rule has also shown variation. Though there is a general understanding that levels of compliance in the third world seem to be generally lower than in the developed countries[55], the reasons for the variation are not well understood. A fundamental result in law and economics is that poor countries need to establish efficient laws that foster economic growth and development. While some models on these aspects assume that such laws, when promulgated in these countries, would be implemented efficiently, others emphasize that enforcement of laws can be a fundamental obstacle to growth and development. However, weak enforcement mechanisms are seen to stem from weaknesses in enforcing agencies. That is, the coercive power of the state itself is subject to fundamental flaws. This has given a rise to vast literature on fostering good governance in poor countries. Instead of focusing

[55] For example the rule of Law Index indicators show that countries with a lower GDP are also the ones with a poor rating on the rule of Law.

on weak enforcement mechanisms of the State, one can also look at the behavior of individuals on whom a law or a rule is being imposed.

This chapter is divided into three main sections. The first section will discuss the similarity between the idea of cooperation and compliance and how it can be used interchangeably in the context of the context of the framework discussed in the thesis. The basic idea behind this is that both acts of compliance and cooperation are costly acts which are usually undertaken for some future benefit. The second section will present literature on existing theories of compliance. The theories that are covered in this section are broadly classified into two categories – instrumental and normative. The literature will focus on brief history of each theory, its basic arguments and propositions and application of theory in different situations. Also note that the model of mechanism of institutions provided us a framework with which we can compare different sets of institutions in terms of individual's attitude towards compliance. The third section will present literature on two different sets of regulations, in this case traffic and copyright regulations, which then will allow a comparative study to be done on the basis of levels of compliance in different situations reasons for compliance/non-compliance.

4.1 Cooperation and Compliance

In the previous chapters it was mentioned that coordination problems under situations of conflict especially in the presence of information asymmetry, market power, externalities, etc. require cooperative solutions. In simple terms cooperation is defined as all those acts of an individual which are costly to that individual but results in benefiting other individuals.[56] It should be noted that this definition is very similar to undertaking a

[56] Cooperation is a widespread phenomenon in the natural world. So much so that one does not need to look hard to observe that various lifeforms such as insects, birds and animals show behaviour which can be described as cooperative. Such behaviour includes building of hives and colonies by various kinds of insects, living in herds, hunting in packs, vigilance for reducing chances of predation and so on. There is also now evidence that even single celled organisms are capable of cooperative or social behaviour. For more on this see Bower (2004).

prescribed action of a particular institution. It is for this reason compliance with an institution should be interpreted as acts of cooperation.

Basic understanding of cooperation phenomena will establish this link easily. Understanding the phenomena of cooperation has been of particular interest in the field of biology. The reason why cooperation becomes a subject matter of great interest is because cooperative trait is an evolutionary dilemma in the Darwinian framework of natural selection[57]. Cooperative actions not only present themselves as a puzzle in evolutionary biology but also pose a significant moral and philosophical problem as can be seen in works such as McMahon (2000) and Goldman (2006). McMahon starts by asking the question "*Why should one contribute to a mutually beneficial cooperative scheme when one could better promote one's values by defecting and acting as a free rider on the contributions of others?*" It is argued that moralistic principles such as concern for fairness alone cannot on their own solve this problem because it is possible that an individual may come to conclude that there exists sufficient moral reason to act as a free-rider on some cooperative scheme given the moral good that could be generated by diverting resources away from the cooperative scheme towards another scheme will outweigh the incremental moral loss from defection and also from obligation of fairness to contribute. The author tries to solve this problem by introducing the concept of Principle of Collective Rationality which is defined in the following way by the author – "*One has sufficient reason to contribute as provided to a cooperative scheme that produces something that one regards as good if the value to one of the outcome of the scheme, when one's contribution is added to the others that will actually be made, exceeds the value to one of the non-cooperative outcome*." Goldman on the other hand presents the problem in terms of six mutually incompatible propositions all of which seem to be true resulting in a paradox. The propositions are as follows – (1) a rule is justified by the fact that universal compliance with it produces better consequences than

[57] Theory of evolution through natural selection was first introduced by the naturalist Charles Darwin in his book *On the Origin of Species* published in 1859. Over the years many theories and models of cooperative behaviour such as Kin Selection, Direct Reciprocity, Indirect Reciprocity, Network Reciprocity and Group Selection have emerged that provide excellent insights into this phenomena. For a better understanding on these mechanisms interested readers may refer to Hamilton (1964); Wilson (2005) for Kin Selection, Trivers (1971); Axelrod and Hamilton (1981) for Direct Reciprocity, . Alexander (1987); Nowak and Sigmund (1998); Leimar & Hammerstein (2001) for Indirect Reciprocity, Nowak and May (1992); Fowler et al. (2010); Rand et al. (2011) for Network Reciprocity, and Traulsen and Nowak (2006) for Group Selection.

those produced by all acting on their own, (2) each individual can produce better consequences by deviating from the rule, (3) rule itself does not constitute a reason for following it, (4) only ordinary consequential reasoning counts, (5) each individual ought to produce the best consequences in her actions and (6) each individual ought to follow the rule. The author resolves this paradox by focusing on the group as a whole to which a rule may be applied. In the author's words "*a group cannot have an obligation if the members of which it is composed do not share individual obligations to fulfill it. Their individual obligations must be to contribute fair shares to the satisfaction of the group's obligation*." He further asserts that "*if the fulfillment of the group's obligation, the provision of public goods, is more important than what individuals could achieve by their own control of that portion of their wealth, then that money should not be considered theirs to dispose of as they choose*." The important inference from these works is that the dichotomy of individual versus the group has important implications when it comes to the compliance or non-compliance with rules or laws.

4.2 Theories of Compliance

Broadly speaking, literature on compliance behavior can be divided into deterrence theory and normative theory.

4.2.1 Deterrence Theory

The history of deterrence theory of compliance with laws can be traced back to the ideas of classical philosophers like Cesare Beccaria and Jeremy Bentham.[58] Deterrence theory typically relies on changing the incentive structure faced by individuals in a society in such a way that it gets aligned with the interests of the society. The theory works under the assumption that society comprises of rational individuals who weigh the advantages and disadvantages of complying with rules against advantages and disadvantages of not complying and choosing the action which best suits their interests. In other words,

[58] See Raymond Paternoster (2010)

individuals act in their own self interests. It is important to note that acting in self-interest may not be best for the society as a whole. In such cases sanctions need to be imposed by the society so that individuals take action actions which are in the interests of the society. These ideas given by Beccaria and Bentham led to the Rational Choice Theory of Crime[59]. Sanctions play the role of altering the advantages and disadvantages of compliance and non-compliance. Sanctions are typically punishments in the form of fines, imprisonment, etc. Punishment is to be designed in such a way that it takes away any extra benefit that an individual might have gotten if he/she had broken a law. Imprisonment is used for serious offences while fines are used for less serious offences. Severity of punishments is generally proportional to the severity of crime committed.[60] Other than imposition of punishments, deterrence also focuses on detection. By detection we mean both catching an offender once a crime has taken place and/or preventing a crime from happening. Detection basically implies reduced opportunities for committing an illegal act. By reducing the opportunity to non-comply, overall compliance increases in the society. While it is true that both severity of punishment and increased detection work together to increase compliance with laws among individuals in any society, increased detection seems to be the stronger. There are studies which confirm this notion. For example, Gramscik and Bryjak (1980) while reviewing other works which made similar claims question the validity of previous measures of perceived severity and argued that the appropriate hypothesis was never tested with a valid measure. They provide a refined measure of perceived severity which is consistent with utilitarian framework and conclude that the perceived severity, at relatively high levels of perceived certainty, has a significant deterrent effect. Also Daniel Nagin (2013) reviews a large body of evidence for deterrence effect and concludes that the deterrent effect of the certainty of punishment is much greater than that of severity of punishments. Nonetheless, the severity of punishment and increased detection both are important instruments that the lawmakers use in order to obtain higher compliance.

The idea of deterrence can also be understood in two different ways: general and specific. General deterrence can be defined as the impact that the threat of sanctions have on the public as a whole. Specific deterrence refers to the impact of the actual legal sanctions on

[59] See Nagin and Pasternoster (1993)
[60] Beccaria gives this principle in his book On Crimes and Punishment

those individuals who get apprehended. Most of the time regulatory sanctions are based on general deterrence. However the idea of specific deterrence has important applications for recidivism. Smith and Gartin (1989) provided an assessment of the influence of arrest on different dimensions of subsequent criminal activity. The results of their work suggest that specific deterrence hypothesis works differently for different groups. According to this work the specific deterrent effect of arrest for novice offenders likely terminates their criminal careers but for experienced offenders the specific deterrent effect of arrest significantly reduces future incidents of crime but does not completely terminate it. Orsagh and Chen (1988) test specific deterrence hypothesis which suggests an inverse relation between recidivism and time served along with the social bonding effect hypothesis which suggests a direct relation between recidivism and time served. Their eclectic approach points towards the hypothesis that the function that relates recidivism to time served will be U-shaped. The results of their study indicate that the hypothesis is true for some offenders and some particular offences.

Deterrence theory of compliance behavior received further popularity after it got incorporated in the field Economics in 1960s. The emerging field of Law and Economics which dealt with understanding human behavior in response to laws could easily adopt deterrence approach due to its reliance on assumption of rationality and self-interest among individuals. One of the first economic models of deterrence can be found in Becker (1968), which to this date remains an important theoretical contribution in this field. The economic model presented by Becker suggests that as long as expected utility derived from an illegal activity is greater than expected utility from a legal activity then the individual has an incentive to carry out the illegal act. The condition can be reversed if probability of apprehension and fines are optimally chosen under certain constraints. Mathematically, the model can be represented as follows:

Assume that individuals are risk-neutral. Let y represent the monetary benefits accruing to an individual from a criminal activity and let x represent the opportunity cost of committing a criminal activity. Also let ρ denote the probability of detection and let Z be the fine imposed.

Expected benefit from a criminal activity can be given by: $(1-\rho)y+\rho(y-Z)$.

An individual will engage in a criminal activity if $(1 - \rho)y + \rho(y - Z) > x$.

The model suggests that ρ and Z are to be set in such a way that the above inequality is reversed.

Also note that the above inequality can be reversed if x rises. Thus, according to deterrence theory an individual can be incentivized to comply with laws by making non-compliance costly through expected sanctions or by increasing the opportunity costs of non-compliance. Deterrence theory suggests that an individual in deciding whether to engage in criminal activity or not will only look at two factors, namely – the expected costs through sanctions and opportunity cost of criminal activity.

Since the publication of Gary Becker's paper the literature on rational choice of crime has been growing steadily. Stigler (1970) builds a theory of rational enforcement of law based upon the economic model of crime as given in Becker. Ehrlich (1973) provides a theoretical and empirical study of participation in illegal activity and concludes that the deterrent effect is present. The rational model of crime has also been applied to the field of tax evasion. Allingham and Sandmo (1972) presented a model of choice between tax evasion and tax compliance based on the assumptions of rational and self-interested individuals. In this economic model tax rate also becomes a variable of interest along with probability of detection and magnitude of fines. Their results suggest that the effect of tax rate on actual income reported is ambiguous implying a clear hypothesis regarding tax evasion and tax rate cannot be formed. But the model is unambiguous when it comes to positive shifts in penalty rate and probability of detection. Any positive shift in either will reduce evasion. Furthermore, Becker and Stigler (1974) provide an economic model of malfeasance by public officials which have implications for quality of enforcement of legal rules. They discuss measures that can be taken to reduce malfeasant practices by the officials. One of the main results from their analysis is that when detection of malfeasant action is uncertain the key to reducing such activity is to change the salary structure of public officials. According to the authors the salaries of enforcers should be increased by an amount that is inversely related to the probability of detection, and directly related to the size of bribes and other benefits from malfeasant practice. This measure essentially raises the opportunity cost of committing malfeasance which then acts as an incentive to not engage in such practices.

Deterrence theory provides a standard way of looking at compliance behaviour of individuals in any kind of regulatory setting. Though the theory offers sound arguments for why one could observe high or low compliance with a particular institution/regulation it has been found as an inadequate explanation for the question why people obey rules. The idea of deterrence itself has been criticized by many on several grounds.[61] A classic example in this regard is that of tax compliance. Most tax compliance literature suggests that the economic model of tax compliance given by Sandmo and Allingham overestimates non-compliance levels. The studies have shown that shown that in spite of facing a low probability of detection and low expected penalties, people have been honest and have paid their taxes. Andreoni, Erard and Feinstein (1998) provides a detailed review of literature on tax compliance both theoretical and empirical. Their review offers a detailed discussion on tax compliance posed as a problem of law enforcement, public finance, etc. In their review several studies were cited which confirmed inadequacy of deterrence theory in explaining higher levels of tax compliance. It is important to point that tax evasion still happens and results in huge revenue losses for governments. However, it is not at a level that deterrence theory would suggest which leads into an inquiry into finding other explanations. One of the main suggestion of this review work was that diverse psychological, moral, and social influences on compliance behavior should be explored and that they be incorporated into standard economic models.

As far as the effect of deterrence on compliance with traffic regulation is concerned the evidence seems to be mixed. Dunbar et al. (1987) argue that introduction of random breath testing has been very successful in curtailing incidences of drinking and driving in Finland. Breath testing increases the probability of detection which ultimately resulted in lowering of death and injury due to accidents. Ross (1975) analyzes and tests the validity of a widespread belief among the Scandinavian public that suggests that tougher regulation against traffic violations especially drinking and driving have reduced the incidence of such deviant acts. The results of his work indicate that no adequate proof for the above belief

[61] For more information see Kennedy (1983)

exists. Votey Jr. (1982) challenges the view given by Ross. In his own study he concludes that there is a solid support for effectiveness of control theories or simply put deterrence. Hingson et al. (1988) study the effect of introduction of new legislations traffic movement across several states in the United States. Their study indicates that tougher legislations do deter people from taking deviant actions initially but ultimately fail to bring a steady long term decline. Also Hansen (2015) offers evidence of effectiveness of punishments and sanctions in reducing recidivism among drunk drivers. The author investigates three primary ways, namely incapacitation, rehabilitation and deterrence that could explain reductions in recidivism and concludes that deterrence seems to be the primary channel.

Another study by Meier and Morgan (1982) looks at the changes made in public policy relating to lowering of The National Maximum Speed Law (NMSL) and compliance attitude towards this change. The basic objective in this study was to explain high lack of compliance with the law. Furthermore, Ross (1981) in his report to U.S. DEPARTMENT OF TRANSPORTATION asserts that public campaigns discouraging drivers to drink and drive were more effective in reducing drinking driving problem. The report however does suggest that this reduction may have been caused due to drivers overestimating the probability of getting caught as a result of widespread campaigns.

The shortcomings of deterrence approach to understanding compliance have led towards social norms based explanations of compliance. These models generally employ behavioral models which are different from strictly rational and self-interest models of behavior. This approach is known as normative approach of understanding compliance. Normative approach suggests that there are other motivations at work which explain why people comply with laws.

4.2.2 Legitimacy Theory

Thomas Franck (1988) proposed a legitimacy theory of compliance wherein he studies the reason as to why states obey laws in the absence of coercion. His study focuses on compliance with international laws by the States. According to Franck "*in a community* *organized around rules, compliance is secured - to whatever degree it is - at least in part by perception of a rule as legitimate by those to whom it is addressed."* The legitimacy theory suggests that legal authorities can increase compliance with laws if they can make the people for whom the law is intended feel that they have a legitimate authority to guide their behavior. Legitimacy obliges people to obey rules. Several empirical studies have been done testing the legitimacy theory of compliance. Tyler (2006) provides a review of studies done on legitimacy as an empirical and theoretical issue as well as the results of his own study. Tyler examined legitimacy in two ways – (i) perceived obligation to obey the law and (ii) support for legal authorities. The study concludes found that there exists a strong feeling of perceived obligation to obey the law. However, evidence for support for legal authorities was found to be weak. Jackson et al. (2012) extended the idea presented in the works of Tyler and develop a new definition of legitimacy based both on obligation to obey and moral alignment. Moral alignment here refers to the idea of unity of purpose and values. According to the authors in the obligation to obey law is stronger when the general public shares the same moral values with law enforcement agencies. They test this hypothesis and conclude that when people feel obligated to obey the police and morally aligned with officers, they are more likely to comply with the law. Kuperan and Sutinen (1998) study compliance behavior of fishermen facing a regulation banning them from fishing in certain zones. The study did not find a strong relationship between legitimacy and compliance. The concept of legitimacy is seen as important for legal authorities as it allows legal authorities to achieve higher levels of compliance without stricter sanctions. Legitimacy theory suggests that as long as individuals in a society believe that rules imposed on them was brought through a fair procedure and for fair reasons, the individuals will comply with those rules even if it does not benefit them directly. It is possible that legitimacy may work to some extent but its importance should not be overestimated. If legitimacy is a valid explanation of compliance behavior of individuals then one should observe similar levels of compliance levels for different laws with same deterrent effect. This however is rarely true as individuals break many rules which are legitimate. For example, The BSA Global Software Survey 2016[62] found that nearly 39 percent of software installed on PCs around the world in 2015 was not properly licensed. The report indicates

[62] See globalstudy.bsa.org/2016/countries.html

that the trend of software piracy is showing modest decline, though the actual incidence can still be regarded as high. The report also gives region/country wise information on rates of unlicensed software as well as the commercial value of unlicensed software. The data revealed considerable regional variations in rates of unlicensed software ranging from 17 percent in US to 58 percent in India to 88 percent in Venezuela.[63] The key insight that can be drawn from this is that software piracy is quiet common among people even in countries which are less corrupt and where rule of law is well enforced.

4.2.3 Social Norms Theory

Social scientists have also focused on influence of social relations, personal values and personal morals on compliance behavior of individuals. Ajzen and Fishbein (1980) developed theory of planned behavior action which states that individual behavior is driven by behavioral intentions where behavioral intentions are a function of an individual's attitude toward the behavior and subjective norms surrounding the performance of the behavior. These subjective norms are attitudes of peers, family, friends, etc. towards an individual who breaks the law. An individual is less likely to engage in illegal activities if family or friends disapprove committing such acts. Several studies have shown a strong link between social norms and tax compliance behaviour. Bobek et al. (2013) using a taxonomy of social norms given by Cialdini and Trost[64] study the role of social norms in tax compliance behaviour. The results of their study suggest that individuals' standards for behavior/ethical beliefs (personal norms) as well as the expectations of close others (subjective norms) directly influence tax compliance decisions, whereas general societal expectations (injunctive norms) and other individuals' actual behavior (descriptive norms) have an indirect influence. Dwenger et al. (2016) in their study on extrinsic and intrinsic motivations for tax compliance provide evidence of importance of intrinsic motivations and further suggest that intrinsic motivations do not crowd-out extrinsic motivations.

[63] It should be noted that even though the actual rate of unlicensed software is low in US the commercial value of unlicensed software is considerably higher than countries like India where the rate of unlicensed software is much higher.
[64] See Cialdini and Trost (1998)

Several other studies also confirm a strong relationship between tax morals and tax compliance behavior. [65]

Conner et al. (2007) apply theory of planned behavior to predict breaking speed limit rule by drivers. They conclude that individuals' propensity to engage in speeding is based upon their intentions to speed and lack of moral norms not to speed. Phau and Ng (2010) use theory of planned behavior as a framework to analyze three factors namely – personal, social and perceived behavioral control, affecting consumers' attitudes towards pirated software. The result of their study is mixed in the sense that only personal factors showed a significant relationship. Personal morals also play an important role in guiding compliance behavior. Douhou et al. (2011) analyzes the perception of severity of small crimes to understand why social norms[66] differ across different socio-economic groups. Also Balestrino (2007) presents a theoretical model of digital piracy explaining how a social norm condemning digital piracy does not arise due to lack of perceived social costs. This line of thought mostly focusses on how social norms that condemn non-compliant behavior with a reference to a particular law comes into existence. Typically, emotions such as shame and guilt play an important role in formation of a norm. Typically, guilt and shame have strong negative connotations attached to it which damages or harms the reputation of individuals. Therefore, they can be considered as a cost to an individual. A simple model of how social norms can affect behavior is given below:

Assume that individuals have a choice of either complying with a rule or not complying with a rule. Assume that non-compliance offers them a direct benefit B but also results in "Shame cost" of C. It can be assumed that the direct benefits of non-compliance are independent of the number of non-compliant agents. However, the costs of non-compliance are assumed to be dependent on how many others in the society do not comply. It is generally observed that individuals feel less guilty about breaking rules when they see others breaking the same rules. That is, an individuals' inhibition to break rules is lessened

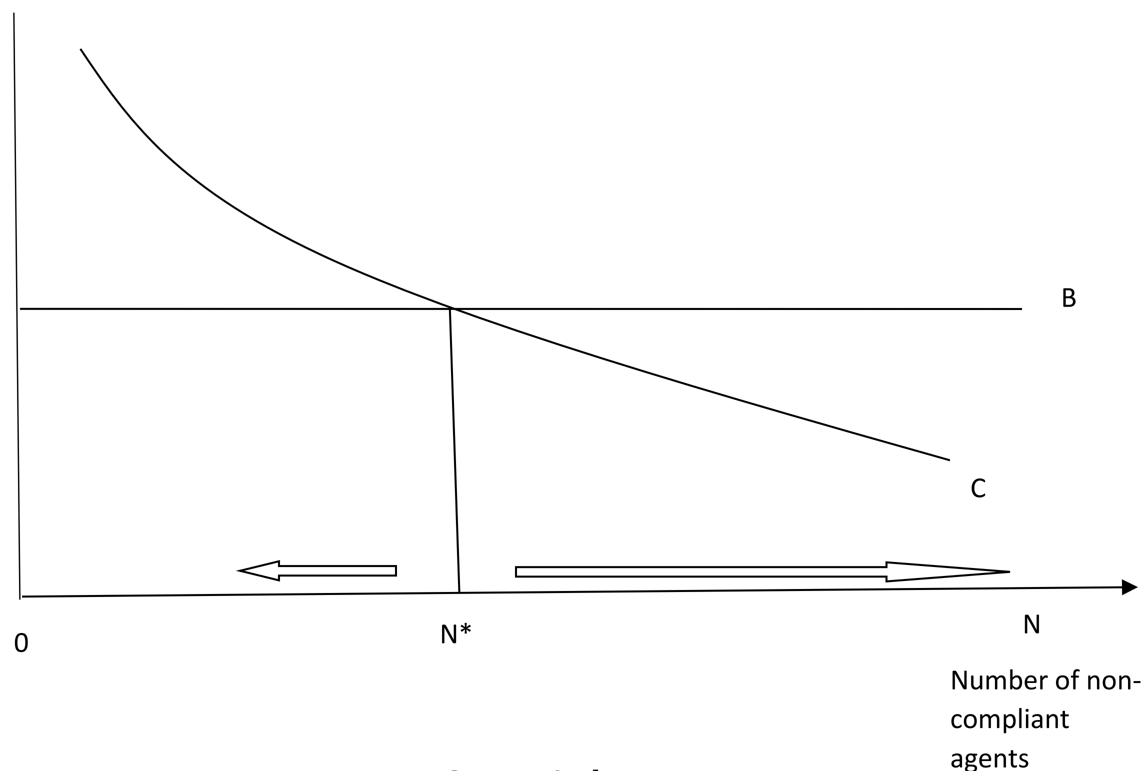
[65]See Ken Davos (2013) Pg. 29.

