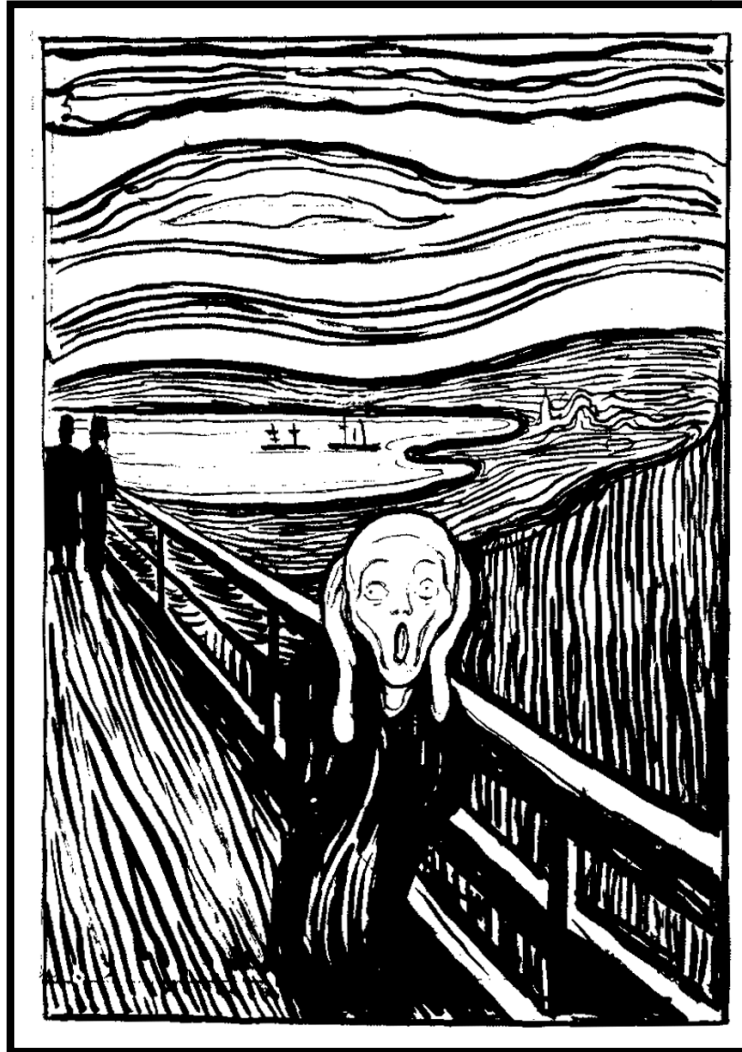# Societal Fear: Portrait of a Market Failure

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Skrik (The Scream), Edvard Munch 1892

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"SOCIETAL FEAR: PORTRAIT OF A MARKET FAILURE"

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ABSTRACT

Some entities, members of the Ideological Superstructure, have the power to influence consumers taste and behavior. In doing so, fear has proven to be a very efficient tool to achieve their profit-seeking goals. The purpose of the thesis is to study fear as a market economy determinant and byproduct. I will follow an inductive analysis in which in Chapter 2 I will part from the individual and study how we shape our reservation prices. This chapter will be based on Witte's (1992) study on fear appeal theory and her Extended Parallel Processing Model and also on Caplin's (2002). Later on Chapter 3 I will go into a broader scope and analyze the monopolist production decisions when faced with the power of shifting up demand with fear and its consequences on social welfare. Chapter 4 will analyze how competition on an oligopoly structure changes the overall picture. These last couple of chapters will present an extension of Dixit & Norman's model (1978). I will try to show that even though fear is bare non ethereal information, it will have parallel effects as any corporeal pollutant and the problems aroused will be related in nature to the same type of market failures that are present on them.

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C h a p t e r   1

INTRODUCTION:

> "For fear—that is man's original and fundamental feeling; through fear everything is explained, original sin and original virtue. Through fear there grew also my virtue, that is to say: Science".
>
> *Thus Spake Zarathustra.* **Friedrich Nietzsche**

What does the "voice on the street" has to say today? Every day we all go around walking, watching, listening, asking, just wandering through endless bits of information; hunting for data that might lead us to base and take our everyday decisions. Decisions regarding every single aspect of our socio-economical, individual and cultural life are based on our everyday digestion and analysis of this data. Evaluating any action, whichever its nature is, is dependent on a process of assimilation of information and further evaluation of it. In utilitarian terms, we could say that information helps us make a personal assessment of the utility that every single action may provide us and the risk we undertake when performing it.