[66] Social norms here is understood as internalization of obligation associated with legal sanction by large number of people. For more see Cooter (1998)

if they observe that many others are also doing the same. Thus it can be safely assumed that the shame costs are a decreasing function of the number of non-compliant agents.

These stylized facts can be put in a simple figure as shown below:

Figure 2: Compliance model based on norms



Source: Author

Even in this very simple model several interesting features present themselves: The value N* would under our assumptions be the number of non-compliant agents in this society. But this is an unstable value as can be seen since C(N) > B for all N < N* therefore full compliance will be the outcome for all N < N*. Similarly B > C(N) for all N > N* and therefore complete non-compliance would be the equilibrium if N is to the right of N*. Thus there are three Equilibria, (0, N*, N) out of which 0, and N are stable. This means that wherever social norms are acting as motivating factor of compliance one should often observe either full compliance or no compliance at all. Full compliance or no compliance will be a common observation. The real world however is more complicated than what this model depicts. In almost all instance of compliance with rules, there exists a proportion of the population that does comply side by side with those who do not.

4.2.4 Focal Point Theory

Richard McAdams (2000) proposed a new theory of compliance behavior which he called Focal Point Theory of legal compliance. According to focal point theory law acts as an instrument which makes a particular outcome more salient than others usually in a strategic situation of a coordination failure problem which allows individuals to coordinate their behavior towards that outcome. In addition to that McAdams claims that law has another expressive function which is information function. Laws tell individuals about the possible risks attached with particular action. Law provides a framework for predicting what other individuals will do. This theory suggests that an individual complies with laws because he expects that the other individual is also doing the same. McAdams and Nadler (2005) test the influence of law on behavior under the Hawk/Dove or Chicken game setting. The objective of the study was to investigate how third party talks influences the behaviour of players in that game setting. The results of this study suggest that despite the conflict of interest among the players, messages that point to an equilibrium tend to produce that particular outcome. In another study, McAdams and Nadler (2008) tested the hypothesis that law can influence compliance simply by making one outcome salient. They undertook two experiments to test this hypothesis and in both of them it was found that laws can create a focal point around which people coordinate their actions. The first experiment that they did replicated a scenario of property dispute under the Hawk/Dove game setting and the second experiment they worked with replicated a scenario of contract dispute involving a commercial transaction under the Battle of Sexes game setting. Furthermore, Funk (2007) empirically analyzes the effect of a hardly sanctioned law. Her study on voter turnout in Switzerland found that legal abolition of the minimally fined voting duty significantly decreased voter turnout. She concludes that this result was consistent with presence of expressive function of law.

4.2.5 Social Learning and Environmental Constraints Theory

Ralph Hertwig looks to answer the question ‘Do legal rules rule individual behavior?’ and suggests that psychological rather than legal principles govern human behavior.[67] According to him chief psychological principles that govern individual behavior are *social learning* and *environmental constraints*. Social learning is the process of acquiring a preference by observing others. Imitation is a social learning trick through which individuals can act in accordance with practices of his social group. The assertion made by Hertwig here is that when social practices are aligned with legal rules, an individual through observation will behave consistently with laws. The second psychological principle that guides individual behavior is environmental constraints. These constraints are usually physical, semantic, cultural and institutional. Environmental constraints influences individual behavior by first narrowing down the set of possible actions followed by making the desired action more obvious indicating individuals which action to take.[68]

4.2.6 Hypothesis based on previous Chapter

The analysis done in previous chapter also suggested a hypothesis for compliance. The hypothesis was stated as: *The tradeoff between the cost of following an institution and the indirect benefits obtained through generation of positive external effects acts as a major motivation for compliance or non-compliance. If the perception that the indirect benefit through positive external effect will outweigh the direct cost of following the institution exists then one can observe compliance if the indirect benefit through positive external effect does not outweigh the direct cost of following the institution then non-compliance will be observed.* Since compliance decision is based on a trade-off between getting indirect benefits through positive external effects and getting the direct benefit of avoiding disutility associated with compliance we shall call this hypothesis the *Trade-off Hypothesis of Compliance.*

---

[67] See Heuristics and Law (2006), chapter 18.
[68] This argument is very similar to Focal Point theory discussed above.

It has been seen that compliance behavior of individuals can be looked at in many different ways. Each theory has its pros and cons. In some cases deterrence theory works well as an explanation of compliance behavior while in some other cases normative theories like legitimacy, social influence, etc. work better. Compliance is a complex behaviour because there are several reasons why a person may choose to comply. The other layer of complexity that comes about is due to the possibility of observations being same even if the reason is different. For example, one individual may choose to comply because of perception of high risk of getting caught but some other individual may take the same action only because of peer pressure and having no regard for fines or punishment. One of the main objectives of this thesis is to compare how each theory/hypothesis compares relative to one another under different circumstances.

4.3 Comparing Two Institutions

We have already seen that laws and regulations or institutions in general affect several aspects of our lives. Each set of regulations is promulgated for different objectives. In this section we will consider Traffic regulations and Copyright regulations.

4.3.1 Traffic Regulation Literature

The primary purpose of traffic regulations is to ensure safety and smooth flow of traffic. These regulations restrict several activities of both the riders as well as pedestrians with the objective of preventing accidents. Traffic violations can in general be classified in 5 categories namely - driving, parking, vehicle, documents and other miscellaneous. A World Health Organization report on road safety titled "GLOBAL STATUS REPORT ON ROAD SAFETY 2018" has shown that the number of road traffic deaths has been continuously and steadily rising, reaching 1.35 million in 2016. The report further reveals some alarming facts. For example, it is now confirmed that road traffic injuries are now the leading cause of death for children and young adults aged 5–29 years. In fact, Road traffic injuries are the eighth leading cause of death for all age groups implying that road traffic injuries are now a bigger health safety concern than diseases like HIV or tuberculosis. The report also focuses on importance of bringing out legislations for effective speed management, driving under influence, use of helmet and seat belts, etc. It is heavily suggested that a majority of road accidents and deaths are caused by speeding, drunken driving, callous attitude towards wearing helmet or using seat belt. For example, estimations show that alcohol related deaths on road alone roughly make up 5–35% of all road deaths.

Cauzard and Quimby (2000) study the general attitude of motorists towards traffic regulations. The authors used SARTRE (Social Attitudes to Road Traffic Risk in Europe) database which includes results from 13 EU countries and contained interviews with nearly 15 thousand drivers. In this analysis they computed a single enforcement index using Multiple Correspondence Analysis (MCA)[69] technique which measured the way drivers in European Union countries viewed the enforcement of traffic regulations and compared the results on the basis of several differences in individual characteristics like gender, age, driving experience, etc. The conclusion of their analysis reveals – (1) drivers who are female, old, married or widowed, professionally non-active, with low annual kilometrages, long driving experience and reporting no involvement in road accident, are more likely to be in favour of enforcement of traffic regulations. (2) drivers who are male, young, single, professionally independent, with high annual kilometrages, short-to-medium driving experience and reporting having had road accident(s), are more likely to be opposed to enforcement of traffic regulations and (3) family income level and level of education showed no effect on attitude towards enforcement of traffic regulations. The inference that we can draw from this is that attitudes towards traffic rule often depend on individual characteristics such as age gender, income, etc. These characteristics also should be factored in when undertaking a study on compliance.

Some India specific studies related to traffic regulations and road accidents are discussed below. Dandona et al. (2006) studied traffic law enforcement undertaken by police with the objective of reducing non-compliance with traffic rules in Hyderabad city for the period

[69] **Multiple correspondence analysis** (**MCA**) is a data analysis technique for nominal categorical data, used to detect and represent underlying structures in a data set. It does this by representing data as points in a low-dimensional Euclidean space.

2001 to 2003. This study revealed that violations relating to driving and parking were the most common in the time period that was studied. Disobeying traffic signals was the most common violation recorded by the police. The study also revealed that only 0.6 traffic personnel are available per 10,000 people in the city implying the perceived risk of being detected and punished for a violation is low. As far as the two most severe driving violations, namely drunken driving and speeding, the study reveals that in Hyderabad, the proportion of challans issued for speeding and driving under the influence of alcohol was less than 0.1 and 0.3%, respectively. Shami (2005) reveals that the economic cost of deaths and the injuries due to traffic accidents in 2002 was about 1.64 per cent of the GDP and if the damage to the vehicles is also taken into consideration the cost comes to about 2 per cent of GDP which is unusually high. The study further revealed that the rate of accidents among the vulnerable road users (VRUs), that is, pedestrians, bicyclists, is very high. About 60 – 80 percent of total road fatalities are constituted of VRUs. Singh (2016) studies road accidents in India at three levels – national, state and metropolitan. One important conclusion regarding cause of accidents or deaths is that several factors are responsible for accidents and chief among them was found to be drivers' fault with drivers' fault alone accounting for 78% of total accidents in 2013. Similarly, Goel and Sachdeva (2016) studies the characteristics and trend of road accidents on a selected stretch of NH-1 between RD 98 km and 148 km by using a four year data. One of the findings in this study show that head on/rear end collisions is caused mainly due to overspeeding/driver's fault which account for 46% of the accidents. Verma et al. (2011) discuss the issues with road travel safety in India. They argue that road safety is a function of four factors namely, factors influencing exposure to risk, factors influencing crash involvement, factors influencing crash severity and lastly factors influencing post-crash injuries. They propose that to improve road travel safety licensing process needs to be changed gearing more towards making drivers more alert towards their surroundings through training and education.

Petridou and Moustaki (2000) review behavioral factors that contribute towards majority of road traffic crashes and provides a classification of such behavioural factors. According to the authors the behavioural factors can be distinguished on actions that reduce capability and actions that promote risk taking both in short term and long term periods. Several actions come under these categories but chief among them are alcohol consumption and speeding. Risk of road traffic crashes are significantly higher due to alcohol consumption and speeding. Kenkel (1993) enunciates the consumer optimization problem of two activities – drinking and driving, both of which are treated as source of utility. This particular optimization problem allows us to generate a demand curve for drinking and driving behaviour. The model specification is then complemented with economic theory of deterrence. In this framework the key feature of the optimization problem is that driving after drinking a certain amount is not only risky but also illegal. Given that there are two ways of reducing demand for drunk driving - deterrence policies that directly increase price of drunk driving and alcohol-control policies that reduces the complementary activity of drinking, the main purpose of this study was to empirically estimate the own and cross-price effects on the demand for drinking and drunk driving. The results suggest that both deterrence policies and alcohol-control policies including taxation can be effective methods reduce heavy drinking and drunk. McCornac (1982) and Wilkinson (1987) use a slightly different analytical framework for understanding drunken driving behaviour. In this framework the assumption is that the individuals maximize utility over two time periods – present and future, with the additional condition that there is a probability of fatal accident or death in the future time period due to the risky nature of drunken driving behaviour. Both studies then focus on policy measures which will reduce incidence of drunken driving. The study by McCornac focuses only on the effect of single policy measure, that being minimum legal purchasing age. This study reveals that raising minimum age reduces risk of accident and fatality. The study by Wilkinson on the other hand incorporates several policy measures to provide a better comparative results on relative effectiveness of each different policy. The results of this study suggest that deterrence policy is largely ineffective at a particular level in terms of marginal effect. But other policies such as raising minimum age, strict enforcement of speed limits, and early closing time of drinking outlets were all effective in reducing road fatality.

Based on above literature one can infer a few things about traffic related situations. Firstly, attitudes towards traffic regulations depend on individual characteristics such as age, income, and sex. Secondly, incidence of traffic violations are very high. This point is pretty clear from the fact that large number of road accidents which are great in number all across the world happen due to violations. The actual number of violations are likely to be even greater since not all violations end up getting detected or cause an accident. Thirdly, the actual probability of getting caught while breaking traffic rules seems to be low. The literature suggests that countries across the world are lacking in both manpower and technology to allow the probability of detection to go up to an appropriate level.

4.3.2 Copyright Regulation Literature

Copyright rules exist to reward creators of original content and to incentivize creation of new content. Economic theory suggests that the supply of reproducible creative works will fall below its socially desirable level in competitive markets. That is because important aspects of such works have characteristics similar to those of a public good. Handke (2011) describes the short run as well as the long run benefits and costs of copyright system. The short run benefit of copyright is that it provides greater revenues to right holders which then in the long run acts as an incentive to provide/supply more original content. Short run costs are access costs to users, administration costs and transaction costs and in the long run copyright system may also obstruct user innovation due to higher costs of compliance.[70] Violations of copyright regulations are called copyright infringements. The advent of internet and digital era has made copyright infringements more commonplace since the new digital era made copying and distributing copyrighted materials even easier than before. Illegal downloading, file sharing, making unauthorized copies and distributing, etc. are actions that come under copyright infringements. As was discussed in the previous section such activities are quiet common even in developed countries where the protection of property – both tangible and intangible, is high. Several studies also seem to suggest that attitudes towards illegal downloading/copying depends on factors such as age, sex, etc. For example, Tjiptono et al. (2015) show that males are more positively predisposed towards digital piracy than females. Higgins (2006) also conclude that significant gender differences exist when it comes to software piracy. However, Al-Rafee and Cronan (2006) in a study examining factors that influence an individual’s attitude toward pirating digital material conclude that while gender differences were present, they

[70] For more on costs of innovation see Handke (2011)

were not significant enough. But when considering the age factor as an influence on attitude their findings show that older subjects have a lower (less favorable) attitude towards digital piracy than younger subjects. Moores and Esichaikul (2011) examine the role of age, gender, and work experience on the propensity to buy, share, and use pirated software. Their conclusions suggest that there exists differences based on gender, age and years of work experience.

One reason why intellectual property rights violations are high is due to lower perception of deterrence. Given the public nature of the good preventing theft of it is rather difficult. Groennings (2005) presents a thorough discussion on attempts of recording industry's to prevent copyright violations along with a discussion on costs and benefits of reducing copyright violations through increasing litigations against individuals. The article suggests that increased threat of sanctions do deter people from engaging in downloading/sharing initially but the decline does not get sustained in long term. Individuals find other ways of avoiding detection[71] while engaging in illegal downloading/file sharing. Large scale infringements pose two serious challenges: possibility of reduced revenue for the industry and possibility of lowering incentives to create new content.

Substantial academic literature exists which focuses on these issues. For example, Zentner (2006) in his study of impact of file sharing on music sales shows that that peer-to-peer usage reduces the probability of buying music by 30 percent. The author also asserts that the results indicate that sales would have been around 7.8 percent higher in 2002. Liebowitz (2006) provides an account of history of file sharing and suggest that number of file sharers have consistently been rising and also that there has been a significant decline in sound recording sales even after the shutting down of Napster. The paper further reviews the impact of other factors on declining sales such as album prices, income, music quality, etc. The author concludes that the impact of all other factors is not a significant one and that file sharing alone can account for the declining sales. Rob and Waldfogel (2006) demonstrate that downloading displaces sales among a convenience sample of college students. To be precise their results indicate that an additional download reduces sales by

[71] Typically such ways include using less popular file sharing platforms, using a secure VPN connection which gives high privacy, etc.

between .1 and .2 units and that downloading reduced expenditure by about 10 percent among the individuals who were sampled. There are also studies which suggest that the link between illegal downloading/file sharing and sales displacement is weak. For example, Oberholzer-Gee and Strumpf (2007) find that file sharing has had no statistically significant effect on purchases of the average album. Similarly, Andersen and Frenz (2010) do not find that P2P downloads are associated with fewer CD album purchases. On the whole, one can say that even though there are a few exceptions most studies suggest or rather conclude that illegal downloading/ file sharing has a negative impact on sales in music industry. The same holds for movie industry as well. DeVany and Walls (2007) using the data for box office revenue and supply of pirated content as primary data find that piracy caused a 40 million dollar revenue loss to the motion picture studio that produced the movie. Bai and Waldfogel (2012) use a survey of college students in China and find that 75% of Chinese movie consumption is through pirate channels, and that each instance of unpaid consumption displaces about 0.14 paid sales. Hennig-Thurau et. al (2007) study the attitude of German consumers and find that illegal file sharing does impact on movie theater box office revenues. They claim that the consumers' intentions to view an illegal copy of a new movie reduces the consumers' propensity to attend theaters. On the other hand, Zentner (2010) tries to measure the effects of peer-to-peer file sharing on the movie industry. The results of this study show that the video sales are negatively affected by peer-to-peer file sharing but the impacts of file sharing on theatrical performance is statistically insignificant.

As far as the second issue is concerned, the evidence as to whether file sharing impacts the supply of creative works is very little. There are very few studies which have looked at this issue. One such study is Waldfogel (2012). In this study the impact of music piracy on the supply of new music is measured. The paper concludes that the evidence thus far indicates no decline in the volume of new recorded music products since the appearance of Napster on internet. Danaher et al. (2014) approach this issue from a theoretical perspective while discussing why literature on this issue is scarce. They propose that that there is strong theoretical rationale for governments to consider the possibility that file sharing may negatively impact social welfare even when a conclusive proof that piracy lowers incentives for creation of new content does not exist at the moment. A proximate way of establishing link between impacts of copyright infringements on supply of new products is to establish a link between protection of intellectual property and innovation through growth in research and development. Kanwar and Evenson (2003) find evidence of a strong positive influence of intellectual property protection on Research and Development investment. If the results of this study are to be taken as true then it is not far-fetched to imagine that supply of new products will be greater whenever there is greater investment in research and development.

Once again based on above literature we can infer a few things. Firstly, differences in individual characteristics play a role in determining attitudes towards copyright regulations. The inference is same as the one that we drew for traffic regulations. Secondly, just like traffic violations, the actual incidence of copyright violations also seems to be high. There is evidence of huge losses in revenue to the music industry, movie industry, software industry, etc. Thirdly, the probability of detection of wrongdoing is again low in case of copyright violations similar to traffic violations.

This similarity between traffic regulations and copyright regulations make it easier to compare the two in terms of attitudes towards compliance and comparing which reasons are primary motivators of taking a particular action. Based on the framework presented in the previous chapter we can enunciate propositions on compliance levels of two comparable institutions.

4.4 Propositions on Compliance Levels of Two Comparable Institutions

If the hypothesis that *the tradeoff between the cost of following an institution and the indirect benefits obtained through generation of positive external effects acts as a major motivation for compliance or non-compliance* is true we can derive some important propositions for compliance and comparability of institutions. Let us assume that there are two different institutions and denote them I_A and I_B. Based on the formal model presented the two institutions will differ from each other on magnitude of two factors: $(\overline{\gamma} - \underline{\gamma})$ and $\frac{\sum_{i=1}^{n} L_i}{n}$. Further assume that both I_A and I_B satisfy first efficiency condition. Comparing the two institutions on the basis of magnitude of $(\bar{\gamma} - \underline{\gamma})$ and $\frac{\sum_{i=1}^{n} L_i}{n}$ will result in three possibilities which can be stated in terms of three different propositions -

Proposition 1: I_A and I_B differ in terms of magnitude of $(\bar{\gamma} - \underline{\gamma})$ but have the same magnitude of $\frac{\sum_{i=1}^{n} L_i}{n}$. Suppose that the magnitude of $(\bar{\gamma} - \underline{\gamma})$ is greater for I_A than it is for I_B. Then given that average loss of utility imposed by the two institutions is same one can expect a higher level of compliance for I_A.