The more accurate information we have, the better production decisions we undertake and hence we face a bigger production possibilities frontier. Uncertainty, no matter in which stage of the production process it takes part, has to be considered as a cost. Information can help us leverage this risk and take better advantage of the inputs, lower the cost function we face, undertake better decisions regarding the market (timing, location …) etc. In this sense, information messages work as an asset or input within the production process and must be considered as such. Informative messages complemented by fear create externalities to people and hence some social costs arise due to this biased and distorted information. The costs that accurate information may be cutting out may be measured not in monetary units but on people's life.

In this thesis we will be concerned on the effect that informative messages have on production and in specific our main concern will be that of fearsome messages. Fear is related to information since we base our worries on data we gather around. There is no way we can fear something we are completely ignorant of. With this in mind we can realize that some informative messages are cause and origin of what we fear. In the present thesis we will be dealing with production of goods, and while doing so we will be analyzing the effect that the presence of fear as appended information has on them.

Information is provided to us by the utmost institutions that constitute the social system. Pelikan (1995) divides the sovereign social system into three relatively separate systems: economic, political and cultural. One of the main purposes of these three systems is to provide information to the state population, in which we can all base our everyday decisions. We will be especially interested on how these different systems work in shaping people's preferences and beliefs via the diverse messages they provide.

Trust and reputation are imperative in the sociological cognitive and ideological process and these systems as represented by their main institutions have the power of having full reliance of the citizens. It is the case not because they are accurate in the production of data but because they were appointed and given the role by society as providers of info. We assume that since these systems and their main institutions are in the highest rank of the social apparatus they have access to the most accurate information. This makes us think that they have incentives to provide us with accurate information, when this might not be true.

These 3 social systems at stake gather the main institutions of all the ones existent in society. The institutions that comprise the economical, cultural and political social systems are not only public but also private and *lucri causa* in nature. They have economic interests and are driven by the sake of gain. The economical system finds itself in a privileged role in

determining the fate of all types of institutions, because all the other institutions have financial needs and desire for profit. Some big corporations with big budgets, constituents of the economic system, may be able to hire cultural institutions to provide them with the right channels to reach the consumer. By doing this, they obtain the same comparative advantages as any cultural institution.

In addition, Pelikan points out, "The experience with the economic system is an important source of information for both individual and social learning". With the economic system experience we evolve institutions (not only considered as lasting organization but also as choice constraining rules) that work out in near-to-biological terms. If institutions find profitable to use fear then this action may filter itself into the very core of institution's behavior and choices. The economic system has a saying in the creation of preferences and beliefs as much as the cultural and political systems.

The paramount importance of the process of getting information forced us to create institutions whose sole purpose was that of providing us with info. Cultural institutions in this matter find themselves in a privileged position since they were created precisely for that, to provide us with the facts from which we would construct our knowledge of. As a result we blindly accept the facts presented, and with them we base and erect our cultural norms, preferences and beliefs. The influence of cultural institutions in shaping preferences is more efficient since it is straightforward, in opposition to the economical and political system whose effect is more indirect.

The political system has several forms of influencing preferences, beliefs and behavior of people, but we will just point out a couple of them. The main one is through the codified law, which enforces institutional rules and the second one, is through political discourse. Through these couple of

channels the political system sends messages whose intention is to provide people with information enough to direct people's values and actions.

These systems are interrelated; they interact and intertwine not only in the creation of values and social norms but also in shaping individual's choices and viewpoints through the information messages they send. As much as they might be interrelated they still have economical interests and thus may find themselves in a position in which the constituent institutions will have to compete against each other in the quest for gain. Competition within these types of institutions takes a different dimension since they have the power to provide people with information and can take the information messages they send into consideration as a factor of production or as a demand determinant.

Institutions such as Media, Church, Government, Financial and Goods Corporations characterize some examples of institutions representing these social systems. People have asymmetric information when compared with them and therefore they have to trust the data they obtain from these ideological leaders. Our rationality is bounded by the info they provide. Normally these constituent institutions are monopolies and they act as such in the production process of data. Therefore throughout the analysis of this thesis we will be assuming and studying this firm structure.

As we stated before, these institutions can use information as an input to influence their demand and if there is any way in which they could raise it over rational limits to gain more profit, they will have no doubt in doing so. These institutions understand that fear is one of the best tools to modify the behaviour of its prospective clients. The power of fear resides in the fact that it can mislead the overall perception of things and thus rational consumers will not react as such anymore. The institutions we are speaking about are our source of information and hence they have the power to direct misleading and fearsome messages for their own benefit.

For any firm having an efficient factor of production and having a big amount of it might prove to be a relative advantage, and the case with fear won't be different. Having the opportunity to influence ones demand through information and fear is a plus for firms. But in the case of information and fear as a factor of production how could we assess the overall quantity and quality of it? Undoubtedly, quantity and quality of information will depend directly on the strength and confidence that the society institutions might have. We will expect a country with strong and trustworthy institutions to be able to produce more and more believable (different from accurate or reliable) messages and at the same time we will expect strong and trustworthy institutions to be more efficient in scaring customers and influencing the demand through fear.

Unfortunately for us •unlike social capital that represents the good use of information• the use of fear brings damages to society. Fear may be represented by mere non corporeal information but it has the same repercussions and effects than any physical pollutant and it must be treated as such. Misleading messages produce negative externalities just as any pollutant and should be subject to the same efficiency constraints.

The main thesis' objective will be precisely to study the vicissitudes emerging from non physical pollutants or more precisely from information pollution in the form of fearsome messages. I will try to show how societal stress will be a by-product from firms and market decisions and what effects this will have on societies' overall welfare. Another objective will be to study the effect that competition will have on the level of fear and on welfare. Hopefully I will be able to raise questions whether fear is merely an accident or an actual deliberate constituent of the Economical System.

The thesis structure will follow an inductive process; I will part from the specific to the general. In Chapter 2 I am going to analyze what variables intertwine and influence an individual economic agent's foundation of its reservation price. A description of how this variables influence fear and

how fear itself enters into the agent's valuation of a good will help us understand the psychological process we follow when deciding to undertake or not a preventive action in an individual and personal level.

In Chapter 3 we develop a monopolistic model to show how institutions take their decisions regarding production and overall use of fear, when the monopolist has the power to influence the demand with its production decisions. We will be focusing on the effect that these decisions will have on welfare. In Chapter 4 we will generalize this model into an oligopoly frame to understand how the conclusions drawn in Chapter 3 might change under a competitive scheme. Finally in Chapter 5 we end up pointing out and commenting over some aspects and conclusions that might be important from the thesis.

C h a p t e r   2

INDIVIDUAL LEVEL: FEAR AND THE CONCEPTION OF THE
RESERVATION PRICE

> "The news automatically becomes the real world for
> the TV user and is not a substitute for reality, but is
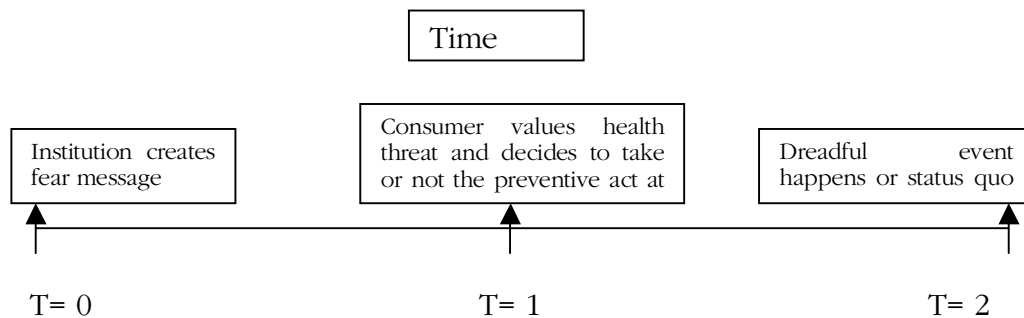> itself an immediate reality"

Marshall McLuhan - 1973

Economics main focus has been diverted into the broadest representation of the economical process while forgetting the fact that economical decisions are taken and part from mere individuals; individuals whose rationality is far from being portrayed by the paradigm of rational choice. In my opinion, economical science should if not part from the individual scope into a general one following an inductive epistemological progression, should at least take into consideration the psychological aspect of individual decisions. With this purpose in mind I appoint this chapter to a superficial analysis on how fear could influence the individual when deciding their reservation price for a good, and how institutions can manipulate this fear level.

The theoretical model over which I will support my analysis will be closely based on Witte's (1992) study on fear appeal theory and her well-known Extended Parallel Processing Model (EPPM) and on Caplin's (2002). One of the main assumptions they both make is that individuals are able to assign a monetary value or a standard unit of measurement to every available health threat.