Proposition 2: I_A and I_B differ in terms of magnitude of $\frac{\sum_{i=1}^{n} L_i}{n}$. but have the same magnitude of $(\bar{\gamma} - \underline{\gamma})$. Suppose that the magnitude of $\frac{\sum_{i=1}^{n} L_i}{n}$ is greater for I_A than it is for I_B. Then given that the measure of gain in utility through positive external effects is same one can expect a higher level of compliance for I_A.

Proposition 3: I_A and I_B differ in magnitude of $(\bar{\gamma} - \underline{\gamma})$ as well as $\frac{\sum_{i=1}^{n} L_i}{n}$. Suppose that magnitude of $(\bar{\gamma} - \underline{\gamma})$ is greater for I_A than it is for I_B but at the same time the magnitude of $\frac{\sum_{i=1}^{n} L_i}{n}$ is lesser for I_B than it is for I_A. In this case it is difficult to suggest for which institution one may observe a higher level of compliance. It would depend on which factor is more dominant.

The previous chapter had a discussion on why magnitude of $(\bar{\gamma} - \underline{\gamma})$ as well as $\frac{\sum_{i=1}^{n} L_i}{n}$ may differ. The basic idea was that institutions satisfies different needs and therefore the measure of gain in utility through positive external effects may differ from institution to institution. This is because human needs are also hierarchical and satisfaction of certain needs takes precedence over others. Similarly, the difference in average loss of utility could be explained on the basis of existence of monetary and non-monetary costs.

4.5 Conclusion

The main purpose of this chapter was to review existing theories of compliance and compare them with the Trade-off hypothesis and also come up with a framework for comparing two different institutions. From the review it was obvious that no particular theory had an advantage over the other theories. In some cases one theory would prove to be a good explanation for compliance while in other cases it would prove not to be a good explanation. Furthermore, the literature review of traffic and copyright regulations allowed us to formulate propositions for comparison in terms of levels of compliance. From the above discussion there are two main questions that emerge which require some attention and must be addressed. The first question can be stated as: What is the primary motive of an individual when it comes to decision to comply or not comply? The primary motive to comply or not comply may differ from individual to individual and also may differ depending on the context. The second question can be stated as: Under which contexts can we expect higher levels of compliance? The main focus of the next chapter is to discuss the methodology of testing which hypothesis will emerge as primary reason for taking compliance/non-compliance decision under different scenarios or context and also test whether or not there is a significant difference in attitudes towards compliance when comparing different scenarios.

Chapter V: Empirical Verification: Testing for Hypothesis and Propositions and Discussion of Results

5 Introduction

The focus of the previous chapters was to enunciate the process through which institutions improve social welfare. This was done with the help of a formal model. One implication of the model was regarding the issue of compliance with institutions. The model suggested that the tradeoff between the cost of following an institution and the indirect benefits obtained through generation of positive external effects acts as a major motivation for compliance or non-compliance. There are other motivations at play as well which were discussed in chapter III. Chapter III also discussed propositions regarding comparison of two different institutions on the basis of levels of compliance. The main purpose of this chapter is to understand which motivation is dominant and under what circumstances. The literature review on compliance suggests that compliance behaviour is a very complex phenomena. There are multiple influences on an individual’s decision to comply or not comply. Some influences work well on members of society under some circumstances while other influences work better under other circumstances. Two individuals could end up taking same action but for completely different reasons. Furthermore, various regulations may occupy a different place in terms of importance for each and every member of the society. This could be true at the level of society as a whole as well. This adds to the complexity of the phenomenon of compliance behaviour. For a better understanding of compliance with institutions we must compare different situations with each other and also compare how different influences including the one that is proposed in this work fare relative to one another in each of those situations. This will be the primary objective of our study and will be dealt with in this chapter. It is hoped that this study will shed some light on attitudes of members of society towards different rules and regulations and which factors affect their decision. The insight that we would get from this study could prove useful for enforcement agencies as it would allow them to better regulate the actions of individuals by focusing their efforts on the primary influences of the individuals.

5.1 Methodology

To develop a methodology that will allow us to gauge the attitudes of individuals in the society towards different regulations certain caveats must be kept in mind. In the previous chapter it was argued that all institutions have the same basic structure. That is, an institution imposes a cost on members of society and generate welfare through positive external effect which itself is a function of how many members decide to follow the institution. While the structure of any two institutions may be same, the two institutions may widely differ from each other in terms of nature of costs and the welfare generated through positive external effect. For instance, in case of some institutions the cost imposed can be expressed directly in monetary terms like in taxation while in case of other institutions a direct monetary equivalent of the cost imposed by these institutions is not easy to obtain like in case of environmental regulations. Similarly, the benefit attained through positive external effect also differs. Taxation as an institution helps in provision of public goods while environmental regulations are designed for maintaining a certain standard of quality of life. Given how the nature of costs imposed and benefits through positive external effect could differ a direct comparison of one institution with the other becomes problematic.

The second caveat is that each institution has its own relevant or target population. The relevant or target population of some institutions can be big while for others it may be small. In some cases it may be well defined while for others it may be broader. For instance the relevant or target population of taxation is working population of the society and the firms/businesses. The relevant or target population of traffic regulations are vehicle owners, drivers and pedestrians. It is not necessary that the relevant or target population of one institution may cross over to the other institution. Comparison of attitude towards different regulations requires that the relevant population of those institutions be more or less the same. So the challenge then is to pick institutions which can resemble each other. Also it must be noted that different institutions cannot be perfectly similar to each other.

Keeping the above caveats in mind the first task has to be selection of regulations that are more or less comparable. It is to be noted that this selection process has a subjective quality to it. On the basis of literature review done on Traffic regulations and Copyright regulations in the previous chapter we can make a case that traffic and copyright regulations are two sets of regulations that could be compared to each other with relative ease. The grounds on which one can justify comparison of traffic and copyright regulation is low probability of detection when breaking the rules, more opportunities to commit either kind of offences in daily lives and a similar relevant populations for each set of regulation as discussed in previous chapter.

5.1.1 Design of Survey

A survey can be a useful way of collecting data or information on attitudes of different people. The questions that will form the part of the questionnaire will involve hypothetical scenarios where the cost of following the institution will be same and their willingness to comply can be measured directly. This will be an experimental study which will look into the attitudes of respondents towards situations involving traffic regulations and copyright regulations. The benefits of doing an experimental study involving hypothetical scenarios is that respondents will be able to answer questions more truthfully. A direct question regarding breaking rules and regulations is tantamount to admission of guilt which could make respondents answer not truthfully. This could be a possibility even when complete anonymity is guaranteed to respondents. Furthermore the scenarios that will be described would be easily comparable to one another. This will allow us to better understand the attitudes of individuals. There is, however, a drawback of conducting an experimental study. The drawback mainly relates to the applicability of results of a hypothetical study as a proxy for explaining real life phenomena. The problem arises because it is very likely that the observed behaviour of some participants in an experimental study may diverge from the actual behaviour of those individuals when facing the situation described in the study in actual real life. The point that is being made here is that there can be discrepancy between results of an experimental study and actual behaviour in real life. This means that the results of an experimental study should not be taken at face value. However, this problem does not completely negate the usefulness of the study. It only implies that there can be some discrepancy between observed behaviour in the study and actual behaviour in real life and unless one has a reasonable reason to doubt that this discrepancy is large, one can accept the results of the study as a decent proxy for actual phenomena.

The design of the experiment is such that individual respondents/participants will be presented with scenarios where each scenario corresponds to a different institutional setting. Broadly, two of these scenarios relate to traffic regulations setting and the other two scenarios relate to copyright regulations setting. The scenarios were kept as realistic as possible so that the respondents can easily relate to it and imagine being in those scenarios. Each scenario presents two courses of action from which one will have to be chosen. One of these actions corresponds with compliance with regulation whereas the other action corresponds with non-compliance with regulation. We also provide a list of reasons for choosing an action and ask the respondents/participants to rank the reasons which influenced their decision to choose that particular action. Ranking is to be assigned on the basis of importance with the most important reason getting assigned Rank 1, the second most important reason getting assigned Rank 2 and so on. Each reason corresponds with a theory of compliance all of which have been reviewed in the previous chapter. For example, in each scenario the possibility of non-compliance comes with a probability of getting caught and the fine that will have to be paid. The probability of getting caught and fine may be perceived as high or low which would reflect its deterrent effect. Similarly, the scenario describes the restriction that is imposed by the regulation which can then be perceived as being fair or unfair which would reflect the legitimacy aspect of the imposition of restrictions. The scenarios also highlight the justification for imposition of restriction which indicates the trade-off aspect of compliance and non-compliance benefits. In each scenario the expectation regarding actions of other individuals also is an important factor that needs to be considered. Also the approval or disapproval of family, friends and peers will play an important role.

The two tables below will show how each theory presents itself as a reason for compliance and non-compliance. Note that the reasons for compliance and non-compliance are both listed because each theory becomes a reason for takin an action in a different way. For example, suppose a person takes an action only on the basis of deterrence. This person will comply if the deterrence effect is high and will not comply if the deterrence is low. This is true for reasons provided by other theories as well. The relationship between reasons for compliance and reasons for non-compliance will be opposite as long as the same theory is being made the anchor point.

Table 1: Theory/Reason for Compliance

Theory	Reason for Compliance
Deterrence	The probability of getting caught was high or the fine to be paid was high.
Legitimacy	The restriction imposed is reasonable and therefore legitimate
Expectation/ Learning	You either expect or learn that others take this action normally and do the same thing
Social Pressures	People close to you (family, friends, colleagues, etc.) would disapprove if you do not take this action
Trade-Off	Choosing this action gives you a personal benefit which you value and which outweighs the benefits of choosing option (b)
Others	Other reasons

Source: Author

Table 2: Theory/Reason for Non-compliance

Theory	Reason for Non-compliance
Deterrence	The probability of getting caught was low or the fine to be paid was low.
Legitimacy	The restriction imposed by this rule is unreasonable and therefore illegitimate
Expectation/ Learning	You expect or learn that others also take this action and decide to do the same
Social Pressures	People close to you (family, friends, colleagues, etc.) do not disapprove when you take this action
Trade-Off	The benefits of choosing option (b) outweigh the benefits of choosing option (a)
Others	Other reasons

Source: Author

All these influences, which have been listed in the two tables above can be ranked in terms of importance. This will allow us to check the significance of each reason or theory as an explanation for compliance. It is expected that the compliance hypothesis that was enunciated as an implication of the formal model developed in Chapter III stated as - *the tradeoff between the cost of following an institution and the indirect benefits obtained through generation of positive external effects acts as a major motivation for compliance or non-compliance* - should rank high when compared with other reasons/theories in all situations or scenarios. Furthermore, it is expected that compliance levels will differ across these scenarios. This is because in each scenario an individual is placed under a different institutional setting and since different institutions satisfy a different need it follows that the attitudes towards compliance should differ. The study can reveal information on relative strength of pull effect of positive external benefit and push effect of costs of compliance in each of the scenarios which allows for a better comparative analysis on different institutional settings. Detailed questionnaires are presented in the Appendix.[72]

The study was conducted through conducting online surveys. The platform SurveyMonkey was used to collect data on attitudes towards different rules and regulations. Two separate surveys were launched to collect responses of individuals under different scenarios. One survey pertained to scenarios involving traffic rules and the other survey pertained to scenarios involving consumption of copyrighted material. For the first survey on attitudes of motorists a total of 105 responses were collected and for the second survey on attitudes of consumers of digital products a total of 104 responses were collected. All respondents were in the age group 25 to 35. The ratio of male to female respondents in both surveys was roughly close to 6:4 for both the surveys. The respondents could also be divided into different groups on the basis of income earned. On the basis of income three groups were created – between 10 to 15 lacs, between 15 to 20 lacs, and between 20 to 25 lacs. Responses for both surveys were collected through Survey Monkey Audience.[73] Upon closer examination of individual responses it was seen that not all responses could be used

[72] See Annexure A and Annexure B at the end of the chapter

[73] For more information on SurveyMonkey Audience go to https://www.surveymonkey.com/collect/audience/calculator/preview?ut_ctatext=Get+an+estimate&ut_source=market_research&ut_source2=solutions%2Faudience-panel&ut_source3=hero

meaningfully. This was due to errors in collection of data. Some of these problems are discussed below.

The first major problem is that respondents have not followed the instructions properly. One common mistake they have made is that many of them have answered questions which they were supposed to skip. For example, with respect to the question of choosing to hire cab or take own vehicle several respondents have ranked the reasons for both the cases when they were supposed to rank reasons only for the option they chose and skip the ranking of reasons for the other option. This contaminates the true weightage of every reason for both options. Furthermore, for certain questions where the appropriate answer was to be 'Not Applicable', respondents have chosen to give answers Yes or No. In certain responses it was found that there was omission of ranking of few reasons. If only one reason was unranked then it does not create a problem since the missing reason can be ranked appropriately. However if two reasons are unranked then it would be problematic. In addition to these problems some respondents have skipped answering questions altogether. Given all these problems certain corrections were required. All the answers to the questions that the respondents were supposed to skip were to be ignored. The answer 'Not applicable' was used wherever the appropriate answer was 'Not applicable'. If the responses were partial which made them unusable then those responses were not taken into account and were completely removed. Having made these corrections we were left with 94 responses for both scenarios in Traffic survey and 94 responses for scenario 1 and 91 responses for scenario 2 in Copyright survey which could be used for further analyses. It is important to note that while majority of responses correspond to both scenarios there are a few exceptions. This was because certain respondents had only given complete responses for one scenario and left the response for other scenario incomplete.

5.1.2 Discussion on Information that will be derived from the Surveys

The survey was designed to collect information on various aspects of compliance/non-compliance decision. The first piece of information that we will be looking at is the exact number of individuals who choose to comply as well as those who choose not to for each scenario. With this information we can look at the overall compliance or non-compliance levels for each scenario and compare them.

The second piece of information that is of interest is regarding ranking of reasons for the decision that was made. The information on ranking will help us understand which particular reason was the primary motivation of an individual regarding choice between compliance and non-compliance in each of the scenarios. For this we will be comparing how many individuals give each reason a high rank, in particular Rank 1. Also for an overall comparison of relative importance of each reason a weighted average is calculated for each reason or motivation.

The third information that we will be looking at is regarding change in behaviour due to changes in certain specific variables of the base model. It is expected that individuals may change their decision regarding compliance if the cost of following the rule increases, the probability of detection decreases, etc. We can look at under which scenario these shifts are more prominent.

The fourth information that we will be looking at is regarding differences in perceptions due to differences in gender and income. It is possible that the choices made by males may significantly differ from those made by females. Similarly, differences in choices made can also be attributed to differences in income. The effect of gender and income differences may also differ or vary across different scenarios. Understanding these differences may help us better understand behaviour of individuals.

5.2 Results of survey titled "Experimental study on attitudes of Motorists"

5.2.1 Driving under Influence Scenario

For scenario 1 involving the situation of driving under influence 72 individuals chose to hire cab while 22 individuals chose to take their own vehicle. Another way of putting it is that 72 individuals chose to follow the rules while 22 chose to break it. Compliance level for this particular scenario stands approximately at 77 percent. Alternatively one can say roughly four out every five individuals complies with this regulation.

Rankings of Motivations

As far as the motivations of choosing any of the options is concerned the breakdown of rankings is given in the tables below. Table 3 shows the rank-reason distribution of individuals who selected hire cab option and table 4 shows rank-reason distribution of individuals who selected take own vehicle option.

Table 3 (Rank-Reason Distribution – Hire Cab)

	Rank 1	**Rank 2**	**Rank 3**	**Rank 4**	**Rank 5**	**Rank 6**	**Σ**
Deterrence	12 (17 %)	10 (14 %)	12 (17 %)	12 (17 %)	19 (26 %)	7 (9 %)	**72**
Legitimacy	12 (17 %)	14 (19 %)	18 (25 %)	11 (15 %)	9 (13 %)	8 (11 %)	**72**
Expectations/Learning	3 (4 %)	11 (15 %)	10 (14 %)	16 (22 %)	17 (24 %)	15 (21 %)	**72**
Social Pressures	10 (14 %)	15 (21 %)	14 (19 %)	17 (24 %)	10 (14 %)	6 (8 %)	**72**
Trade-Off	24 (33 %)	17 (24 %)	11 (15 %)	9 (13 %)	7 (9 %)	4 (6 %)	**72**
Others	11 (15 %)	5 (7 %)	7 (9 %)	7 (9 %)	10 (14 %)	32 (44 %)	**72**
Σ	**72**	**72**	**72**	**72**	**72**	**72**	

Source: Author's Calculation

Table 4 (Rank-Reason Distribution – Take own vehicle)

Table 2	**Rank 1**	**Rank 2**	**Rank 3**	**Rank 4**	**Rank 5**	**Rank 6**	**Σ**
Deterrence	2 (9 %)	3 (13 %)	3 (13 %)	5 (23 %)	5 (23 %)	4 (18 %)	**22**
Legitimacy	2 (9 %)	4 (18 %)	5 (23 %)	5 (23 %)	2 (9 %)	4 (18 %)	**22**
Expectations/Learning	4 (18 %)	3 (13 %)	5 (23 %)	3 (13 %)	4 (18 %)	3 (13 %)	**22**
Social Pressures	3 (13 %)	5 (23 %)	5 (23 %)	4 (18 %)	3 (13 %)	2 (9 %)	**22**
Trade-Off	9 (41 %)	4 (18 %)	1 (5 %)	4 (18 %)	4 (18 %)	0 (0 %)	**22**
Others	2 (9 %)	3 (13 %)	3 (13 %)	1 (5 %)	4 (18 %)	9 (41 %)	**22**
Σ	**22**	**22**	**22**	**22**	**22**	**22**	

Source: Author's Calculation

Each entry in the table shows the number of individuals who gave a particular ranking to a particular reason. Numbers in the bracket indicate the approximated percentage figures for each entry. From a cursory glance it can be seen that Trade-off hypothesis got assigned rank 1 most number of times. As Table 3 shows, 24 out of 72 individuals who chose to hire cab gave Trade-off hypothesis the highest rank. In other words Trade-off reason was the biggest influence for roughly 33 percent of the total individuals. Similarly, Table 4 shows that 9 out of 22 individuals who chose to take their own vehicle gave Trade-off hypothesis the highest ranking which roughly constitutes 41 percent of the total individuals. The rest of the reasons are more or less evenly spread out. This indicates that for most individuals the tradeoff between immediate benefit of noncompliance and the resulting benefit through cooperative efforts from compliance is the most important reason.

One can also look at how each reason compares with one another. For an overall comparison one could take a weighted average for each reason and compare which reason gets a higher score. The weighted average score essentially acts a score for relative importance of a reason in influencing decision of an individual. Higher the weighted average score of a reason higher would be its relative importance. A simple way of assigning the weights to each rank is to assign six points to Rank 1, five points to Rank 2, 4 points to Rank 3, three points to Rank 4, two points to Rank 5 and one point to Rank 6. A weighted average score for each reason can then be calculated for both courses of action described in the scenario. Table 5 below will show the weighted average score for each reason for both courses of action.

Table 5 (Weighted average score of Reasons – Driving under Influence)

Theory	Weighted Average	
	Hire Cab	Take Own Vehicle
Deterrence	3.48	3.09
Legitimacy	3.79	3.4
Expectations/Learning	2.91	3.59
Social Pressures	3.72	3.77
Trade-Off	4.41	4.45
Others	2.66	2.68

Source: Author's Calculation

On the basis of the weighted average scores one can assert that most influential reason for both compliance and non-compliance decisions under 'Driving under Influence' scenario is the one given by Trade-off hypothesis.

Analysis of Changes in Policy Variables

Results of variable changes in Scenario 1 of First Survey (Driving under influence case)

- For the change in price case out of the 72 who hired cab 24 individuals did not change the action, 40 changed their action and 8 skipped the question
- For the change in probability of detection case out of the 72 who hired cab 25 individuals did not change the action, 41 changed their action and 6 skipped the question
- For the external observation case out of the 72 who hired cab 25 individuals did not change the action, 44 changed their action and 3 skipped the question

Looking at the pattern of change in decision after changes in variables one can see that majority of individuals decided to take their own vehicle. The data indicates that the number of respondents who altered their behaviour roughly seems to be the same in all three cases. This means that no particular variable stands out in comparison with other variables.

5.2.2 Over speeding/Jumping Red Light Scenario

For scenario 2 involving the situation of traffic rules 79 individuals chose to drive within speed limit and not jump red light while 15 individuals chose to engage in overspeeding or jump red light. Another way of putting it is that 79 individuals chose to follow the rules while 15 chose to break it. Compliance level for this scenario stands approximately at 84 percent.