Another important assumption Caplin and I make is that the agent at stake has no danger control processes (DCP) or resistance to the received messages. Witte (1992) defines this DCP as: "primarily cognition processes where individuals evaluate their susceptibility to the threat, the severity of the threat, their ability to perform the recommended response (perceived

self-efficacy), and the effectiveness of the recommended response (perceived response efficacy)". What this means is that we could add up some variables such as education, intelligence, fear resistance, etc, which might be able to change individual's susceptibility to be scared. However we disregard these variables since adding them up will not change our conclusions. Even if we all present some resistance, this will only change the level of fear we will be subjected to. We are all susceptible and victims of fear.

Fear is undoubtedly an inter-temporal phenomenon and hence we have to account for this feature in our model of analysis. We will characterize our individual as having only two periods of life. The decision that the individual will face is either to take (referred as p) or not (referred as N) the preventive action and this decision can only be taken in the first period. It will influence the individual's state of health in period 2 in which it will be either good or bad. The preventive action will have a cost for the individual equal to the price charged by the institution P > 0 in monetary units.

Time

Institution creates fear message	Consumer values health threat and decides to take or not the preventive act at	Dreadful event happens or status quo

T= 0   T= 1   T= 2

A quick thought about the timeline could hint us that the time periods need not to be equidistant and also not quantified on fixed amounts of time. The time elapsed from T=0 to T=1 might be very short or very long, the same will happen with the time form T=1 to T=2. We have also to note

that in reality because this time periods can be very distant from each other a lot of intermediate actions can be taken by the institution and also by the consumer. The institution could for instance send more than a single dreadful message between periods of time.

When examining the reservation price that we are willing to pay for the preventive action, we will take into consideration two elements. The first element is: a) the rational risk or actual danger assessment associated with the threat and, the second will be represented by b) the irrational element provided by fear which will magnify the reservation price. Both of these elements will be concerned and focused on the valuation of the health threat occurring on T = 1. The only difference being the fact that danger assessment is a rational full-informed valuation of the threat and the element given by fear will be an irrational add-in to the first element. Giving an algebraic representation to the first and rational element, we can state that under rational assessment of danger the preventive act will be undertaken iff the expected health benefit (Left hand side of 2.1) exceeds the cost of preventing it:

$$2.1) \ (\beta_N - \beta_p)H \geq P$$

Where β_N refers to the probability or susceptibility of an individual to suffer from the health threat if it does not undertake the preventive action and conversely β_p refers to the probability when the individual prevents. Hence the difference between these two probabilities $(\beta_N - \beta_p)$ will give us a probabilistic gain or efficacy measure from preventing.

In Caplin`s paper H refers to a non-biased and net discounted valuation of the health threat. Let us say that this valuation refers to the price we would in average pay in a future to get rid of the disease when the threat becomes no longer a threat but a real sickness or unpleasant event. In the case the threat can not be cured, it will signify a monetary compensation

that would leave us with the same level of utility also considering it in average terms throughout the population. Equation 2.1) hence can be explained as the price we would pay rationally (considering the actual risk) not to get sick in period 2, having to pay H either in monetary value or in utility terms.

Once we have described the rational assessment of danger is its turn for the second element which will be fear itself. To get a grasp of the fear concept we might want to look to the definition that "The shorter Oxford English Dictionary" gives for panic. It states that panic is "a sudden and excessive feeling of alarm, usually affecting a body of persons, and leading to extravagant or **injudicious** efforts to secure safety". Witte (1992) defines it as a "negatively-valenced emotion, accompanied by a high level of arousal, and is elicited by a threat that is perceived to be significant and personally relevant". Hence as we can see from the above definitions this second element while being a human emotion will lead us to act irrationally and assign an exaggerated valuation to the actual and rational danger.

In economic terms, fear shall be treated as a non-excludable and a non-rival good. Further up, it is not only non-rival but in times it turns to be the complete opposite of a rival good. The "consumption" of fear by an individual may raise the level of fear or "consumption" from another agent in contact with him. The possibility of creating a cascade-like reaction and expansion of mass panic when society is exposed to fear is always latent.

The level of danger from preventing is given by $\beta_p \mathrm{H}$; the higher danger from non prevention (N) is given by $\beta_N \mathrm{H}$. This couple of measures account for the expected health cost associated to the given choice of action. Fear as stated by the definition given above is an injudicious feeling of alarm or in other words an amplified outlook from the actual health threat hence, in order to simulate the effect we need to add a multiplier for

the expected health cost. Caplin (2002) refers to this multiplier as attentional multiplier and defines it as A_N and A_p conversely for non prevention and prevention. Fear therefore is defined as:

$$2.2) \quad \begin{aligned} F_p &= A_p \beta_p H \\ F_N &= A_N \beta_N H \end{aligned}$$

The values associated with A_N and A_p should be both positive, since negative values are nonsensical.

Caplin states that these attentional multipliers are dependent on two elements which are m, the message intensity and H, the health threat itself. A_N and A_p are hence restated as $A_N(m,H)$ and $A_p(m, H)$. Some non-linearity issues might arise, we could arrive to a threshold in which the level of attention related to H will became too unpleasant to stand that the agent will not engage in preventive act. This inverse U-shaped response to fear was first hypothesized by Janis (1967). For simplicity we will assume linearity but keeping in mind that it might well behave as an inverse U-shape function. A person when faced with fear according to Caplin will engage in the preventive action iff the following equation is satisfied:

$$2.3) \quad \begin{aligned} (\beta_N - \beta_p)H + \left[F_N - F_p \right] &\geq P \\ (\beta_N - \beta_p)H + \left[\beta_N A_N(m,H) - \beta_p A_p(m,H) \right] H &\geq P \end{aligned}$$

Where P refers to the actual price of the preventive action defined by the firm or institution, hence consumption will be achieved if the left side or the reservation price construction is greater than P. We refer to the element in brackets as the injudicious fear component of the risk valuation or the monetary increment of value derived by fear. This component is in excess of and is added to the objective valuation of the risk by people. It represents the difference between the fear of not performing the preventive action and the fear of preventing it. As long as this fear differential turns

positive the person will be willing to spend more money on the preventing action than under an objective valuation.

In simpler terms imagine that you value a vaccine for a dreadful virus. If you had all the information available and knew the real risks you will value it with $(\beta_N - \beta_p)\mathbf{H}$. Now imagine that you are a normal being and have knowledge of what you listen. Under this panorama if you start listening that the virus leads to a very horrid and tortuous death and you get scared then you will be willing to pay more. This increase in the willingness to pay because of fear is what we imply by the expression in brackets. In turn we get a hint that an incentive to cause and manipulate this fear element might exist in institutions that have the power to do so. If fear is to be present, a condition on the multipliers has to be considered and is the fact that: $A_N(m, H) > A_p(m, H)$.

Is precisely on these elements called and described by Caplin as attentional multipliers where I would like to expand and build up the analysis of this section and state which elements are under the control of the social systems I refer. As I have stated before, Caplin distinguishes between two elements that in his opinion determine the level of these multipliers: the health threat (H) and the message intensity (m). He makes the assumption that the more intense messages as well as worse health threats will make the danger more alarming. This couple of elements embrace in a very general way the determinants of the attentional multipliers and I would like to take into account the variables that further determine H and m.

H the health threat valuation is showed on Caplin`s paper as an exogenous variable whose value is already given just as if the valuation of health would be the same for everyone. If we all had the whole available information and no distorters of reality were present, we would be able to value the health threat objectively. This valuation should be equal to the exact monetary compensation that would drag us back to a starting utility

curve if the threat is materialized. This rational health threat pricing will still be assumed to be true but only in the rational danger assessment process (or the left hand side of the left side of equation 2.3).

On the other hand in the injudicious element of danger assessment the valuation of the health threat can be influenced by fear and other elements and hence sticking with the former definition of H as unbiased will be useless. For this reason I will add an endogenous variable on the fear assessment called personal valuation of the health threat (h) that will take the place of H in the previous model in the right hand side. This personal valuation variable will consist on an exogenous part defined by H and some other variables that we will take into consideration later. Equation 2.3) now should look like this:

$$2.3b)\, (\beta_N - \beta_p)\mathrm{H} + \lfloor \beta_N A_N(m,h) - \beta_p A_p(m,h) \rfloor h \geq P$$

A second determinant of the personal valuation for the health threat h will be the available income (y). We might want to reinterpret h as the net discounted individual, uninformed, biased and personal willingness to pay to get healthy. By making the assumption that people with higher available incomes will be able and willing to pay more to get rid of the threat we also assume that the relationship between h and y will be positive. It is important to realize that people with low levels of income might not be able to pay for the preventive act but still will have a utility loss due to fear or stress.[1]

At this point we shall also note that any influence affecting h might be doing so through the discount rate which in the fear valuation procedure is also personal and might be distorted by the same elements that change h. Hereby we will assume that any variable that affects h might be as well affecting the personal perception we might have on the discount rate.