Ranking of Motivations

As far as the motivations of choosing any of the options is concerned the breakdown of rankings is given below. Table 6 and Table 7 below shows rank-reason distribution of respondents who selected drive within speed limits/not jump red light option and respondents who selected engage in over speeding/jump red light option

Table 6 (Rank-Reason Distribution – Drive within speed limit/Not jump Red light)

	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Σ
Deterrence	14 (18 %)	16 (20 %)	11 (14 %)	13 (16 %)	13 (16 %)	12 (15 %)	**79**
Legitimacy	15 (19 %)	13 (16 %)	15 (19 %)	13 (16 %)	15 (19 %)	8 (10 %)	**79**
Expectations/Learning	11 (14 %)	13 (16 %)	15 (19 %)	11 (14 %)	18 (23 %)	11 (14 %)	**79**
Social Pressures	12 (15 %)	13 (16 %)	13 (16 %)	17 (21 %)	12 (15 %)	12 (15 %)	**79**
Trade-Off	22 (28 %)	17 (21 %)	10 (13 %)	14 (18 %)	9 (11 %)	7 (9 %)	**79**
Others	5 (6 %)	7 (9 %)	15 (19 %)	11 (14 %)	12 (15 %)	29 (37 %)	**79**
Σ	**79**	**79**	**79**	**79**	**79**	**79**	

Source: Author's Calculation

Table 7 (Rank-Reason Distribution – Over speeding/Red light Jumping)

	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Σ
Deterrence	5 (33 %)	2 (13 %)	3 (20 %)	1 (7 %)	3 (20 %)	1 (7 %)	**15**
Legitimacy	1 (7 %)	4 (27 %)	2 (13 %)	4 (27 %)	3 (20 %)	1 (7 %)	**15**
Expectations/Learning	2 (13 %)	3 (20 %)	1 (7 %)	4 (27 %)	2 (13 %)	3 (20 %)	**15**
Social Pressures	3 (20 %)	2 (13 %)	4 (27 %)	3 (20 %)	3 (20 %)	0 (0 %)	**15**
Trade-Off	3 (20 %)	3 (20 %)	4 (27 %)	0 (0 %)	3 (20 %)	2 (13 %)	**15**
Others	1 (7 %)	1 (7 %)	1 (7 %)	3 (20 %)	1 (7 %)	8 (53 %)	**15**
Σ	**15**	**15**	**15**	**15**	**15**	**15**	

Source: Author's Calculation

On the basis of the data presented in the tables above one can see that Trade-off hypothesis got assigned rank 1 most number of times at least by individuals who chose to follow rules. As Table 6 shows 22 out of 79 individuals who decided to drive within speed/ not jump red lights, which roughly constitutes 28 percent of the total sample, gave Trade-off hypothesis the highest ranking. Data in table 7 indicates that for a majority of individuals, roughly 33 percent of the sample, the perception of lower deterrence effect was the primary motive of non-compliance.

Again for an overall comparison, one can calculate the weighted average scores of each reason for both courses of action presented in the scenario. Table 8 below shows these weighted average scores.

Table 8 (Weighted average score of Reasons – Over speeding/Jumping Red light)

Theory	**Weighted Average**	
	Within speed limit/Not jump red lights	**Overspeed/Jump Red Lights**
Deterrence	3.6	4.13
Legitimacy	3.69	3.53
Expectations/Learning	3.43	3.33
Social Pressures	3.5	3.93
Trade-Off	4.1	3.8
Others	2.67	2.26

Source: Author's Calculation

From the above table it can be seen that the weighted average score of Trade-off hypothesis and Deterrence hypothesis is highest for the case ‘Within speed limit/Not jump red lights’ and ‘Overspeed/Jump Red Lights’ respectively. This implies that the most influential reason for compliance is the one described by Trade-off hypothesis whereas the most influential reason for non-compliance is the one described in Deterrence theory.

Analysis of Changes in Policy Variables

Results of variable changes in Scenario 2 of First Survey (Overspeeding/ Jumping Red Light case)

- For the change in price case out of the 79 who did not overspeed/jump red light 29 individuals did not change the action, 43 changed their action and 7 skipped the question
- For the change in probability of detection case out of the 79 who did not overspeed/jump 31 individuals did not change the action, 43 changed their action and 5 skipped the question
- For the external observation case out of the 79 who did not overspeed/jump 26 individuals did not change the action, 48 changed their action and 5 skipped the quest

Results of variable changes overspeeding/red light jumping scenario suggest that whenever a variable changes more number of people change their behaviour compared to those who do not. Furthermore the pattern of change in behaviour is similar no matter which policy is changed similar to the driving under influence scenario discussed previously. That is the number of respondents who changed their answers are roughly the same across all three cases of changes in variables.

5.3 Results of survey titled "Experimental study on attitudes of Digital Consumers"

5.3.1 Purchase of Software

For scenario 1 involving the situation of purchase of one time use software 89 individuals chose to buy legitimate copy while 5 individuals chose get unauthorized version. Another way of putting it is that 89 individuals chose to follow the rules while 5 chose to break it. Compliance level for this particular scenario stands approximately at 95 percent.

Ranking of Motivations

As far as the motivations of choosing any of the options is concerned the breakdown is given in the table below. Again tables below will present the rank-reason distribution of individuals taking either options. Table 9 will show the rank-reason distribution of respondents who selected buy authentic version of software option. Similarly, Table 10 will show the rank-reason distribution of respondents who selected the get pirated version of software option.

Table 9 (Rank-Reason Distribution – Buy authentic version)

	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Σ
Deterrence	15 (17 %)	16 (18 %)	13 (14 %)	19 (21 %)	18 (20 %)	8 (9 %)	**89**
Legitimacy	19 (21 %)	15 (17 %)	12 (13 %)	14 (16 %)	16 (18 %)	13 (14 %)	**89**
Expectations/Learning	14 (16 %)	18 (20 %)	21 (24 %)	16 (18 %)	12 (13 %)	8 (9 %)	**89**
Social Pressures	12 (13 %)	15 (17 %)	20 (22 %)	10 (11 %)	16 (18 %)	16 (18 %)	**89**
Trade-Off	24 (27 %)	20 (22 %)	13 (14 %)	15 (17 %)	13 (14 %)	4 (4%)	**89**
Others	5 (6 %)	5 (6 %)	10 (11 %)	15 (17 %)	14 (16 %)	40 (45 %)	**89**
Σ	**89**	**89**	**89**	**89**	**89**	**89**	

Source: Author's Calculation

Table 10 (Rank-Reason Distribution –Get pirated version)

	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Σ
Deterrence	1 (20 %)	1 (20 %)	1 (20 %)	2 (40 %)	0 (0 %)	0 (0 %)	**5**
Legitimacy	0 (0 %)	0 (0 %)	1 (20 %)	2 (40 %)	1 (20 %)	1 (20 %)	**5**
Expectations/Learning	0 (0 %)	1 (20 %)	0 (0 %)	0 (0 %)	2 (40 %)	2 (40 %)	**5**
Social Pressures	2 (40 %)	0 (0 %)	2 (40 %)	0 (0 %)	1 (20 %)	0 (0 %)	**5**
Trade-Off	2 (40 %)	1 (20 %)	1 (20 %)	1 (20 %)	0 (0 %)	0 (0 %)	**5**
Others	0 (0 %)	2 (40 %)	0 (0 %)	0 (0 %)	1 (20 %)	2 (40 %)	**5**
Σ	**5**	**5**	**5**	**5**	**5**	**5**	

Source: Author's Calculation

On the basis of the data presented in the tables above one can see that Trade-off hypothesis got assigned rank 1 most number of times by individuals who chose to follow the rule. As Table 9 shows 24 out of 89 individuals who decided to buy legitimate copy, which roughly constitutes 27 percent of the total sample, gave Trade-off hypothesis the highest ranking. Data in table 10 indicates that 2 individuals each gave reasons based on Social Pressures theory and Trade-off hypothesis the highest ranking. Only one individual gave lower deterrence effect the highest ranking.

We again calculate the weighted average scores of each reason for both courses of action presented in the scenario for an overall comparison. Table 11 below shows these calculated weighted average scores of each reason for both courses of action.

Table 11 (Weighted average score of Reasons – Purchase of software)

Theory	**Weighted Average**	
	Buy legitimate copy	**Get unauthorized version**
Deterrence	3.62	4.2
Legitimacy	3.64	2.6
Expectations/Learning	3.79	2.2
Social Pressures	3.42	4.4
Trade-Off	4.16	4.8
Others	2.33	2.8

Source: Author's Calculation

On the basis of the weighted average scores one can assert that most influential reason for both compliance and non-compliance decisions under 'Purchase of Software' is the one given by Trade-off hypothesis.

Analysis of Changes in Policy Variables

Results of variable changes in Scenario 1 of Second Survey

- For the change in price case out of the 89 who got legitimate copy 34 individuals did not change the action, 42 changed their action and 13 skipped the question
- For the change in probability of detection case out of the 89 who got legitimate copy 32 individuals did not change the action, 33 changed their action and 24 skipped the question
- For the external observation case out of the 89 who got legitimate copy 37 individuals did not change the action, 34 changed their action and 18 skipped the question.

Looking at this data it is difficult to determine which particular variable change had the biggest effect. This is because several respondents decided to skip the question.

5.3.2 Subscription to Legal Streaming

For scenario 2 involving the situation subscribing to streaming services 84 individuals chose to subscribe while 7 individuals chose to illegally download. Another way of putting it is that 84 individuals chose to follow the rules while 7 chose to break it. Compliance level for this particular scenario stands approximately at 92 percent.

Ranking of Motivations

As far as the motivations of choosing any of the options is concerned the breakdown is given in the tables below.

Table 12 (Rank-Reason Distribution – Subscribe to legal streams)

	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Σ
Deterrence	12 (14 %)	8 (10 %)	16 (19 %)	16 (19 %)	19 (23 %)	13 (15 %)	**84**
Legitimacy	19 (23 %)	22 (25 %)	11 (13 %)	16 (19 %)	8 (10 %)	8 (10 %)	**84**
Expectations/Learning	10 (12 %)	16 (19 %)	21 (24 %)	10 (12 %)	18 (20 %)	7 (8 %)	**84**
Social Pressures	14 (17 %)	17 (20 %)	10 (12 %)	19 (23 %)	19 (23 %)	3 (3 %)	**84**
Trade-Off	25 (30 %)	13 (15 %)	16 (19 %)	13 (15 %)	10 (12 %)	7 (8 %)	**84**
Others	4 (5 %)	8 (10 %)	8 (10 %)	8 (10 %)	10 (12 %)	46 (52 %)	**84**
Σ	**84**	**84**	**84**	**84**	**84**	**84**	

Source: Author's Calculation

Table 13 (Rank-Reason Distribution – Illegal download)

	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Σ
Deterrence	2 (29 %)	0 (0 %)	1 (14 %)	2 (29 %)	2 (29 %)	0 (0 %)	**7**
Legitimacy	0 (0 %)	3 (43 %)	1 (14 %)	1 (14 %)	1 (14 %)	1 (14 %)	**7**
Expectations/Learning	1 (14 %)	1 (14 %)	1 (14 %)	2 (29 %)	1 (14 %)	1 (14 %)	**7**
Social Pressures	3 (43 %)	1 (14 %)	2 (29 %)	0 (0 %)	1 (14 %)	0 (0 %)	**7**
Trade-Off	1 (14 %)	2 (29 %)	2 (29 %)	1 (14 %)	0 (0 %)	1 (14 %)	**7**
Others	0 (0 %)	0 (0 %)	0 (0 %)	1 (14 %)	2 (29 %)	4 (57 %)	**7**
Σ	**7**	**7**	**7**	**7**	**7**	**7**	

Source: Author's Calculation

On the basis of the data presented in the tables above one can see that Trade-off hypothesis got assigned rank 1 most number of times at least by individuals who chose to follow rules. As Table 12 shows 25 out of 84 individuals who chose to subscribe to legal streaming services, which roughly constitutes 30 percent of the total sample, gave Trade-off hypothesis the highest ranking. Table 13 shows that 3 out 7 individuals gave lack of social pressures as their primary motive of illegal downloading.

We again calculate the weighted average scores of each reason for both courses of action presented in the scenario for an overall comparison. Table 14 below shows these calculated weighted average scores of each reason for both courses of action.

Table 14 (Weighted average score of Reasons – Subscription to Legal Streaming)

Theory	Weighted Average	
	Subscribe to legal streams	**Illegally download**
Deterrence	3.39	3.71
Legitimacy	4.04	3.57
Expectations/Learning	3.6	3.42
Social Pressures	3.75	4.71
Trade-Off	4.1	4
Others	2.21	1.57

Source: Author's Calculation

From the above table it can be seen that the weighted average score of Trade-off hypothesis and Social Pressures hypothesis is highest for the case 'Subscribe to legal streams' and 'Illegally download' respectively. This implies that the most influential reason for compliance is the one described by Trade-off hypothesis whereas the most influential reason for non-compliance is the lack of social pressure exerted by family/friends/peers.

Analysis of Changes in Policy Variables

Results of variable changes in Scenario 2 of Second Survey

- For the change in price case out of the 84 who subscribed 38 individuals did not change the action, 39 changed their action and 7 skipped the question
- For the change in probability of detection case out of the 84 subscribed 32 individuals did not change the action, 37 changed their action and 15 skipped the question
- For the external observation case out of the 84 who subscribed 43 individuals did not change the action, 29 changed their action and 12 skipped the question

For the above data it can be seen that changes in variables certainly alter behaviour of respondents. The variable that caused the least change is the third variable, which is the external observation. For the other two variables the number of respondents who change behaviour and those who do not are roughly the same.

5.4 Gender and Income based Analysis

The reason why we are interested in gender and income based analysis is because these are important categorical differences which can have an effect on decisions taken. Since our sample consists of both males and females a closer examination may reveal that choices made by males and females show a clearly distinct pattern. One reason for the difference in attitudes of male and female respondents could be due to their differences in attitudes towards risk and preferences.[74] Similarly, it would not be unreasonable to expect that choice of action of individuals with lower incomes may be different from individuals with higher levels of income. Identifying patterns of choice based on categorical differences can help in better enforcement through better targeting.

[74] For more on Croson and Gneezy (2009). In this article the authors review a large body of literature on gender differences in economic experiments. They identify robust differences in risk preferences, social preferences and attitude towards competition.

5.4.1 Traffic Survey Results Analysis

In this section we will present the results of how the respondents answered the questions in both scenarios and also see if their sex or income can reveal something about the choices they made..

For ease of presentation all respondents can be divided into 5 main groups based on the answers given in each scenario.

Group I: Compliance in both scenarios (CC)

Group II: Compliance in first scenario but not in second (CN)

Group III: Non-compliance in first scenario but compliance in second (NC)

Group IV: Non-compliance in both scenarios (NN)

The fifth group only exists because some respondents gave full responses only for one scenario and not the other. All these responses can be clubbed together.

There were 59 individuals in Group I (CC). Out of these 59 individuals 35 were male and 24 were females. Distribution of these 59 individuals on the basis of income reveals that 30 individuals belonged in first income bracket, 25 belonged in second income bracket and only 4 individuals belonged in third income bracket.

There were 8 individuals in Group II (CN). This group mostly consisted of females. Out of these 8 individuals 7 were females with only 1 male respondent. On the basis of income 2 respondents were in income bracket I and 6 respondents were in income bracket II. No individual in this group belonged in income bracket III.

There were 16 respondents in group III (NC). Unlike Group II this group consisted mostly of males. Out of the total 16 respondents 14 were males with only 2 respondents being female. Distribution on the basis of income reveals that 5 of those respondents were in income bracket I and 11 were in income bracket II. No respondent was in income bracket III.

Group II is highly skewed towards females and group III is highly skewed towards males. This fact indicates towards certain social norm or perception in action. It could also indicate towards differences in perception of risk among males and females which itself is context dependent.

There were 7 respondents who belong to group IV. Among these 7 respondents 5 are males and 2 are females. This perhaps indicates men are more likely to not follow any rules than women. Based on income the distribution is very even with 4 individuals belonging in income bracket I and 3 individuals belonging in bracket II.

As far as group V is concerned, there are 8 individuals in this group. There were 4 individuals who only responded for first scenario but not for the second scenario. Again there were 4 individuals who only responded in full for second scenario but not for the first. All these 8 individuals complied with rule present in those specific scenarios. Based on income, among these 8 individuals 5 belonged in income bracket I, 2 in income bracket II and 1 in income bracket III.

For the first scenario involving drinking and driving situation the results of overall distribution of respondents based on income is as follows. In total there are 98 responses including 4 respondents who skipped first scenario. Income bracket I had 46 individuals, income bracket II had 47 individuals and only 5 individuals belonged in income bracket III. Among those in bracket I, 8 individuals did not comply, 36 complied and 2 skipped the question. Among those in bracket II, 14 individuals did not comply, 32 complied and 1 individual skipped. Among those in bracket III, no individual broke the rule, 4 individuals complied and 1 individual skipped the question. Similarly, on the basis of gender the distribution is as follows. Again the total responses were 98 which includes the 4 respondents who skipped scenario 1 questions. Among these 98 individuals 38 were females and 60 were males. Among the 38 female respondents 4 did not comply, 32 complied and 2 skipped the question. Among the 60 male respondents 18 did not comply, 40 complied and 2 skipped the question. *Upon closer examination it could be said that gender rather than income is having a greater influence on a respondent's decision to comply.*

For the second scenario involving overspeeding/jumping red light situation the results of overall distribution of respondents based on income is as follows. In total there are 98 responses including 4 respondents who skipped second scenario. Income bracket I had 46 individuals, income bracket II had 47 individuals and only 5 individuals belonged in income bracket III. Among those in bracket I, 6 individuals did not comply, 37 complied and 3 skipped the question. Among those in bracket II, 9 individuals did not comply, 37 complied and 1 individual skipped. Among those in bracket III, no individual broke the rule, 5 individuals complied and none skipped the question. Similarly, on the basis of gender the distribution is as follows. Again the total responses were 98 which includes the 4 respondents who skipped scenario 1 questions. Among these 98 individuals 38 were females and 60 were males. Among the 38 female respondents 9 did not comply, 28 complied and 1 skipped the question. Among the 60 male respondents 6 did not comply, 51 complied and 3 skipped the question. *In this case as well decision to comply or not comply is more or less evenly distributed on income basis. But taking gender into account it can be argued that there is a role reversal of some sort. More female respondents chose not to follow the rule than the male respondents.*

5.4.2 Copyright Survey Results Analysis

Once again this section will present the results of how the respondents answered the questions in both scenarios and see if their sex or income can reveal something about the choices they made. The respondents can be divided into five groups for ease of presentation.

Group I: Compliance in both scenarios (CC)

Group II: Compliance in first scenario but not in second (CN)

Group III: Non-compliance in first scenario but compliance in second (NC)

Group IV: Non-compliance in both scenarios (NN)

Group V: Skip question in one scenario

There were 80 individuals in Group I (CC). Out of these 59 individuals 51 were male and 29 were females. Distribution of these 80 individuals on the basis of income reveals that 49 individuals belonged in first income bracket, 26 belonged in second income bracket and only 5 individuals belonged in third income bracket.

There were 4 respondents in group II (CN). This group is equally distributed between male and female respondents with 2 males and 2 females. On the basis of income 3 respondents were in income bracket I, none were in income bracket II and 1 individual in this group belonged in income bracket III.

There were only 2 respondents in group III (NC). Both respondents were males. On the basis of income 1 respondent belonged to income bracket I and the other belonged to income bracket III.

In group IV (NN) as well there were only 2 respondents. Both respondents were females and both belonged in income category II.

As far as group V is concerned, there are 7 individuals in this group. There were 5 individuals who only responded for first scenario but not for the second scenario. There were 2 individuals who only responded in full for second scenario but not for the first. Among the 5 individuals who only responded in first scenario 3 were male and 2 were female. No individual was in income bracket I, 2 were in income bracket II and 3 were in income bracket III. All but one respondent complied. Among the 2 individuals who only responded in second scenario both were female and belonged in income category II. One respondent complied and one did not comply.

For the first scenario involving authorized/unauthorized version of software situation the results of overall distribution of respondents based on income is as follows. In total there are 96 responses including 2 respondents who skipped first scenario. Income bracket I had 54 individuals, income bracket II had 32 individuals and only 10 individuals belonged in income bracket III. Among those in bracket I, 1 individuals did not comply, 53 complied and none skipped the question. Among those in bracket II, 2 individuals did not comply, 28 complied and 2 individuals skipped. Among those in bracket III, 2 individuals broke the rule, 8 individuals complied and no individual skipped the question. Similarly, on the basis of gender the distribution is as follows. Again the total responses were 96 which includes the 2 respondents who skipped questions for this scenario. Among these 96 individuals 38 were females and 58 were males. Among the 38 female respondents 3 did not comply, 33 complied and 2 skipped the question. Among the 58 male respondents 2 did not comply, 56 complied and none skipped the question. *Looking at the data it can be said that neither income level nor gender is a factor in deciding whether or not to comply.*

For the second scenario involving subscription to legal services situation the results of overall distribution of respondents based on income is as follows. In total there are 96 responses including 2 respondents who skipped first scenario. Income bracket I had 54 individuals, income bracket II had 32 individuals and only 10 individuals belonged in income bracket III. Among those in bracket I, 3 individuals did not comply, 51 complied and none skipped the question. Among those in bracket II, 3 individuals did not comply, 27 complied and 2 individuals skipped. Among those in bracket III, 1 individual broke the rule, 6 individuals complied and 3 individuals skipped the question. Similarly, on the basis of gender the distribution is as follows. Again the total responses were 96 which includes the 2 respondents who skipped questions for this scenario. Among these 96 individuals 38 were females and 58 were males. Among the 38 female respondents 5 did not comply, 31 complied and 2 skipped the question. Among the 58 male respondents 2 did not comply, 53 complied and 3 skipped the question. *Upon closer examination it seems that females are more likely to break copyright rules than males. Income level of either male or female respondent does not seem to play a big role.*

5.5 A Comparison of Compliance Levels of Traffic related scenarios and Copyright related Scenarios

Compliance with traffic rules satisfies the need for safety and compliance with copyright rules satisfies the need for creativity and innovation. Based on Maslow’s hierarchy of needs, the need for safety may be regarded as more important than need for creativity and innovation. However, the traffic related scenarios and copyright related scenarios in our experimental study differ on one more important ground, that being, non-monetary costs of compliance. In the experimental study the each scenario was created such that the monetary costs of compliance would be same across all scenarios. But the scenarios differed in terms of non-monetary costs of compliance. Non-monetary costs in terms of inconvenience of complying with rules exist in traffic related scenarios (search costs of hiring cab, waiting time during red light, etc.) but these non-monetary costs were largely absent from the copyright related scenarios. In fact, non-monetary costs existed in copyright related scenarios when choosing non-compliance with rules (for example, search costs of finding a hacked version of software, website with the relevant content, etc.)