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[1] This point will be further studied in the next chapter.

The valuation of the health threat is also dependent on the information we have on the threat itself. In the face of ignorance people will measure and value new risks disproportionately higher than if they had all the relevant information. This tallies with Slovic`s (2000) statement that people show a disproportionate fear of risks that seem unfamiliar and hard to control. Hence a variable for the available information about the disease should come at hand; we will name this variable as knowledge (k). It will show a negative relationship with h, since as we have less knowledge we will value the health threat higher.

The available information is interrelated and decided partly by the cultural institutions we are studying. They have the power to decide which diseases to focus their coverage and attention to, therefore they could centre their aim at diseases for which the public available data is shallow and with this increase indirectly the public valuation of h. In order to differentiate the variables that depend partly or completely on the cultural institutions, we will use a symbol $\sim$ over the variable. Knowledge hence will be defined as ($\widetilde{k}$).

The personal valuation of the health threat consequently will be defined as a function dependent on the standard non-biased net discounted valuation H, on the available income y and also on the public available knowledge ($\widetilde{k}$), being this last element dependent up to a certain degree on the cultural institutions. The algebraic representation of h will be given by: $h\left(H, y, \widetilde{k}\right)$.

The second element of the attentional multipliers (A_N and A_P) to whom Caplin refers as message intensity (m) needs also to be further studied through the variables that determine the force of the message. The force or intensity of a message will be determined by two main elements: a) the content of the message and b) the saturation or constant repetition of the

message. The proper management of these elements which are under complete control of the institutions will be at the core of the preferences moulding phenomenon we are trying to portrait.

As we can see from equation 2.3) in Caplin`s model, the message affects both attentional multipliers, he does not account for any difference in content or of message specialization. He assumes that a single message affects the awareness we have towards the events of preventing and not doing so, when in fact messages can be directed and specialized towards each of these choice valuations. This is what Witte (1992) assumes.

Witte shows that there is the possibility to specialize and focus the content on each attentional multiplier separately. Witte in her paper speaks of two different types of messages each aiming to affect at a specific multiplier: 1) Threatening message aiming at A_N and 2) Efficacy message aiming at A_p. Just for having a comparison parameter we are going to define a third type of message, an objective message. An objective message will have the sole purpose of informing and being fair about reality. It might be described as an impassionate message that will lead the public opinion into an accurate view of reality.

The threatening message as explained by Witte (1992) "is focused on the severity of the threat (e.i., "Terrorism leads to an agonic death") and on the targeted population's susceptibility to the threat" (e.i., "You're at a higher risk of suffering from terrorism if you are American"). This threat message is an external stimulus variable that in our case is assumed to be set by the cultural institutions and it will exist independently whether a person knows it or not.

Accordingly, the efficacy message also exists as an external stimulus and leads to a personal belief of the efficacy of the undertaken measure. The perception of response efficacy refers according to Witte "to an individual's beliefs as to whether a response effectively prevents the threat (e.g., " I

think that if I stay at home I will not suffer from terrorism", or "If X party wins, they will fight against crime"), and *perceived self-efficacy* refers to an individual's belief in his or her ability to perform the recommended response" (e.g., "I can easily stay at home and watch TV", "I can easily vote for party X and prevent crime from happening"). In order to separate the different messages (m) according to their nature (threatening or efficacy) we will define them as $\widetilde{m}_T$ and $\widetilde{m}_E$. Similarly the objective message will be defined in same terms as $\widetilde{m}_O$. It will still keep the symbol $\sim$ since it will still be under the institution's will to provide or not the objective message.

The relationship between this three message types can be described and defined by the following statements:

$$2.4) \qquad A_N(\widetilde{m}_T,...) > A_N(\widetilde{m}_O,...) > A_p(\widetilde{m}_E,...)$$

In words, in the case of A_N *ceteris paribus* an attentional multiplier affected by a threatening message will be bigger than one in which the institution has responsibly decided to act in an objective manner. In the same way an A_p affected by an efficiency message will be smaller or in other words, will create a false security feeling in the person compared to how it would have been if faced with an objective message.

Here we can also realize why giving an objective message is not an acceptable stable condition. Parting from the fact that it represents exactly the same cost providing an objective message $\widetilde{m}_O$ or a message with passionate content $\widetilde{m}_T$ or $\widetilde{m}_E$ we can immediately recognize in the fear elements of our reservation price valuation that *ceteris paribus*:

$$2.5) \quad \begin{aligned} \left[\beta_N A_N(\widetilde{m}_T,...) - \beta_p A_p(\widetilde{m}_O,...)\right]h(...) &> \left[\beta_N A_N(\widetilde{m}_O,...) - \beta_p A_p(\widetilde{m}_O,...)\right]h(...) \\ \left[\beta_N A_N(\widetilde{m}_O,...) - \beta_p A_p(\widetilde{m}_E,...)\right]h(...) &> \left[\beta_N A_N(\widetilde{m}_O,...) - \beta_p A_p(\widetilde{m}_O,...)\right]h(...) \end{aligned}$$

A corollary we will arrive to, is that institutions will find it profitable not to act objectively. Passionately in the endless quest for profit they will direct their messages towards threat and efficacy up to the point where the marginal cost of producing a more intense message equals the marginal benefit.

So far we have spoken only about the specialization of the messages into threat messages and efficacy measures, but we have not spoken about the magnitude or efficiency of the messages. The variables $\tilde{m}_T$ and $\tilde{m}_E$ will present an increase of their influence on the individual's attention as long as the content of the messages are more efficient in their purpose of threatening or showing the efficacy of the solution. This content efficiency will be supported by the right mixture of images, discourse, sound, attitude, medium, environment, etc. Threatening messages will be more efficiently supported by presenting alarming content in the form of vivid images, dreadful content, gory pictures, personalistic language, etc… Efficiency messages in the other hand will be more efficiently supported by images with relaxing content, exciting language, exacerbated optimism, etc…

Threatening and Efficacy messages can be of a diverse nature, covering every imaginable human communication channel available. Advertising under this scheme is important as an information source but it is not the only one and certainly not the only one under study. We speak about any message conveying some sort of information to the consumer.

As we stated previously in this chapter there are two ways in which cultural institutions can create a long lasting impression on their messages, the first is through the content of the messages and the second one is through the repetition of the message. Just as Sunstein (2003) states: "in the aftermath of a terrorist act, and for a period thereafter, that act is likely to be both available and salient, and thus make people think that another

such act is likely, whether or not it is fact or not". Both aim at increasing the significance and availability of the message, although we might say that the content is more efficient in making an event salient and the number of messages will be efficiently targeted into individual's accessibility to relate to an event.

The availability of a readily example is equally as important as the strength of the message since most of us assess the probabilities through the use of the so-called availability heuristics. Tversky and Kahneman (1974) refer to these situations as the ones in which "people assess the frequency of a class or the probability of an event by the ease with which instances or occurrences can be brought to mind". This type of heuristics is a useful support for building up our experience since frequently the most repeated examples that come at our memory will be more probable as well. We use this type of heuristics in our everyday learning process and in procedures as simple as letting a ball fall. Imagine the unlikely scenario in which the first time we let fall a ball it went up instead of down as the gravity law specifies. Since it is the first time we do it and it is the only experience we have, we will value the probability of a ball going up as 100%. So, even though this is an exception on the real world, the individual doing the experiment will think that this experience will repeat itself with a 100% of probability. On life we follow a similar procedure while evaluating chances. We create our probabilities according to the available examples in our mind.

Unfortunately not all life experiences can be lived at first hand through a personal available example and we need to rely on what people or institutions have seen and lived in order to reflect their experiences as ours. For this reason considering the frequency or number of messages sent by cultural institutions is important in our analysis. An example might be that since afro American people are more frequently portrayed as criminals on the media we might think that the probability of them

committing a crime would be higher than it really is. Repetitive messages depicted by institutions are prone to be considered more likely to occur than those that escape from their interest.

A variable destined for the effect of the number of messages on the individual's judgment of probabilities is at need and hence we will use the n with a symbol $\sim$ above ($\tilde{n}$) expressing that it is under the control of institutions. This variable should take into account the times a message is seen before the purchase decision has to be taken. It will specify the effect that each time has on the probabilities assessment. It shall not be mistaken as a discrete variable since this variable accounts for the effect on the odds. The frequency of the messages are also propaganda directed, hence a subscript T and E, comes at hand referring to threatening and efficacy messages repetition effect.