As we have seen compliance level for the two traffic related scenarios stood at 77 percent (drunken driving scenario) and 84 percent (overspeeding/jumping red light) respectively. For the two copyright related scenarios these number stood at 95 percent (getting legitimate software scenario) and 92 percent (subscription to legal streaming services). Compliance levels for copyright related scenarios are higher than that for traffic related scenarios. This seems to suggest that inconvenience costs of compliance are playing a more significant role in determining decision to comply.

5.6 Summary of Findings

The primary objective of this study was to get an insight into attitudes of members of society towards different rules and regulations and which factors affect their decision to comply or not comply. There are several theories/hypothesis of compliance including the one that was developed in this thesis which explain why individuals may or may not comply with certain laws and regulations as was discussed in the previous chapter. Each theory/hypothesis presents a motivation of compliance. Our primary interest lied in finding out which motivation acts as a primary influence towards decision to comply under different but comparable scenarios. The other important aspect that the study tried to shed light on was to look at compliance or non-compliance patterns across gender and income differences. Some of the main findings of this study are –

1. Compliance levels, that is the number of individuals who decided to comply as a percentage of the total sample size, differed across all four different scenarios as per expectation. Compliance levels for the two traffic related scenarios was approximately 80 percent whereas compliance level for the two copyright regulation scenarios was over 90 percent. This difference in compliance levels suggests that inconvenience costs of compliance are playing a more significant role in determining decision to comply.
2. Based on the ranking of different motivations to comply or not comply our study reveals that the trade-off influence was primary influence of compliance or non-compliance decision in all four different scenarios with few exceptions. This can be said on the basis of both the number of individuals who gave trade-off hypothesis their highest ranking as well as the weighted average score of trade-off hypothesis for both compliance and non-compliance courses of action in each scenario.
3. As far as change of behaviour due to changes in certain variables such as cost of following the institution, probability of getting caught and observation regarding behaviour of others is concerned, all these variables when changed in a way to induce shift from compliance to non-compliance actually led to several respondents changing their chosen action from compliance to non-compliance. However, no single variable mentioned above stands out prominently since pattern of shift caused by each variable is relatively same. This was true for all scenarios.
4. A look at compliance or non-compliance patterns across gender and income differences lead to some interesting observations. In the Driving under Influence scenario we find that amongst individuals who chose not to comply, a large majority is comprised of males. This observation is perhaps indicative of differences in risk perception among males and females. No clear cut pattern emerges when takin income differences into account. In the case of overspeeding/ jumping red lights scenario more female respondents chose not to follow the rule than the male respondents in contrast to Driving under Influence scenario. Decision to comply or not comply is more or less evenly distributed on income basis in this case as well. In the case of Purchase of Software scenario the differences seem to be small to suggest that neither income level nor gender is a factor in deciding

whether or not to comply. Lastly in the case of Subscription to Legal streaming services scenario more females chose not to comply in comparison to male respondents but the size of the sample is very small. Income level of either male or female respondent does not seem to play a big role in this case too.

5.7 Conclusion

Based on the above findings it can be said that attitudes of individuals towards compliance does differ depending on factors such as monetary and non-monetary costs of compliance and the nature of positive external benefits generated through compliance. Demographic characteristics also have on decision making regarding compliance with members of a particular gender or belonging to a certain income class making different decisions. While it is true that the finding of the study do suggest these differences the question of whether these differences are actually significant or not still remains to be answered. This implies that tests of significance will have to be undertaken to determine whether compliance levels across four scenarios, attitudes of males and females in a particular regulatory setting or attitudes of individuals who belong in various income class are significantly different from each other or not. It is possible that these differences may not large enough to confirm our hypothesis. The next chapter will be dedicated towards testing for significance and presenting the results of those tests.

Appendix A

Experimental Study on Attitudes of Motorists

Basic Information

1. Personal Information
   - City/Town –
   - State/Province –
   - ZIP/Postal Code –
   - Country –
2. What is your sex?
   - Male
   - Female
3. What is your annual income?
   - Between Rs. 10,00,000 to Rs. 15,00,000
   - Between Rs. 15,00,000 to Rs. 20,00,000
   - Between Rs. 20,00,000 to Rs. 25,00,000
4. Do you own a vehicle?
   - Yes
   - No

Situation 1

Imagine yourself in a situation where you are at home and have had alcohol. You suddenly need to go someplace else for some urgent and important work. You can travel to your destination by hiring a cab or you could take your own vehicle. If caught driving under influence you will have to pay a fine. This rule exists to reduce the chances of road accidents from happening. The amount of alcohol that you have consumed is just about sufficient enough to be detected in the test. Taking your own vehicle does not cost money unless you are caught but hiring a cab does have significant costs. The cab fares usually depend on distance to be travelled and demand for cabs at that time.

What would be your choice of action if the cab fare is Rs. 500, the fine to be paid if you are caught is Rs. 5000 and the chances of you getting caught are 10%?

- Hire Cab
- Take your own vehicle

If you chose to hire cab, a list of possible reasons for choosing this action is given below. Assign each reason a rank based on how important that reason was in influencing your decision. That is, assign rank 1 to most important reason, rank 2 to second most important reason and so on.

- ➢ The probability of getting caught was high or the fine to be paid was high.
- ➢ The restriction imposed is reasonable and therefore legitimate
- ➢ You either expect or learn that others take this action normally and do the same thing

- People close to you (family, friends, colleagues, etc.) would disapprove if you do not take this action
- Choosing this action gives you a personal benefit which you value and which outweighs the benefits of choosing the other alternative
- Others reasons…

If you chose to take your own vehicle, a list of possible reasons for choosing this action is given below. Assign each reason a rank based on how important that reason was in influencing your decision. That is, assign rank 1 to most important reason, rank 2 to second most important reason and so on.

- The probability of getting caught was low or the fine to be paid was low.
- The restriction imposed by this rule is unreasonable and therefore illegitimate.
- You expect or learn that others also take this action and decide to do the same
- People close to you (family, friends, colleagues, etc.) do not disapprove when you take this action
- The benefits of choosing this action outweigh the benefits of choosing the first alternative
- Others reasons…

If you chose to hire cab then would you change your action if the cab fare increased from Rs. 500 to Rs. 1000?

- Yes
- No

If you chose to hire cab then would you change your action if the probability of getting caught was close to zero?

- Yes
- No

If you chose to hire cab then would you change your action if you saw someone else drive under influence and get away with it?

- Yes
- No

Situation 2

Suppose that you have bought a ticket to a classical music concert or a theatre play which you were looking forward to seeing. Late entry is not allowed for this show and the tickets are non-refundable. If you miss this show then it is unlikely you will get an opportunity to watch this program live again. Now imagine that you are in a situation where you are running late to get to your destination. To reach on time and not lose out on money paid for the ticket you will have to jump red lights whenever you can, ride at speeds much higher than what the speed limit prescribes and engage in reckless driving. If caught either jumping red light or over speeding you will have to pay a fine. The rule exists to ensure smooth movement of traffic and lower the chances of accidents from happening.

What would be your choice of action if the price of the ticket is Rs. 500, the fine to be paid if you are caught is Rs. 5000 and the chances of you getting caught are 10%?

- Drive within speed limits and not jump red light
- Engage in over speeding and jump red light whenever you can

If you chose to drive within speed limit and not jump red light, a list of possible reasons for choosing this action is given below. Assign each reason a rank based on how important that reason was in influencing your decision. That is, assign rank 1 to most important reason, rank 2 to second most important reason and so on.

- ➢ The probability of getting caught was high or the fine to be paid was high.
- ➢ The restriction imposed is reasonable and therefore legitimate
- ➢ You either expect or learn that others take this action normally and do the same thing
- ➢ People close to you (family, friends, colleagues, etc.) would disapprove if you do not take this action
- ➢ Choosing this action gives you a personal benefit which you value and which outweighs the benefits of choosing the other alternative
- ➢ Others reasons…

If you chose to engage in overspeeding and/or jump red light, a list of possible reasons for choosing this action is given below. Assign each reason a rank based on how important that reason was in influencing your decision. That is, assign rank 1 to most important reason, rank 2 to second most important reason and so on.

- ➢ The probability of getting caught was low or the fine to be paid was low.
- ➢ The restriction imposed by this rule is unreasonable and therefore illegitimate.
- ➢ You expect or learn that others also take this action and decide to do the same

- ➢ People close to you (family, friends, colleagues, etc.) do not disapprove when you take this action
- ➢ The benefits of choosing this action outweigh the benefits of choosing the first alternative
- ➢ Others reasons…

If you chose to drive within speed limit and not jump red light then would you change your action if the price of ticket was Rs. 1000?

- Yes
- No

If you chose to drive within speed limit and not jump red light then would you change your action if the probability of getting caught was close to zero?

- Yes
- No

If you chose to drive within speed limit and not jump red light then would you change your action if you saw someone else engage in overspeeding and/or jumping red light and get away with it?

- Yes
- No

Appendix B

Experimental Study on Attitudes of Digital Consumers

Basic Information

1. Personal Information
    - City/Town –
    - State/Province –
    - ZIP/Postal Code –
    - Country –
2. What is your sex?
    - Male
    - Female
3. What is your annual income?
    - Between Rs. 10,00,000 to Rs. 15,00,000
    - Between Rs. 15,00,000 to Rs. 20,00,000
    - Between Rs. 20,00,000 to Rs. 25,00,000

Situation 1

Suppose you need to use a software, say an anti-virus software, video editor, grammar checking software etc. for one time use only implying you will not need this software for a foreseeable future. This software is available in market at a particular price. However one can also obtain an unauthorized copy of the software which works as well as the original at little or no cost. It is against the rules to obtain an unauthorized copy of the software. The rule exists to incentivize creativity. When original copies of software are sold the developers of the software are able to update the software to provide better satisfaction for its users. Suppose further that if caught using an unauthorized version of the software a penalty must be paid.

What would be your choice of action if the price of the software is Rs. 500, the fine to be paid if you are caught is Rs. 5000 and the chances of you getting caught are 10%?

- Buy legitimate version of software
- Get an unauthorized version of software

In case you chose to buy legitimate version of software, a list of possible reasons for choosing this action is given below. Assign each reason a rank based on how important that reason was in influencing your decision. That is, assign rank 1 to most important reason, rank 2 to second most important reason and so on.

- ➢ The probability of getting caught was high or the fine to be paid was high.
- ➢ The restriction imposed is reasonable and therefore legitimate
- ➢ You either expect or learn that others take this action normally and do the same thing

- People close to you (family, friends, colleagues, etc.) would disapprove if you do not take this action
- Choosing this action gives you a personal benefit which you value and which outweighs the benefits of choosing other alternative
- Others reasons…

If you chose to get an unauthorized version of software, a list of possible reasons for choosing this action is given below. Assign each reason a rank based on how important that reason was in influencing your decision. That is, assign rank 1 to most important reason, rank 2 to second most important reason and so on.

- The probability of getting caught was low or the fine to be paid was low.
- The restriction imposed by this rule is unreasonable and therefore illegitimate.
- You expect or learn that others also take this action and decide to do the same
- People close to you (family, friends, colleagues, etc.) do not disapprove when you take this action
- The benefits of choosing this action outweigh the benefits of choosing first alternative
- Others reasons…

If you chose to buy legitimate version of software then would you change your action if the price of software increased from Rs 500 to Rs. 1000?

- Yes
- No

If you chose to buy legitimate version of software then would you change your action if the probability of getting caught was close to zero?

- Yes
- No

If you chose to buy legitimate version of software then would you change your action if you saw someone else get an unauthorized copy and get away with it?

- Yes
- No

Situation 2

Most movies, television shows, etc. are available online through streaming services such as Netflix, Amazon Prime, etc. Suppose that you are interested in watching a particular movie or a television series but are not currently subscribed to the streaming service that is showcasing it. You can subscribe to this streaming service by paying a subscription fees. Most of the content that is available on these streaming services can also be accessed illegally at zero cost including the movie or the television show that you are interested in watching. It is unlikely that you will be watching any other content on the catalogue of that streaming service implying the subscription fees becomes the exact price to be paid for the movie or television show. It is against the rules to watch content on unauthorized websites. If caught breaking this rule a fine will have to be paid. The rule exists to incentivize creation of new contents on a regular basis.

What would be your choice of action if the average price that you pay for watching content on Netflix, Prime, etc. is Rs. 500, the fine to be paid if you are caught is Rs. 5000 and the chances of you getting caught are 10%?

- Subscribe to legal services
- Illegally download and watch the content

If you chose to subscribe to legal services, a list of possible reasons for choosing this action is given below. Assign each reason a rank based on how important that reason was in influencing your decision. That is, assign rank 1 to most important reason, rank 2 to second most important reason and so on.

- ➢ The probability of getting caught was high or the fine to be paid was high.
- ➢ The restriction imposed is reasonable and therefore legitimate
- ➢ You either expect or learn that others take this action normally and do the same thing
- ➢ People close to you (family, friends, colleagues, etc.) would disapprove if you do not take this action
- ➢ Choosing this action gives you a personal benefit which you value and which outweighs the benefits of choosing the other alternative
- ➢ Other reasons …

If you chose to illegally download and watch content, a list of possible reasons for choosing option this action is given below. Assign each reason a rank based on how important that reason was in influencing your decision. That is, assign rank 1 to most important reason, rank 2 to second most important reason and so on.

- ➢ The probability of getting caught was low or the fine to be paid was low.
- ➢ The restriction imposed by this rule is unreasonable and therefore illegitimate.
- ➢ You expect or learn that others also take this action and decide to do the same
- ➢ People close to you (family, friends, colleagues, etc.) do not disapprove when you take this action
- ➢ The benefits of choosing this action outweigh the benefits of choosing first alternative
- ➢ Others reasons…

If you chose to subscribe to legal services then would you change your action if the subscription fees was Rs. 1000?

- Yes
- No

If you chose to subscribe to legal services then would you change your action if the probability of getting caught was close to zero?

- Yes
- No

If you chose to subscribe to legal services then would you change your action if you saw someone else illegally download the content and get away with it?

- Yes
- No

Chapter VI: Testing for Significance of Results

6 Introduction

In our experimental study, for each scenario two courses of actions were available for individuals to choose. That is, the decision variable is categorical in each scenario - comply or not comply. From each population dichotomous or binary responses can be obtained. We have data on number of individuals who chose to comply and not comply for each scenario along with data on the gender and income composition of sample for each of the scenarios. Given that the decision variable is categorical sample proportions test should be used.

6.1 Major observations to be tested

There are three main things which can be tested for. Firstly, we can test whether or not the proportion of individuals who chose to comply in one particular scenario is significantly different from proportion of individuals who chose to comply in some other different scenario. In this case we will have a total of six combinations of comparison. These are –

(1) Comparison of Compliance levels between Driving under Influence scenario and Overspeeding/Red light jumping scenario
(2) Comparison of Compliance levels between Driving under Influence scenario and Purchase Authentic Software scenario
(3) Comparison of Compliance levels between Driving under Influence scenario and Subscription to Legal Streaming Services scenario
(4) Comparison of Compliance levels between Overspeeding/Red light jumping scenario and Purchase Authentic Software scenario
(5) Comparison of Compliance levels between Overspeeding/Red light jumping scenario and Subscription to legal streaming services scenario
(6) Comparison of Compliance levels between Purchase Authentic Software scenario and Subscription to legal streaming services scenario

Secondly, we can test for significance of differences in proportions on the basis of gender for each particular scenario. Since there are four scenarios in total there will be four combinations which will be tested. They are –

(1) Differences in Compliance proportions and Gender proportions for Driving under Influence scenario
(2) Differences in Compliance proportions and Gender proportions for Over speeding/Red light jumping scenario
(3) Differences in Compliance proportions and Gender proportions for Purchase of Software scenario
(4) Differences in Compliance proportions and Gender proportions for Subscription to Legal Streaming scenario

And thirdly, we can test for significance of differences in proportions on the basis of income for each particular scenario. Here as well, we will have four possible combinations that will be tested. They are –

(1) Differences in Compliance proportions and Income group proportions for Driving under Influence scenario
(2) Differences in Compliance proportions and Income group proportions for Over speeding/Red light jumping scenario
(3) Differences in Compliance proportions and Income group proportions for Purchase of Software scenario
(4) Differences in Compliance proportions and Income group proportions for Subscription to Legal Streaming scenario

6.2 Expectations

For the first set of major observations, that is the comparison of compliance levels for different scenarios, it is expected that compliance levels will significantly differ whenever nature of positive external benefit or the nature of inconvenience costs are different. This means one can expect a significant difference in compliance levels when comparing traffic regulation scenarios with copyright regulation scenarios. However, if the nature of positive external benefit or the nature of inconvenience costs are similar then differences in compliance levels may or may not be significant. There are four cases in the first set of major observations where we expect a significant difference in compliance levels and two cases where the differences might be insignificant. The four cases where significant difference is expected are –

(1) Comparison of Compliance levels between Driving under Influence scenario and Purchase Authentic Software scenario
(2) Comparison of Compliance levels between Driving under Influence scenario and Subscription to Legal Streaming Services scenario
(3) Comparison of Compliance levels between Overspeeding/Red light jumping scenario and Purchase Authentic Software scenario
(4) Comparison of Compliance levels between Overspeeding/Red light jumping scenario and Subscription to legal streaming services scenario

The two cases where the differences might be insignificant are –

(1) Comparison of Compliance levels between Driving under Influence scenario and Overspeeding/Red light jumping scenario
(2) Comparison of Compliance levels between Purchase Authentic Software scenario and Subscription to legal streaming services scenario

As far as the second set of observations are concerned, the expectation is that there would be a significant difference between compliance proportions based on gender for the Driving under Influence scenario. Compared to male respondents a higher proportion of female respondents had chosen to comply. For the other three scenarios it is not clear whether the differences will be significant or not. For third set of observations which are differences in proportions on the basis of income for each particular scenario, it is difficult to say whether differences will be significant since no clear pattern is discernible. It is likely that differences will be found to be insignificant.

6.3 Testing for Significance

The testing can be done using a standard method of testing differences between proportions. One of the most common method is called the **two-proportion z-test.** The two-proportion z-test can be used when these conditions are met -

- The samples are obtained through simple random sampling for each population.
- The samples should be independent.
- Number of successes/failure is at least 5 for each sample.[75]
- Each population is at least 20 times as big as its sample.

The data from random samples of size n_1 and n_2 from the two populations can be displayed in a 2 x 2 contingency table such as:

Table 15: Contingency Table (two-proportion z-test)

	Success	Failure	Total
Group 1	x_{11}	x_{12}	n_1
Group 2	x_{21}	x_{22}	n_2
Total	m_1	m_2	N

The binomial proportions π_1 and π_2 are estimated from the data using the following formulae:

$$\hat{\pi}_1 = \frac{x_{11}}{n_1} \text{ and } \hat{\pi}_2 = \frac{x_{21}}{n_2}$$

The z-test statistic is given by the formula: $Z_t = \frac{\hat{\pi}_1 - \hat{\pi}_2}{\widehat{\sigma_D}}$

[75] In some textbooks it is recommended that the number of successes and failure should be at least 10.

where $\widehat{\sigma_D} = \sqrt{\hat{\pi}(1 - \hat{\pi})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}$ and $\hat{\pi} = \frac{n_1\hat{\pi}_1 + n_2\hat{\pi}_2}{n_1 + n_2}$

The difference π_1 - π_2, is the most direct measure for comparing two proportions.

The null hypothesis is H_0: π_1 - π_2 = 0 and the alternative hypothesis is H_A: π_1 - $\pi_2 \neq 0$. This particular specification is for a two tailed test. We will mostly focus on two tailed test since we do not have any prior expectation regarding the direction in which the two sample proportion will differ if at all there is a significant difference.

We will perform the test for differences in proportions using this z-statistic unless we have a situation or a case where one of the above conditions is not met. In that case a different test which will be more appropriate will be used.

Checking for statistical significance between proportions of two categorical variables when the sample size is small or to be precise at least one of the entries in the contingency table is less than 5, one can use a Fisher's Exact Test. The test is used to determine if there are nonrandom associations between the two categorical variables. Fisher's exact test does not depend on large-sample distribution assumptions, and instead calculates an exact *p*-value based on the sample data. Although Fisher's exact test is valid for samples of any size, it is not recommended for large samples because it is computationally intensive.

Suppose the contingency table is given by:

The data from random samples of size n_1 and n_2 from the two populations can be displayed in a 2 x 2 contingency table such as:

Table 16: Contingency Table (Fisher's Test)

	Success	Failure	Total
Group 1	x_{11}	x_{12}	n_1
Group 2	x_{21}	x_{22}	n_2
Total	m_1	m_2	N

Steps involved in Fisher's test are as follows:

1. Using a multivariate generalization of the hypergeometric probability function, calculate the conditional probability of observing the exact result in the contingency table if the null hypothesis were true, given its row and column sums. The conditional probability is

$$P_{cutoff} = \frac{n_1!n_2!n_3!n_4!}{x_{11}!x_{12}!x_{21}!x_{22}!N!}$$

2. Find all possible matrices of nonnegative integers consistent with the row and column sums. For each matrix, calculate the associated conditional probability using the equation for P_{cutoff}.
3. Use these values to calculate the *p*-value of the test, based on the alternative hypothesis of interest. For a two-sided test, sum all of the conditional probabilities less than or equal to P_{cutoff} for the observed contingency table. This represents the probability of observing a result as extreme as, or more extreme than, the actual outcome if the null hypothesis were true.

The null hypothesis for the test is that there is no association between the rows and columns of the 2 x 2 contingency table such that the probability of a subject being in a particular row is not influenced by being in a particular column. Small *p*-values cast doubt on the validity of the null hypothesis, in favor of the alternative hypothesis of association between the variables. If the p-value is less than the significance level we can reject the null hypothesis. The smaller the p-value the greater certainty there is that the null hypothesis can be rejected.

6.3.1 Comparison of Compliance levels

As was said before one can compare the proportion of individuals who chose to comply in one scenario with proportion of individuals who chose to comply in some other scenario. This is the first set of observations that will be tested. As was mentioned there are six possible combinations of such comparisons, the results of which will be discussed below -

Comparison of Compliance levels between Driving under Influence scenario and Overspeeding/Red light jumping scenario

Given the fact that regulations in both settings are designed for ensuring safety it is quite likely that the difference in compliance level may be found to be insignificant. In case it is found that the difference is significant a closer examination of the nature of inconvenience/ non-monetary costs have to be undertaken to satisfactorily explain the statistical difference. For scenario 1 (Driving under Influence) we have the following information – the total number of samples is 94, number of success is 72 and number of failure is 22. For scenario 2 (Overspeeding/Red light jumping) the total number of samples is again 94, number of success is 79 and number of failure is 15. Putting these numbers in above formulas to calculate z statistic we find that at 5 % level of significance there is no significant difference between the population proportions.

Comparison of Compliance levels between Driving under Influence scenario and Purchase Authentic Software scenario

In this case the nature of positive external benefit is different for the two scenarios. While the regulation prohibiting driving under influence is designed to ensure safe travel the regulation prohibiting acquiring pirated versions of software was designed to incentivize creativity and innovation. The non-monetary costs of compliance in the two scenarios also differ. Given this information it is expected that the difference in compliance levels for these two scenarios will be significant. For scenario 1 (Driving under Influence) and scenario 3 (Purchase of authentic software) the relevant information is as follows. For scenario 1 the total number of samples is 94, number of successes is 72 and number of failures is 22. For scenario 3 the number of total samples, the number of successes and number of failures is 94, 89 and 5 respectively. At 5 % level of significance we can reject the null hypothesis implying a significant difference between proportions of individuals who decided to comply in the two different scenarios.

Comparison of Compliance levels between Driving under Influence scenario and Subscription to Legal Streaming Services scenario

In this case as well the nature of positive external benefit and the nature of inconvenience/ non-monetary costs are different in the two scenarios. Given this the difference is compliance levels should be statistically significant. The relevant information regarding scenario 1 (Driving under Influence) and 4 (Subscription to legal streaming services) is as follows. For scenario 1 the total number of samples is 94, number of successes is 72 and number of failures is 22. For scenario 4 we have number of total samples at 91, number of successes at 84 and number of failures at 7. Performing the test at 5 % level of significance we reject the null hypothesis. This implies that there exists a significant difference between compliance levels in the two scenarios.

Comparison of Compliance levels between Overspeeding/Red light jumping scenario and Purchase Authentic Software scenario

For this case as well the differences in nature of positive external benefit and nature of inconvenience costs exist. As such the difference between compliance levels should be statistically different. For scenario 2 (Overspeeding/ Red light jumping) the information is a follows. The total number of samples is 94, number of successes are 79 and number of failures are 15. For scenario 3 (Purchase of authentic software) we have the number of samples at 94, number of successes is 89 and number of failures is 5. The results indicate that at 5 % level of significance the null hypothesis can be rejected implying there is a significant difference between the two proportions.

Comparison of Compliance levels between Overspeeding/Red light jumping scenario and Subscription to legal streaming services scenario

Once again the two scenario is different in terms of the nature of positive external benefit generated by the regulation and the nature of inconvenience/ non-monetary costs. One can expect that the difference in compliance levels will be statistically significant. Again the relevant information regarding the two scenarios is as follows. For scenario 2 (Overspeeding/ Red light jumping) the total number of samples is 94, the number of successes is 79 and number of failures is 15. For scenario 4 (Subscription to legal streaming services) the number of total samples, the number of successes and number of failures is 91, 84 and 7 respectively. At 5 % level of significance the calculations suggest that null hypothesis can be rejected. Again there is a significant difference between the two proportions.

Comparison of Compliance levels between Purchase Authentic Software scenario and Subscription to legal streaming services scenario

Since the regulation of prohibiting acquiring pirated software and regulation prohibiting illegal download of creative contents both are designed to incentivize creativity and innovation the nature of positive external benefit is similar. Likewise the inconvenience/non-monetary costs of compliance are similar. Therefore, it is to be expected that the difference between compliance levels will be statistically insignificant. For comparison between scenario 3 and scenario 4 the relevant information is as follows. The total number of samples, the number of successes and number of failures for scenario 3 is 94, 89 and 5 respectively. For scenario 4 these numbers are 91, 84 and 7 respectively. At 5 % level of significance we see that null hypothesis cannot be rejected. One can say that statistical difference between the two proportions is not significant.

6.3.2 Gender and Income group comparisons

For Gender and Income group comparisons we can use the Fisher's exact test for checking differences in proportions and testing statistical significance of it. For each scenario we will perform the test by categorizing the data into two categorical variables. First we will do the test for these categorical variables – Gender and Compliance Status. Secondly, we will do the test for Income group and Compliance Status.

From building the 2 x 2 contingency tables we find that z test cannot be administered because in majority of the cases the number of failures is less than 5. Since the number of failures is less than 5, a binomial cannot be approximated as a normal distribution.

Testing for differences in Compliance proportions and Gender proportions

Driving under Influence scenario

For this scenario contingency table will look like this.

Table 17: Contingency Table – Gender (Driving under Influence)

	Comply	Not Comply	Total
Male	40	18	58
Female	32	4	36
Total	72	22	94

Using Fisher Exact Test Calculator[76] we find that the Fisher exact test statistic value is 0.0433. At 5 % level of significance we can reject the null hypothesis. That is, the result is significant at $p < .05$. This implies that the proportions differ across the two genders.

Over speeding/Jumping Red light Scenario

For this scenario contingency table will look like this.

Table 18: Contingency Table – Gender (Over speeding/Jumping Red Light)

	Comply	Not Comply	Total
Male	51	6	57
Female	28	9	37
Total	79	15	94

For this scenario z-statistic test can also be used but we will use Fisher Exact Test here. Using Fisher Exact Test Calculator we find that the Fisher exact test statistic value is 0.0894. At 5 % level of significance we can cannot reject the null hypothesis. The test is

[76] See https://www.socscistatistics.com/tests/fisher/default2.aspx

insignificant at $p < .05$. This implies there is no statistical difference between the two proportions.

Purchase of Software scenario

For this scenario contingency table will look like this.

Table 19: Contingency Table – Gender (Purchase of Software)

	Comply	Not Comply	Total
Male	56	2	58
Female	33	3	36
Total	89	5	94

Using Fisher Exact Test Calculator we find that the Fisher exact test statistic value is 0.3676. At 5 % level of significance we can cannot reject the null hypothesis. The test is insignificant at $p < .05$. This implies there is no statistical difference between the two proportions.

Subscription to Legal Streaming Services scenario

For this scenario contingency table will look like this.

Table 20: Contingency Table – Gender (Subscription to Legal Services)

	Comply	Not Comply	Total
Male	53	2	55
Female	31	5	36
Total	84	7	91

Using Fisher Exact Test Calculator we find that the Fisher exact test statistic value is 0.1085. At 5 % level of significance we can cannot reject the null hypothesis. The test is insignificant at $p < .05$. This implies there is no statistical difference between the two proportions.

From the above analysis it can be concluded that gender becomes a significant factor only in scenario 1. For the other three scenarios we find that gender seems not to be an influence.

Testing for differences in Compliance proportions and Income group proportions

Before performing the test we have merged Income Group II and Income Group III since there are not that many entries in Income Group III. This merger will also allow us to do a Fisher Exact Test for 2x2 contingency table.[77]

Driving under Influence scenario

For this scenario contingency table will look like this.

Table 21: Contingency Table – Income (Driving under Influence)

	Comply	Not Comply	Total
Income Group I	36	8	44
Income Group II	36	14	50
Total	72	22	94

We can do a z-statistic test here as well but we have chosen to perform Fisher Exact Test. Using Fisher Exact Test Calculator we find that the Fisher exact test statistic value is 0.3316. At 5 % level of significance we can cannot reject the null hypothesis. The test is

[77] The Fisher Exact Test can be performed for *m x n* contingency tables.

insignificant at $p < .05$. This implies there is no statistical difference between the two proportions.

Over speeding/Jumping Red light scenario

For this scenario contingency table will look like this.

Table 22: Contingency Table – Income (Over speeding/Jumping Red Light)

	Comply	Not Comply	Total
Income Group I	37	6	43
Income Group II	42	9	51
Total	79	15	94

Just like scenario 1 above a z-statistic test can be done but we have chosen to perform Fisher Exact Test. Using Fisher Exact Test Calculator we find that the Fisher exact test statistic value is 0.7792. At 5 % level of significance we can cannot reject the null hypothesis. The test is insignificant at $p < .05$. This implies there is no statistical difference between the two proportions.

Purchase of Software scenario

For this scenario contingency table will look like this.

Table 23: Contingency Table – Income (Purchase of Software)

	Comply	Not Comply	Total
Income Group I	53	1	54
Income Group II	36	4	40
Total	89	5	94

Using Fisher Exact Test Calculator we find that the Fisher exact test statistic value is 0.1595. At 5 % level of significance we can cannot reject the null hypothesis. The test is insignificant at $p < .05$. This implies there is no statistical difference between the two proportions.

Subscription to Legal Streaming services

For this scenario contingency table will look like this.

Table 24: Contingency Table – Income (Subscription to Legal Services)

	Comply	Not Comply	Total
Income Group I	51	3	54
Income Group II	33	4	37
Total	84	7	91

Using Fisher Exact Test Calculator we find that the Fisher exact test statistic value is 0.4362. At 5 % level of significance we can cannot reject the null hypothesis. The test is insignificant at $p < .05$. This implies there is no statistical difference between the two proportions.

6.4 Summary/Conclusion of the Results of Tests of Significance

Given the nature of the data that was collected from the surveys tests of proportions was employed. For testing whether or not the proportion of individuals who chose to comply in one particular scenario is significantly different from proportion of individuals who chose to comply in some other different scenario **two-proportion z-test** was used. The results of the testing indicate that compliance levels were statistically different from each other in 4 out of 6 possible permutations of comparison. The two proportions – (a) compliance level in driving under influence scenario and compliance level in overspeeding/ red light jumping and (b) compliance level in purchase of software and compliance level in subscription to legal streaming services, were found to be insignificant. The reason for the insignificant statistical difference in the cases may have to do with the similarity in the nature of positive external benefit. The two traffic regulations – restriction on driving under influence and restriction on reckless driving in terms of over speeding and jumping red lights both serve the purpose of increasing safety while travelling which makes the two regulations similar to each other. Similarly, the two copyright regulations – restriction on acquiring pirated software and restriction on illegal download both serve the purpose of incentivizing creation of new content again making the two regulations somewhat similar. In the other four cases the statistical differences can be attributed to differences in both positive external benefit and costs of compliance. Given the fact that compliance levels were higher in copyright regulation scenarios compared to traffic regulation scenarios inconvenience costs of compliance, which were lower or rather absent from the two copyright regulation scenarios, seems to be the stronger force than nature of positive externality factor.

For testing for significance of differences in proportions on the basis of gender for each particular scenario it was found that **z test** could not be administered and therefore **Fisher's Exact Test** was used. The results of the Fisher Exact Test show that male and female proportions and the decision regarding compliance were statistically different only in one of the four scenarios. Only in the Driving under Influence scenario was it found to be statistically different. This implies that males and females behave similarly in most of the regulatory settings. The question of why the behaviour of males and females differed in Driving under Influence Scenario needs to be carefully looked at and requires further examination.

Again, **Fisher's Exact Test** was used for testing significance of differences in proportions on the basis of income for each particular scenario. Before performing the test we merged two separate income groups into one income category. This was done because in one of the income bracket the total number of individuals were very few. Results of the tests show that for all scenarios the income group proportions and compliance and non-compliance proportions were statistically indifferent. This implies that differences in income levels seems not to be paying a role in attitudes towards compliance under any of the regulatory settings that we have discussed.

Chapter VII: Conclusion

The overall theme that this thesis explored was around the idea of welfare. Welfare economics generally deals with the concept of what is welfare and how it can be measured. For example, welfare could mean greatest good for greatest number of people and rising GDP or some quality of life index could be a way of measuring it. There exists another aspect to welfare economics which is the generation of welfare aspect. Unfortunately, this aspect has not garnered as much attention as the other two aspects. Perhaps this was because there was not much need for understanding the nuts and bolts of the process through which social welfare increases. In the Classical or Neoclassical approach the belief is that greater freedom for an individual regarding the choice of actions will allow that individual to improve his/her welfare and consequently the welfare of the society as whole. The two welfare theorems prove this point. As we discussed in the introductory chapter neoclassical approach only shows one side of social welfare. In many situations cooperative solutions are required to increase social welfare. Since achievement of cooperative solutions is not guaranteed an approach which is different from neoclassical approach was required. This new approach came in the form of Institutional approach.

The institutional approach was based on the idea of constraints especially man-made constraints. In essence this idea is fundamentally different from free market neoclassical approach. Yet the institutional approach forms the basis on which neoclassical approach can stand on. The point is neoclassical approach assumed away or ignored several aspects of human behaviour which then became the main subject matter of institutional economics. One of the main insights of the institutional approach is that wherever cooperative solutions are required for ensuring improvement in social welfare certain human activities need to be constrained or curtailed. Even the idea of free markets will fail if certain human behaviour and actions go unchecked. Theory of transaction costs tells us mutually beneficial market exchanges are only possible if transaction costs are not high. These costs are usually very high when there is great deal of uncertainty among individuals regarding what actions others will take. As such streamlining actions that are available to individuals become very necessary. Thus, one could make an argument that constraints on human action and behaviour are just as important for individual and social welfare as is the idea of freedom. If individual and social welfare can be visualized as a coin then the idea of freedom and constraints can be interpreted as the two sides of this coin. The thesis mainly focused on the theme of welfare through constraints.

There are three main sub-themes within the overall theme of welfare through constraints that this thesis explores. The first of which is the recognition and identification of actions that generate benefit in the society. The second sub-theme pertains to the choice of individuals with regard to compliance and non-compliance with institutions. And finally the third theme involves testing the insights that were gained from exploring the first and the second sub-themes. The work done in this thesis was a humble attempt at identifying gaps within our understanding of how institutions work, theorizing a possible explanation and applying the insights gained from this endeavor to explore decision making behaviour of individuals.

The First Sub-Theme: Given that institutions are important for realizing cooperative solutions one has to look at the broader theme and the subthemes of this thesis from an institutional approach. From an institutional perspective the first sub-theme of recognizing and identifying actions that increase social welfare can be understood as the question of which institutions are efficient and which are not. Review of literature on Institutional Economics suggests that institutions have a definite impact on outcomes and that some institutional arrangements are better at achieving their stated objective than other institutional arrangements. For instance, the institutions of right to private property and well defined property rights have produced wonderful outcomes whereas other forms of property right like state ownership have not worked out that well. Moreover, there is no guarantee that an institutional arrangement that works or can be considered as efficient in the present time period may continue to remain efficient in the future. Changes in political and economic systems throughout the history is a testament to this fact. In essence the point that was being made was that institutions act as instruments of welfare.

To understand how institutions act as instruments of welfare a theoretical model was developed which acts as a complement to the transaction costs theory. In the thesis it was argued that transaction costs approach to explain improvement in social welfare works very well in situation where market transaction or exchange takes place. The transaction costs approach simply assumes that cooperative surplus exists without any justification and also without explaining how the cooperative surplus emerges in the first place and what factors could affect the cooperative surplus. In some cases exploitation of cooperative surplus may prove to be inadequate. For example, consider the case of intellectual property rights. These rights are given to creators of original content to incentivize further innovation and creativity. This incentivization cannot fully be explained only with the help of exploitation of cooperative surplus because incentives for further innovation and creativity are getting created after the exchange of product happens at its market price. For this reason, it was argued that an alternative framework was required for explaining movement from a particular state to a preferred state.

The starting point for building an alternative framework was taken as hypothetical society where no institutions exist which constraint human actions or behaviour. This state proved to be useful because it allowed comparison of overall welfare of individuals before and after the introduction of rules and regulations. A detailed analysis on the basis of this idea allowed us to identify the process through which institutions improve welfare. This process was described in the following way – (1) Institutions impose costs on individuals by forcing them to refrain from undertaking certain activities. The cost here refers to the possible reduction in utility that an individual may experience because of following the institution and (2) Institution creates welfare through positive external effects. More the number of individuals who follow the institution larger is the magnitude of these positive external effects.

A formal model describing the above process was presented which then allowed us to derive two efficiency conditions for institutions thereby enabling a better or clear demarcation between efficient and inefficient institutions. Based on the above framework for an institution to be characterized as efficient it must at least satisfy the first condition. The first efficiency condition ensures that it is best for the society to have the institution and have everyone follow it to a situation where it does not exist or no one follows it. It was argued that most institutions which are efficient are likely to satisfy the first efficiency condition but not the second. Second efficiency condition ensures that Social Welfare is maximum only when all individuals follow the institution. It is a much stronger condition that implies rules and regulations can be specified perfectly for all possible contingency scenarios. The closer a set of rules comes towards specifying required actions in all possible contingent scenarios the greater would be the efficiency of that institutional arrangement. This framework is useful not only because it clearly lays out conditions that must be met for efficiency but also for its easy applicability. For instance, it was mentioned how traffic regulations, copyright regulations, institutionalized fishing practices, prohibitions regulations and even large scale government policies such as Soviet Collectivization program can be understood using the framework that was developed. The fact that these various institutions affect human lives in different ways shows that the alternative method has great degree of applicability. The framework can be applied as long as a decent measure of disutility caused by imposition of regulation and beneficial positive external effect can be gauged, the framework proves to be useful.

Second Sub-theme: A major implication of this model is regarding the issue of compliance with institutions. This is where the framework allows us to delve deeper into the second theme of the thesis. The second theme of this thesis revolved around the idea of choice of individuals regarding compliance and non-compliance with a particular institution. The main focus here was on understanding the incentive structure for following or not following a particular institution. On the basis of the analysis done in the thesis one could infer that the members of the society are motivated to follow the institution when the institution works in their favour and they are less motivated to follow an institution if they do not place a high value on the indirect benefit generated through positive external effects. The analysis suggested a hypothesis for compliance which can be stated as: *The tradeoff between the cost of following an institution and the indirect benefits obtained through generation of positive external effects acts as a major motivation for compliance or non-compliance. If the perception that the indirect benefit through positive external effect will outweigh the direct cost of following the institution exists then one can observe compliance and if the indirect benefit through positive external effect does not outweigh the direct cost of following the institution then non-compliance will be observed.* This hypothesis indicated self-regulatory nature of an institution. In the thesis this hypothesis was referred to as the Trade-off hypothesis. This trade-off not only depends on the nature of indirect benefit generated through positive external effects but also on direct and indirect costs of compliance. As a result of these differences it was natural to expect differences in favourability towards different regulations. That is, observed compliance levels should be different if two institutions differ from each other in terms of nature of indirect benefit generated through positive external effect and magnitude of direct and indirect costs of compliance. The differences in favourability towards regulations in terms of expected levels of compliance were presented as three propositions.

Note that in the thesis it was mentioned that the Trade-off hypothesis on its own is not sufficient to explain cooperativeness or decision of an individual to comply or not comply. It is a well-known fact that compliance can be a very complex behaviour and could be influenced by several other factors. Factors such as deterrence and other psychological factors such as perception of legitimacy of rule or the rule maker, expected behaviour of other individuals, social norms, peer pressure and so on, affect decision making as well. Any comparison of attitude towards different regulatory settings must incorporate these influences as well. Under this light it became important to understand which influence is the primary influence and under which institutional settings. This led us to the third theme that was covered in the thesis.

Third sub-theme: The third theme primarily involved testing out our hypothesis and propositions that were derived from the formal analysis and interpreting the results of the tests. Developing a methodology for analyzing differences in attitudes of individuals towards different institutional or regulatory settings required neutralizing certain caveats that would arise while doing a comparative analysis of this kind. A direct comparison of attitudes of individuals towards different regulations is not straight forward. Caveats such as differences in nature of costs imposed and benefits accrued through positive external effect and similarity or dissimilarity of target population that must be minimized. In the thesis we provided an argument for comparability of traffic regulations and copyright regulations. Keeping this in mind an experimental study was designed which presented two scenarios that pertain to traffic regulations and copyright regulations respectively. Each scenario presented two courses of action – one representative of compliance behaviour and the other representative of non-compliance behaviour. The respondents were also asked to assign ranks to different motivations that influenced their decision in terms of importance. This study was done using Survey Monkey online platform.

Some of the main findings of this study are –

1. Compliance levels for the two traffic related scenarios was approximately 80 percent whereas compliance level for the two copyright regulation scenarios was over 90 percent. This difference was also found to be statistically significant. The difference in compliance levels suggests that inconvenience costs of compliance are playing a more significant role in determining decision to comply.
2. Based on the ranking of different motivations to comply or not comply our study revealed that the trade-off influence was primary influence of compliance or non-compliance decision in all four different scenarios with few exceptions.
3. As far as change of behaviour due to changes in certain variables is concerned, all these variables when changed in a way to induce shift from compliance to non-compliance actually led to several respondents changing their chosen action from compliance to non-compliance. However, no single variable mentioned above stands out prominently since pattern of shift caused by each variable is relatively same. This was true for all scenarios.
4. Compliance or non-compliance patterns across gender and income differences showed some interesting observations. Except for the Driving under Influence scenario where we find a statistical difference in attitudes of males and females regarding compliance, all other scenarios showed no statistical difference in attitudes towards compliance based on gender No clear cut pattern emerges when taking income differences into account and differences were all statistically insignificant. This was true for all scenarios.

What things can we infer from the above findings and what policy implications can we draw from it? The results suggested that inconvenience costs incurred while taking an action seem to be a more dominant factor which pushes individuals towards compliance or non-compliance. If this is true then in order to deter individuals from breaking traffic rules especially the drunken driving behaviour, fines and punishments should also be designed in such a way that it would include significant time cost penalties as well. And in the case of reducing piracy making original content legally available in short span of time alone should be sufficient.

To sum up, in the introductory chapter two issues were raised when it came to the idea of welfare through cooperative solutions. The first was regarding recognizing and identifying welfare inducing actions. The theoretical framework developed in the thesis helped us with this endeavor. The work done in the thesis suggests that any institution that is being considered for promulgation must satisfy the first efficiency condition if not the both. As long as one can arrive at an accurate estimate for average loss of utility and increase in utility due to positive external benefit it is possible to recommend or reject policy of introducing that institution. Of course, it is noted that arriving at fairly accurate estimates for average loss in utility and increase in welfare due to positive external benefit is not an easy task as both loss and benefit may have intangible aspects as well which makes using the efficiency criterion a little difficult. Nonetheless, if a particular institutional setting has stood the test of time then one can with a reasonable degree of confidence say that first efficiency condition is satisfied. As far as levels of cooperation, which was the second issue raised in the introductory chapter is concerned, the results of the study indicate that choice of compliance is affected by several variables and that non-monetary costs or benefits play just as important a role in decision making as the monetary costs and benefits of compliance or non-compliance. Ignoring or neglecting the effect of non-monetary aspects of compliance or non-compliance will result in either overestimating or underestimating the favourability of institutions in the eyes of the relevant public. The basic ideas presented in the thesis can also be applied to real life incidents. In Annexure C to the chapter we present an anecdotal evidence in support of the claims made in the thesis. Broadly speaking, we try to present an analysis of lockdown as an institution to curb spread of Corona Virus and its impact on individual and overall social welfare.

Future Research Agenda: So far we have discussed the results of the thesis and provided justification for the theoretical framework proposed in the thesis and its implications and propositions regarding compliance behaviour. The study revealed some interesting results and insights that can be helpful for policy makers. Nonetheless, it should be noted that there is always a possibility that the study can be improved or expanded to reveal even better insights. The question then becomes how we can take this research forward. One way of expanding this research is to include more heterogeneous population and compare whether significant differences exist in their behaviour. We know that perception regarding avoiding costs of compliance and value of positive external effect benefit, deterrence, legitimacy, importance of peer-pressure, etc. depend on age, gender and various other factors. Understanding how these perceptions change with age, gender or any other factor could prove to be very useful for designing rules and regulations and could greatly help in effective enforcement of such rules.

Appendix C

An Anecdotal Evidence for the Theoretical Framework and Results

From the results of the experimental study done one can conclude that there is a decent support or justification for the theoretical framework that this thesis proposed. It appears that the claims made in the thesis regarding the process of how institutions improve welfare and the role of trade-off between benefit of avoiding compliance costs and indirect benefit through positive external effect in decision making of individuals have some merit. Given that the support for the theoretical framework used in this thesis comes from an experimental study an obvious question arises - to what extent can the results of the study be considered as credible? In other words, would the results correspond with real life situations and in different kinds of setting? The answer to these questions is not simple or obvious and perhaps cannot ever be answered satisfactorily. Nonetheless, some anecdotal evidence can prove to be somewhat useful in this task. One such anecdotal evidence will be discussed below.

Case of Lockdown during Covid-19 Pandemic: The outbreak of Covid-19 pandemic brought an abrupt change in the world by not only taking a heavy toll on human lives but also by disrupting the social and economic aspects of human lives. Due the severe danger that this pandemic posed governments across the globe were forced to undertake drastic measures to contain the spread of the disease and India was no exception. Given the poor state of health infrastructure in this country Government of India took major steps for containing the spread. One such step was in the form of a nation-wide lockdown that was imposed in March 2020.[78] This nation-wide lockdown initiative can be regarded as an emergency institution that was imposed on the public. As a measure for maintaining social distance individuals were required to stay at home. Shops and businesses with a few exceptions were to remain closed for the duration of lockdown. It should be clearly evident that such restrictions imposed heavy costs on individuals as well as businesses. At the same time these heavy restrictions played a vital role in containing the spread of the virus. Also

[78] The duration of lockdown was initially meant to be two weeks but got extended beyond that.

note that the success of lockdown initiative depended on cooperation levels of the general public. The greater the number of individuals and businesses who would comply with the requirements of the lockdown initiative lower would be the spread of the disease. Thus, the idea of interpreting lockdown as an institution fits perfectly well within the framework that was developed in the thesis.

As far as compliance issue is concerned it would not be wrong to say that public in general cooperated to a large extent especially for the duration of the initial two weeks. It should also be kept in mind that government – both central and state, sought greater compliance through deterrence through introduction of punishments for violators. Furthermore, the legitimacy of the lockdown initiative was also not questionable in the eyes of the public.[79] Other influences such as expectation of appropriate behaviour and peer and family pressures were present which played a role in achieving greater compliance levels.

In spite of its initial favourability and success the lockdown initiative went through a significant hiccup. The lockdown period was extended beyond its initial intended duration of two weeks. The extended lockdown initiated a process of reverse migration of workers from urban to rural areas. This was known as the migrant labour crisis. It was seen that thousands of workers across several states in India began to break the lockdown protocols to return to their home states in spite of knowing the risks associated with it. The problem was so severe that government had to take cognizance of this fact and had to take measures for safe transportation of workers to their respective home states. Naturally, had the crisis been avoided or prevented from ever emerging in the first place, the spread of the virus could have been further contained. To understand why the crisis emerged one has to understand the change in attitudes of migrant workers towards lockdown protocols. The decision of workers to break lockdown protocol could be looked at in terms of trade-off hypothesis. Given that most factories and businesses were shut and as the duration of lockdown got extended the cost of compliance with lockdown protocols increased for these migrant workers. This increase could have been significant enough to outweigh the indirect benefit of lower risk of infection. That is, for this section of the population the lockdown

[79] This could be because the lockdown was not introduced suddenly. The government initiatives like Janta curfew had made public aware about the dangers of the virus and it also had the effect of preparing the public for more drastic measures.

initiative may have become an inefficient institution. In fact one can make an argument that out of all the compliance theories and hypothesis, only the trade-off hypothesis can explain this change in attitude in a satisfactory manner. This is because there was neither a change in deterrence effect nor a change in perception of legitimacy of introduction of lockdown. Furthermore, other psychological factors such as peer-pressure and expected behavior could not have changed drastically either. Thus, in this particular case the trade-off hypothesis proves to be a significant explanation for compliance behaviour. As such it can be said that the case of lockdown initiative is a decent anecdotal evidence for the claims made in the thesis.

Bibliography

Acemoglu, D. and Robinson, J.A., (2008). Persistence of Power, Elites, and Institutions. *American Economic Review*, *98*(1), pp.267-93.

Aghion, P., & Holden, R. (2011). Incomplete Contracts and the Theory of the Firm: What Have We Learned over the Past 25 Years? *The Journal of Economic Perspectives, 25*(2), 181-197.

Ahn, T., Esarey, J., & Scholz, J. (2009). Reputation and Cooperation in Voluntary Exchanges: Comparing Local and Central Institutions. *The Journal of Politics, 71*(2), 398-413. doi:10.1017/s0022381609090355

Ajzen, I, and Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, N.J.: Prentice-Hall.

Ake, C. (1970). Social Contract Theory and the Problem of Politicization: The Case of Hobbes. *The Western Political Quarterly, 23*(3), 463-470. doi:10.2307/446566

Akerlof, G. (1970). The Market for "Lemons": Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics*, *84*(3), 488-500.

Al-Rafee, S., & Cronan, T. (2006). Digital Piracy: Factors That Influence Attitude toward Behavior. *Journal of Business Ethics, 63*(3), 237-259.

Alexander, R. D. (1987). *The Biology of Moral Systems*. Transaction Publishers.

Allingham, M. G., & Sandmo, A. (1972). Income tax evasion: A theoretical analysis. *Journal of Public Economics*, *1*(3-4), 323-338.

Andersen, B., & Frenz, M. (2010). Don't blame the P2P file-sharers: the impact of free music downloads on the purchase of music CDs in Canada. *Journal of Evolutionary Economics*, *20*(5), 715-740.

Andreoni, J., Erard, B., & Feinstein, J.. (1998). Tax Compliance. *Journal of Economic Literature*, *36*(2), 818–860.

Arrow, K. (1963). Uncertainty and the Welfare Economics of Medical Care. *The American Economic Review*, *53*(5), 941-973.

Axelrod, R., & Hamilton, W. D. (1981). The Evolution of Cooperation. *Science*, *211*(4489), 1390-1396.

Bai, J., & Waldfogel, J. (2012). Movie piracy and sales displacement in two samples of Chinese consumers. *Information Economics and Policy*, *24*(3-4), 187-196.

Baker, M., Bulte, E., & Weisdorf, J. (2006). The Origins of Governments: From Amorphy to Anarchy and Hierarchy. *Journal of Institutional Economics, 6(2)*

Balestrino, A. (2008). It is a theft but not a crime. *European Journal of Political Economy*, *24*(2), 455-469.

Bardhan, P. (2005). Institutions matter, but which ones?. *Economics of Transition*, *13*(3), 499-532.

Becker, G. (1968). Crime and Punishment: An Economic Approach. *Journal of Political Economy*, *76*(2), 169-217.

Becker, G. S., & Stigler, G. J. (1974). Law enforcement, malfeasance, and compensation of enforcers. *The Journal of Legal Studies*, *3*(1), 1-18.

Bellinger, W.K., (2016). *The Economic Analysis of Public Policy 2nd Edition*. New York: Routledge

Block, W., & DiLorenzo, T. (2000). Is Voluntary Government Possible? A Critique of Constitutional Economics. *Journal of Institutional and Theoretical Economics (JITE) / Zeitschrift Für Die Gesamte Staatswissenschaft*, *156*(4), 567-582.

Blocker Jr, J.S., (2006). Did Prohibition Really Work? Alcohol Prohibition as a Public Health Innovation. *American Journal of Public Health*, *96*(2), pp. 233-243.

Bobek, D., Hageman, A., & Kelliher, C. (2013). Analyzing the Role of Social Norms in Tax Compliance Behavior. *Journal of Business Ethics*, *115*(3), 451-468.

Bolton, P., & Dewatripont, M. (2005). *Contract Theory*. MIT press.

Bower, B. (2004). One-celled socialites: Bacteria mix and mingle with microscopic fervor. *Science News*, *166*(21), 330-332.

Bowles, S., & Gintis, H. (2013). *A Cooperative Species: Human Reciprocity and its Evolution*. Princeton University Press.

Briggeman, J. (2009). Governance as a Strategy in State-of-Nature Games. *Public Choice*, *141*(3/4), 481-491.

Buchanan, J. M. (1975). *The Limits of Liberty: Between Anarchy and Leviathan*. University of Chicago Press.

Bush, W., (2005). Individual Welfare in Anarchy. In: Edward Stringham ed., *Anarchy, State and Public Choice*, Edward Elgar Publishing.

Bush, W. C., & Mayer, L. S. (1974). Some Implications of Anarchy for the Distribution of Property. *Journal of Economic Theory*, *8*(4), 401-412.

Cauzard, J. P., & Quimby, A. (2000). The attitudes of European drivers towards the enforcement of traffic regulations. *ESCAPE'project*, *Deliverable*, *7*.

Chang, H. J. (2005). Globalization, Global Standards, and the Future of East Asia. *Global Economic Review*, *34*(4), 363-378.

Chang, H. J. (2011). Institutions and Economic Development: Theory, Policy and History. *Journal of Institutional Economics*, *7*(4), 473-498.

Chavance, B., (2008). *Institutional economics*. Routledge.

Cialdini, R. B., & Trost, M. R. (1998). *Social influence: Social norms, conformity and compliance.* In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The Handbook of Social Psychology* (p. 151–192). McGraw-Hill.

Coase, R. (1937). The Nature of the Firm. *Economica, 4*(16), new series, 386-405. doi:10.2307/2626876

Coase, R. (1960). The Problem of Social Cost. *Journal of Law and Economics*, The University of Chicago Press, Vol. 3 (Oct., 1960): 1–44, doi:10.1086/466560.

Colander, D. (1996). New Institutionalism, Old Institutionalism, and Distribution Theory. *Journal of Economic Issues, 30*(2), 433-442.

Conner, M., Lawton, R., Parker, D., Chorlton, K., Manstead, A. S., & Stradling, S. (2007). Application of the theory of planned behaviour to the prediction of objectively assessed breaking of posted speed limits. *British Journal of Psychology*, *98*(3), 429-453.

Constantine, C. (2017). Economic Structures, Institutions and Economic Performance. *Journal of Economic Structures*, *6*(1), 1-18.

Cooter, R. (1998). Expressive Law And Economics. *The Journal of Legal Studies*, *27*(S2), 585-607. doi:10.1086/468036

Dagger, R. (2000). Philosophical Anarchism and Its Fallacies: A Review Essay. *Law and Philosophy*, *19*(3), 391-406.

D'Agostino, F.,Thrasher, J., and Gaus, G. (2017). Contemporary Approaches to the Social Contract. In: Edward N. Zalta., ed, *The Stanford Encyclopedia of Philosophy*. The Metaphysics Research Lab, Center for the Study of Language and Information (CSLI), Stanford University. plato.stanford.edu/index.html

Danaher, B., Smith, M., & Telang, R. (2014). Piracy and Copyright Enforcement Mechanisms. *Innovation Policy and the Economy, 14*(1), 25-61. doi:10.1086/674020

Dandona, R., Anil Kumar, G., & Dandona, L. (2005). Traffic law enforcement in Hyderabad, India. *International journal of injury control and safety promotion*, *12*(3), 167-176.

Darwin, C. (2016). On the Origin of Species, 1859. URl: http://darwin-online.org.uk/converted/pdf/1861_OriginNY_F382.pdf

Davos, K. (2013). *Factors influencing individual taxpayer compliance behaviour*. Springer Science & Business Media.

De Graaf, G. (2006). The Autonomy of the Contracting Partners: An Argument for Heuristic Contractarian Business Ethics. *Journal of Business Ethics, 68*(3), 347-361.

De Long, J.B. and Shleifer, A., (1993). Princes and Merchants: European City Growth before the Industrial Revolution. *The Journal of Law and Economics*, *36*(2), pp. 671-702.

Demsetz, H. (1967). Toward a Theory of Property Rights. *The American Economic Review, 57*(2), 347-359.

De Vany, A., & Walls, W. (2007). Estimating the Effects of Movie Piracy on Box-office Revenue. *Review of Industrial Organization, 30*(4), 291-301.

Dequech, D. (2002). The Demarcation between the "Old" and the "New" Institutional Economics: Recent Complications. *Journal of Economic Issues*, *36*(2), 565-572.

Dequech, D. (2007). Neoclassical, Mainstream, Orthodox, and Heterodox Economics. *Journal of Post Keynesian Economics, 30*(2), 279-302.

Dorfman, J. (1955). The Role of the German Historical School in American Economic Thought. *The American Economic Review, 45*(2), 17-28.

Douhou, S., Magnus, J. R., & van Soest, A. (2011). The perception of small crime. *European Journal of Political Economy*, *27*(4), 749-763.

Dunbar, J., Penttila, A., & Pikkarainen, J. (1987). Drinking And Driving: Success Of Random Breath Testing In Finland. *British Medical Journal (Clinical Research Edition), 295*(6590), 101-103.

Dunfee, T., & Donaldson, T. (1995). Contractarian Business Ethics: Current Status and Next Steps. *Business Ethics Quarterly, 5*(2), 173-186. doi:10.2307/3857352

Dwenger, N., Kleven, H., Rasul, I., & Rincke, J. (2016). Extrinsic and Intrinsic Motivations for Tax Compliance: Evidence from a Field Experiment in Germany. *American Economic Journal: Economic Policy, 8*(3), 203-232.

Ehrlich, I. (1973). Participation in illegitimate activities: A theoretical and empirical investigation. *The Journal of Political Economy*, 521-565.

Fitzpatrick, S., (1996). *Stalin's Peasants: Resistance and Survival in the Russian Village after Collectivization*. New York: Oxford University Press.

Fowler, J. H., & Christakis, N. A. (2010). Cooperative behavior cascades in human social networks. *Proceedings of the National Academy of Sciences*, *107*(12), 5334-5338.

Franck, T. M. (1988). Legitimacy in the international system. *The American Journal of International Law*, *82*(4), 705-759.

Funk, P. (2007). Is there an expressive function of law? An empirical analysis of voting laws with symbolic fines. *American Law and Economics Review*, *9*(1), 135-159.

Goel, G., & Sachdeva, S. N. (2016). Analysis of road accidents on NH-1 between RD 98 km to 148 km. *Perspectives in Science*, *8*, 392-394.

Goldman, A. H. (2006). The rationality of complying with rules: paradox resolved. *Ethics*, *116*(3), 453-470.

Grasmick, H. G., & Bryjak, G. J. (1980). The deterrent effect of perceived severity of punishment. *Social Forces*, *59*(2), 471-491.

Groennings, K. (2005). Costs and Benefits of the Recording Industry's Litigation against Individuals. *Berkeley Technology Law Journal*, *20*(2), 571-601.

Grossman, S., & Hart, O. (1986). The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration. *Journal of Political Economy, 94*(4), 691-719.

Hamilton, W. D. (1964). The genetical evolution of social behaviour. II. *Journal of theoretical biology*, *7*(1), 17-52.

Handke, C. (2011). Economic effects of copyright. The emprical evidence so far. *Report prepared for the Committee on the Impact of Copyright Policy on Innovation in the Digital Era (USA).*

Handke, C. (2011). The innovation costs of copyright. *Society for Economic Research in Copyright Issues*

Hansen, B. (2015). Punishment and Deterrence: Evidence from Drunk Driving. *The American Economic Review*, *105*(4), 1581-1617.

Hardin, G. (1968). The Tragedy of the Commons. *Science, 162*(3859), 1243-1248.

Hart, O., & Moore, J. (1990). Property Rights and the Nature of the Firm. *Journal of Political Economy, 98*(6), 1119-1158.

Hart, O., & Moore, J. (1999). Foundations of Incomplete Contracts. *The Review of Economic Studies, 66*(1), 115-138.

Hertwig, R. (2006). *Do legal rules rule behavior?* In G. Gigerenzer & C. Engel (Eds.), *Dahlem workshop reports. Heuristics and the law* (p. 391–410). MIT Press; Dahlem University Press.

Hennig-Thurau, T., Henning, V., & Sattler, H. (2007). Consumer File Sharing of Motion Pictures. *Journal of Marketing*, *71*(4), 1-18.

Higgins, G. E. (2006). Gender differences in software piracy: The mediating roles of self-control theory and social learning theory. *Journal of Economic Crime Management*, *4*(1), 1-30.

Hingson, R. W., Howland, J., & Levenson, S. (1988). Effects of Legislative Reform to Reduce Drunken Driving and Alcohol-Related Traffic Fatalities. *Public Health Reports (1974-), 103*(6), 659-667.

Hirshleifer, J. (1995). Anarchy and its Breakdown. *Journal of Political Economy, 103*(1), 26-52.

Hodgson, G. (2006). What Are Institutions? *Journal of Economic Issues, 40*(1), 1-25.

Hodgson, G. (2000). What Is the Essence of Institutional Economics? *Journal of Economic Issues*, *34*(2), 317-329.

Holmström, B. (1979). Moral Hazard and Observability. *The Bell Journal of Economics, 10*(1), 74-91. doi:10.2307/3003320

Ikeda, Y. (2008). The German Historical School: Toward the Integration of the Social Sciences. *The History of Economic Thought*, *50*(1), 79-95.

Jackson, J., Bradford, B., Hough, M., Myhill, A., Quinton, P., & Tyler, T. (2012). WHY DO PEOPLE COMPLY WITH THE LAW? Legitimacy and the Influence of Legal Institutions. *The British Journal of Criminology, 52*(6), 1051-1071.

Jones, C. and Hall, R., (1999). *Why Do Some Countries Produce So Much More Output per Worker than Others?* Cambridge, Massachusetts: National Bureau of Economic Research.

Joskow, Paul. (2008). New Institutional Economics: A Report Card. In: Brousseau, E. and Glachant, J.M., ed., *New Institutional Economics: A Guidebook*. Cambridge University Press.

Kanwar, S., & Evenson, R. (2003). Does Intellectual Property Protection Spur Technological Change? *Oxford Economic Papers, 55*(2), 235-264.

Kaufman, B. E. (2007). The Institutional economics of John R. Commons: Complement and Substitute for Neoclassical Economic Theory. *Socio-Economic Review*, *5*(1), 3-45.

Keeley, M. (1980). Organizational Analogy: A Comparison of Organismic and Social Contract Models. *Administrative Science Quarterly, 25*(2), 337-362. doi:10.2307/2392458

Keeley, M. (1995). Continuing the Social Contract Tradition. *Business Ethics Quarterly, 5*(2), 241-255. doi:10.2307/3857355

Kenkel, D. (1993). Drinking, Driving, and Deterrence: The Effectiveness and Social Costs of Alternative Policies. *The Journal of Law & Economics, 36*(2), 877-913.

Kennedy, K. C. (1983). *Critical Appraisal of Criminal Deterrence* Theory. *Dick. L. Rev.*, *88*, 1.

Knack, S. and Keefer, P., (1995). Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures. *Economics & Politics, 7*(3), pp.207-227.

Konrad, K., & Skaperdas, S. (2012). The market for protection and the origin of the state. *Economic Theory, 50*(2), 417-443.

Kuperan, K., & Sutinen, J. G. (1998). Blue water crime: deterrence, legitimacy, and compliance in fisheries. *Law and Society Review*, 309-338.

Langlois, R. N. (1989). What was wrong with the Old Institutional Economics (and what is still wrong with the New)?. *Review of Political Economy*, *1*(3), 270-298.

Leeson, P. (2007). Efficient Anarchy. *Public Choice, 130*(1/2), 41-53.

Leimar, O., & Hammerstein, P. (2001). Evolution of cooperation through indirect reciprocity. *Proceedings of the Royal Society of London. Series B: Biological Sciences*, *268*(1468), 745-753.

Liebowitz, S. J. (2006). File sharing: creative destruction or just plain destruction?. *The Journal of Law and Economics*, *49*(1), 1-28.

Maskin, E., & Roberts, K. (2008). On the Fundamental Theorems of General Equilibrium. *Economic Theory*, *35*(2), 233-240.

Maskin, E., & Tirole, J. (1999). Unforeseen Contingencies and Incomplete Contracts. *The Review of Economic Studies*, *66*(1), 83-114.

Maslow, A. H. (1943). A Theory of Human Motivation. *Psychological Review*, *50*(4), 370.

Maslow, A. H. (1954). *Motivation and Personality*. New York: Harper & Row Publishers Inc.

Mathew, S., & Boyd, R. (2011). Punishment sustains large-scale cooperation in prestate warfare. *Proceedings of the National Academy of Sciences of the United States of America*, *108*(28), 11375-11380.

Mauro, P., (1995). Corruption and Growth. *The Quarterly Journal of Economics*, *110*(3), pp.681-712.

Mayhew, A. (1987). The Beginnings of Institutionalism. *Journal of Economic Issues*, *21*(3), 971-998.

McAdams, R. H. (2000). A focal point theory of expressive law. *Virginia Law Review*, 1649-1729.

McAdams, R. H., & Nadler, J. (2005). Testing the Focal Point Theory of Legal Compliance: The Effect of Third-Party Expression in an Experimental Hawk/Dove Game. *Journal of Empirical Legal Studies*, *2*(1), 87-123.

McAdams, R. H., & Nadler, J. (2008). Coordinating in the shadow of the law: Two contextualized tests of the focal point theory of legal compliance. *Law & Society Review*, *42*(4), 865-898.

McCormick, P. (1976). Social Contract: Interpretation and Misinterpretation. *Canadian Journal of Political Science / Revue Canadienne De Science Politique, 9*(1), 63-76.

McCornac, D. (1982). The Effects of Government Regulation on Teenage Motor Vehicle Mortality. *NBER Working Papers 1030*, National Bureau of Economic Research, Inc.

McIntosh, D. (1978). The Dimensions Of Anarchy. *Nomos*, *19*, 239-272.

McMahon, C. (2000). Collective rationality. *Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition*, *98*(3), 321-344.

Meier, K., & Morgan, D. (1982). Citizen Compliance with Public Policy: The National Maximum Speed Law. *The Western Political Quarterly, 35*(2), 258-273. doi:10.2307/448019

Melis, A., & Semmann, D. (2010). How is human cooperation different? *Philosophical Transactions: Biological Sciences, 365*(1553), 2663-2674.

Mennell, S.J., (1969). Prohibition: A Sociological View. *Journal of American Studies*, *3*(2), pp. 159-175.

Mirrlees, J. (1976). The Optimal Structure of Incentives and Authority within an Organization. *The Bell Journal of Economics, 7*(1), 105-131. doi:10.2307/3003192

Molander, P. (1992). The Prevalence of Free Riding. *The Journal of Conflict Resolution, 36*(4), 756-771.

Moore, G. (1978). Wesley Mitchell in Retrospect. *Journal of Economic Issues, 12*(2), 277-286.

Moores, T. T., & Esichaikul, V. (2011). Socialization and Software Piracy: A study. *Journal of Computer Information Systems*, *51*(3), 1-9.

Nagin, D. S., & Paternoster, R. (1993). Enduring individual differences and rational choice theories of crime. *Law and Society Review*, 467-496.

Nagin, D. S. (2013). Deterrence in the twenty-first century. *Crime and Justice, 42*(1), 199-263.

Nöldeke, G., & Schmidt, K. (1995). Option Contracts and Renegotiation: A Solution to the Hold-up Problem. *The RAND Journal of Economics, 26*(2), 163-179.

North, D.C., (1991). Institutions. *Journal of Economic Perspectives, 5*(1), pp. 97-112.

North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press.

North, D. C. (1993). The New institutional Economics and Development. *Economic History*. 9309002, University Library of Munich, Germany.

Nowak, M. A., & May, R. M. (1992). Evolutionary games and spatial chaos. *Nature*, *359*(6398), 826-829.

Nowak, M. A., & Sigmund, K. (1998). Evolution of indirect reciprocity by image scoring. *Nature*, *393*(6685), 573-577.

Oberholzer-Gee, F., & Strumpf, K. (2007). The Effect of File Sharing on Record Sales: An Empirical Analysis. *Journal of Political Economy, 115*(1), 1-42. doi:10.1086/511995

Okuguchi, K. (1976). Natural Equilibrium in The Bush-Mayer Model of Anarchy: A Dynamic Analysis. *Public Choice, 26*, 129-134.

Olson, M. (1993). Dictatorship, Democracy, and Development. *The American Political Science Review, 87*(3), 567-576. doi:10.2307/2938736

Orsagh, T., & Chen, J. R. (1988). The effect of time served on recidivism: An interdisciplinary theory. *Journal of Quantitative Criminology*, *4*(2), 155-171.

Ostrom, E. (1990). *Governing the commons: The evolution of Institutions for Collective Action*. Cambridge University Press.

Paternoster, R. (2010). How much do we really know about criminal deterrence?. *The Journal of Criminal Law and Criminology,* 765-824.

Pauly, M. (1968). The Economics of Moral Hazard: Comment. *The American Economic Review, 58*(3), 531-537.

Petridou, E., & Moustaki, M. (2000). Human factors in the causation of road traffic crashes. *European journal of epidemiology*, *16*(9), 819-826.

Phau, I., & Ng, J. (2010). Predictors of usage intentions of pirated software. *Journal of Business Ethics*, *94*(1), 23-37.

Powell, B., & Stringham, E. (2009). Public Choice and the Economic Analysis of Anarchy: A Survey. *Public Choice, 140*(3/4), 503-538.

Raihani, N., & Hart, T. (2010). Free-riders promote Free-riding in a Real-World Setting. *Oikos, 119*(9), 1391-1393.

Rand, D. G., Arbesman, S., & Christakis, N. A. (2011). Dynamic social networks promote cooperation in experiments with humans. *Proceedings of the National Academy of Sciences*, *108*(48), 19193-19198.

Rand, D., Dreber, A., Ellingsen, T., Fudenberg, D., & Nowak, M. (2009). Positive Interactions Promote Public Cooperation. *Science, 325*(5945), new series, 1272-1275.

Ritchie, D. (1891). Contributions to the History of the Social Contract Theory. *Political Science Quarterly, 6*(4), 656-676. doi:10.2307/2139203

Rob, R., & Waldfogel, J. (2006). Piracy on the High C's: Music Downloading, Sales Displacement, and Social Welfare in a Sample of College Students. *The Journal of Law & Economics, 49*(1), 29-62. doi:10.1086/430809

Rodrik, D., Subramanian, A. and Trebbi, F., (2004). Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development. *Journal of Economic Growth*, *9*(2), pp.131-165

Ross, H. (1975). The Scandinavian Myth: The Effectiveness of Drinking-and-Driving Legislation in Sweden and Norway. *The Journal of Legal Studies, 4*(2), 285-310.

Ross, H. L. (1981). *Deterrence of the drinking driver: An international survey*. The Administration.

Rutherford, M. (1989). What is wrong with the New Institutional Economics (and what is still wrong with the Old)?. *Review of Political Economy*, *1*(3), 299-318.

Rutherford, M. (1995). The Old and the New Institutionalism: Can Bridges Be Built? *Journal of Economic Issues, 29*(2), 443-451.

Rutherford, M. (2001). Institutional Economics: Then and Now. *The Journal of Economic Perspectives, 15*(3), 173-194.

Rutten, A. (1999). Can Anarchy Save Us from Leviathan? *The Independent Review, 3*(4), 581-593.

Sääksvuori, L. (2014). Intergroup conflict, ostracism, and the evolution of cooperation under free migration. *Behavioral Ecology and Sociobiology, 68*(8), 1311-1319.

Sabine, G. H. (1937). *A History of Political Theory*. Holt, Rinehart and Winston Inc., New York

Sasaki, T., & Uchida, S. (2013). The evolution of cooperation by social exclusion. *Proceedings: Biological Sciences, 280*(1752), 1-7.

Schmidt-Trenz, H. (1989). The State of Nature in the Shadow of Contract Formation: Adding a Missing Link to J.M. Buchanan's Social Contract Theory. *Public Choice, 62*(3), 237-251.

Schofield, N. (1985). Anarchy, Altruism and Cooperation: A Review. *Social Choice and Welfare, 2*(3), 207-219.

Scott, J.C., (1998). *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven and London: Yale University Press.

Senn, P. R. (2005). The German historical schools in the history of economic thought. *Journal of Economic Studies*, *32*(3), 185-255.

Shami, S. (2005). Road Traffic Safety: Cost of Government Neglect. *Economic and Political Weekly*, *40*(16), 1598-1602.

Shapiro, P., & Votey Jr, H. L. (1984). Deterrence and subjective probabilities of arrest: Modeling individual decisions to drink and drive in Sweden. *Law and Society Review*, 583-604.

Shavell, S., (2012). When Is Compliance with the Law Socially Desirable?. *The Journal of Legal Studies*, *41*(1), pp. 1-36.

Shirley, M. M. (2005). Institutions and Development. In *Handbook of New Institutional Economics* (pp. 611-638). Springer, Boston, MA.

Simon, H. (1955). A Behavioral Model of Rational Choice. *The Quarterly Journal of Economics, 69*(1), 99-118.

Smith, D. A., & Gartin, P. R. (1989). Specifying specific deterrence: The influence of arrest on future criminal activity. *American Sociological Review*, 94-106.

Spence, M. (1973). Job Market Signaling. *The Quarterly Journal of Economics, 87*(3), 355-374.

Spithoven, A. (2019). Similarities and Dissimilarities between Original Institutional Economics and New Institutional Economics. *Journal of Economic Issues*, *53*(2), 440-447.

Stigler, G. (1970). The Optimum Enforcement of Laws. *Journal of Political Economy*, *78*(526), 36.

Stiglitz, J. (1975). The Theory of "Screening," Education, and the Distribution of Income. *The American Economic Review*, *65*(3), 283-300.

Suzuki, S., & Akiyama, E. (2005). Reputation and the Evolution of Cooperation in Sizable Groups. *Proceedings: Biological Sciences, 272*(1570), 1373-1377.

Tadenuma, K., & Xu, Y. (2012). Extensions of the Fundamental Welfare Theorems in a Non-Welfaristic Framework. *Hitotsubashi Journal of Economics, 53*(1), 107-120.

Thornton, Mark., (1991). *The Economics of Prohibition*. Salt Lake City: University of Utah Press

Tjiptono, F., & Arli, D. (2016). Gender and digital privacy: Examining determinants of attitude toward digital piracy among youths in an emerging market. *International Journal of Consumer Studies*, *40*(2), 168-178.

Tirole, J. (1999). Incomplete Contracts: Where Do We Stand? *Econometrica, 67*(4), 741-781.

Tomasello, M. (2014). The Ultra-Social Animal. *European Journal of Social Psychology*, *44*(3), 187-194.

Traulsen, A., & Nowak, M. A. (2006). Evolution of cooperation by multilevel selection. *Proceedings of the National Academy of Sciences*, *103*(29), 10952-10955.

Tribe, K. (2002). Historical Schools of Economics: German and English, *Method and History of Econ Thought* , University Library of Munich, Germany.

Trivers, R. L. (1971). The evolution of reciprocal altruism. *The Quarterly review of biology*, *46*(1), 35-57.

Tullock, W., (2005). The Edge of the Jungle. In: Edward Stringham ed., *Anarchy, State and Public Choice*, Edward Elgar Publishing.

Tyler, T. R. (2006). *Why people obey the law*. Princeton University Press.

Usher, D. (1989). The Dynastic Cycle and the Stationary State. *The American Economic Review, 79*(5), 1031-1044.

Vahabi, M. (2020). Introduction: A Symposium on the Predatory State. *Public Choice*, *182*(3), 233-242.

Verma, A., Velumurugan, S., Chakrabarty, N., & Srinivas, S. (2011). Recommendations for driver licensing and traffic law enforcement in India aiming to improve road safety. *Current Science, 100*(9), 1373-1385.

Votey Jr, H. L. (1982). Scandinavian Drinking-Driving Control: Myth or Intuition? *The Journal of Legal Studies, 11*(1), 93-116.

Waldfogel, J. (2012). Copyright Protection, Technological Change, and the Quality of New Products: Evidence from Recorded Music since Napster. *The Journal of Law & Economics*, *55*(4), 715-740. doi:10.1086/665824

Wall, G. (1978). Philosphical Anarchism Revisited. *Nomos, 19*, 273-293.

Watson, J. B. (1913). Psychology as the behaviorist views it. *Psychological Review, 20*(2), 158.

Wempe, B. (2008). Four Design Criteria for Any Future Contractarian Theory of Business Ethics. *Journal of Business Ethics, 81*(3), 697-714.

Williamson, O. (1971). The Vertical Integration of Production: Market Failure Considerations. *The American Economic Review, 61*(2), 112-123.

Williamson, O. E. (1975). Markets and Hierarchies: Analysis and Antitrust Implications: A Study in the Economics of Internal Organization. *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*.

Williamson, O. (2000). The New Institutional Economics: Taking Stock, Looking Ahead. *Journal of Economic Literature, 38*(3), 595-613.

Wilson, E. O. (2005). Kin selection as the key to altruism: its rise and fall. *Social Research*, 159-166.

World Health Organization. (2018). *Global Status Report on Road Safety 2018: Summary* (No. WHO/NMH/NVI/18.20). World Health Organization.

Yarros, V. (1936). Philosophical Anarchism: Its Rise, Decline, and Eclipse. *American Journal of Sociology*, *41*(4), 470-483.

Zentner, A. (2006). Measuring the Effect of File Sharing on Music Purchases. The Journal of Law & Economics, 49(1), 63-90. doi:10.1086/501082

Zentner, A. (2010). Measuring the Impact of File Sharing on the Movie Industry: An Empirical Analysis using a Panel of Countries. *Available at SSRN*: https://ssrn.com/abstract=1792615 or http://dx.doi.org/10.2139/ssrn.1792615

Annexure A: Papers Presented in Conferences

Celebrating Golden Jubilee Year
IPE 50
1964 - 2014

Indian Council of Social Science Research

INSTITUTE OF PUBLIC ENTERPRISE

Certificate

This is to certify that Mr. Suyog Dandekar, Research Scholar, School of Economics, University of Hyderabad has participated in the International Seminar on "Social Sector Development: Issues, Challenges and Policy" held at Institute of Public Enterprise, Hyderabad during November 27-28, 2014 and presented a paper titled An Institutional Approach to Economic Development.

Prof. R. K. Mishra
Chairperson & Director, IPE

Dr. Anand Akundy Dr. Ch. Lakshmi Kumari
Seminar Conveners

NIRDPR

सत्यमेव जयते

राष्ट्रीय ग्रामीण विकास एवं पंचायती राज संस्थान
ग्रामीण विकास मंत्रालय, भारत सरकार
जवाहरनगर, खानापारा, गुवाहाटी -781022 (भारत)

NATIONAL INSTITUTE OF RURAL DEVELOPMENT & PANCHAYATI RAJ
Ministry of Rural Development, Govt. of India
NORTH EASTERN REGIONAL CENTRE
Jawaharnagar, Khanapara, Guwahati—781022, (INDIA)

Certificate

Ms. Athili Lolia and Mr. Suyog Dandekar has presented a joint paper entitled "Exploring Institutional Mechanisms for Success of Act East Policy" in the International Conference on "Act East Policy: Prospects and Challenges for North East Region" held at NIRDPR-NERC, Guwahati during March 15-16, 2019.

संयोजक
Convenor

निदेशक
Director

Annexure B: Paper Publication in Asian Journal of Law & Economics

DE GRUYTER Asian Journal of Law and Economics 2015; 6(1): 1–21

Suyog Ravindra Dandekar* and Angara V. Raja

Economic Analysis of Pre-trial Negotiations: A Behavioral Approach

Abstract: The paper provides a behavioral approach to analysis of pre-trial negotiations. This paper differs from earlier studies in that the most likely outcome forms the basis on which the parties assess their benefits and costs. This is based not on precise calculations of expected values, but on the expectations of the parties which depend on assessment of relative strengths of their case. This is modelled as an outcome of an imperfect cognitive process which is characterized by coherence based reasoning and insensitivities to actual probabilities, and legal discovery. Furthermore, the paper identifies factors which affect bargaining power and how bargaining power affects settlement amounts.

Keywords: coherence based reasoning; Hard and Soft Bargaining; probability insensitivity.

DOI 10.1515/ajle-2014-0009

1 Introduction

A dispute is either resolved in a court or it is resolved outside the court through private bargaining among the disputants. However, settlement of disputes through private bargaining is efficient if transaction costs are not significant. In other words lower transaction costs lubricate bargaining. The normative Coase theorem[1] leads to the principle that law ought to be structured so as to minimize transaction costs to facilitate private bargaining. In an ideal scenario law can be structured in a way that will allow all disputes to be resolved through private bargaining. This will happen when law can be made so clear and precise that it will remove all confusion and bring the transaction costs to zero.

1 See Cooter and Ulen (2004) Ch. 4, p. 97.

***Corresponding author: Suyog Ravindra Dandekar,** School of Economics, University of Hyderabad, Gachi Bowli, Hyderabad, Telangana 500046, India, Tel.: +91-9160110953, e-mail: suyogdandekar@gmail.com, suyog.dandekar@yahoo.com
Angara V. Raja, School of Economics, University of Hyderabad, Gachi Bowli, Hyderabad, Telangana 500046, India

Annexure C: Plagiarism Report of Thesis

Analyzing Cooperation in Institutional Settings: Illustration of Two Institutional Arrangements

by Suyog Dandekar

Submission date: 21-Jun-2021 11:47AM (UTC+0530)
Submission ID: 1609919746
File name: Suyog_Dandekar_14SEPH09_Thesis_Plagiarism_Check.pdf (1.81M)
Word count: 47925
Character count: 250865

Analyzing Cooperation in Institutional Settings: Illustration of Two Institutional Arrangements

ORIGINALITY REPORT

6%	4%	5%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.journals.uchicago.edu Internet Source	<1%
2	www.tandfonline.com Internet Source	<1%
3	dokumen.pub Internet Source	<1%
4	epdf.tips Internet Source	<1%
5	virtual.vtt.fi Internet Source	<1%
6	William T. Harbaugh, Naci Mocan, Michael S. Visser. "Theft and Deterrence", Journal of Labor Research, 2013 Publication	<1%
7	la.mathworks.com Internet Source	<1%
8	Sandholm, William. "Vital Statistics", Oxford University Press Publication	<1%

150

75	Manolis Manioudis, Giorgos Meramveliotakis. "chapter 2 New Institutional Economics and Economic Development", IGI Global, 2021 Publication	<1 %
76	benchmarkjournals.com Internet Source	<1 %
77	en.unionpedia.org Internet Source	<1 %
78	leembizkit-wisdom.blogspot.com Internet Source	<1 %
79	wiki.piug.org Internet Source	<1 %

Exclude quotes	On	Exclude matches	< 14 words
Exclude bibliography	On		

159