Before moving on I would like to expand over a theory presented by Sunstein (2003) in which he explains how people when their emotions are intensely engaged will fall in something he calls as *probability neglect.* He states that "people fall victim to probability neglect if and to the extent that the intensity of their reaction does not greatly vary even with large differences in the likelihood of harm. When probability neglect is at work, people's attention is focused on the bad outcome itself, and they are inattentive to the fact that it is unlikely to occur". This possibility is also considered by Caplin in which he considers that in "the case of unconditional preoccupation (case where fear has created an obsession) there is the possibility that ever more intense messages become more and more productive in terms of the prevention incentive, by making it harder to avoid contact with the danger".

Therefore, when faced with an extreme fear engagement or obsession agents will just take either of two actions. One possible action might be avoidance; the moment the level of attention becomes too unpleasant to

bear the agent would be unwilling to perform the preventive act. This would be the same as saying that there is nonlinearity or there are marginal decreasing gains from the message impact after a threshold $\overline{F}$. This might be because the preventive act places them in such a close contact to what they fear that they might as well not engage on it. The second possibility is the one pictured by *probability neglect* in which agents will only take into consideration their personal valuation of the health threat (here denominated as h) and underestimate the probability of the threat occurring. This might even present returns of scale for the impact of the message. Hence the achieved outcome after this $\overline{\overline{F}}$ threshold becomes quite arbitrary. It could lead people either to full rejection or complete obsession, with people engaging in the preventive action at whichever cost charged.

In the case depicted above, that of an obsession with the threat, the agent will take the preventive act as long as his health threat valuation is greater than the price of preventing. Before we stated the fact that the valuation of one's health is dependent on the knowledge we have about the threat. Since we are speaking about cultural institutions, that is, the institutions whose main purpose is to provide society with knowledge, we should appoint the task that these institutions' messages have on knowledge. Knowledge $\widetilde{k}$ thus, is at a certain degree dependent on $\widetilde{m}_T$ and $\widetilde{m}_E$. In the above development and in the following I disregard any influence of $\widetilde{m}_T$ and $\widetilde{m}_E$ on knowledge for simplicity but it is worthwhile to comment on it in this extreme case. The valuation and purchase when the agent is obsessed occurs as long as:

$$2.6) \quad h\left[H, y, \widetilde{k}\left(\widetilde{m}_T, \widetilde{m}_E\right)\right] \geq P$$

Leaving apart these extreme cases and now having described all the elements that form and affect our individual reserve price we can restate

equation 3) in order to analyze closely the repercussions that fear might have on individual economic agent's behaviour. The modified version of equation 3) is restated as:

$$2.7) \quad (\beta_N - \beta_p)\mathrm{H} + \left[\beta_N A_N(\tilde{m}_T, h(\bullet), \tilde{n}_T) - \beta_p A_p(\tilde{m}_E, h(\bullet), \tilde{n}_E)\right]h(H, y, \tilde{k}) \geq P$$

With a glance at equation 2.7), it can be very easily seen how effortless is for cultural institutions and how many tools they have in order to move the consumer's reservation price into their own benefit. Unfortunately for us we all are influenced and even we might say we are consequence of our own institutions. We are all very susceptible to their actions. We have stated a model with quite many degrees of freedom but this does not entail complete freedom to institutions. As we have seen before, all individuals have danger and fear control processes that will enact in ourselves in order to level and try to control fear. In our model we underestimated their influence but they should be taken into consideration.

Some relations can intuitively be drawn from the equation above. In first place we can notice that the relationship between $(\tilde{m}_E, \tilde{n}_E)$ and A_p is a negative one. Since the messages are going to be efficiency focused, attention has to be diverted into a false security sentiment. The risk of getting the sickness when taking the preventive act β_p has to become smaller in order to be worth undertaking the action. Conversely, the relationship between $(\tilde{m}_T, \tilde{n}_T)$ and A_N is positive. The reason for threatening is to exaggerate about the dangers of not undertaking the action, therefore A_N will aim to provide a magnified perception of β_N.

We will also expect that $\tilde{m}_T$ and $\tilde{n}_T$ will at low levels increase the attentional multiplier A_N and arrive into a maximum and then fall, following an inverted U-shape. This behavior is close in spirit to that of the studies by Janis' (1967) and Hovland et al., (1953) in which they proposed

an inverted-U shaped relation between fear and message acceptance. In the other hand we will expect that at high levels of efficacy in $\widetilde{m}_E$ and $\widetilde{n}_E$ will asymptotically lead A_p to zero. This is the same as saying that high levels of efficacy will give the agent the sensation of being completely safe if undertaking the preventive act and thus driving β_p to a very close value to zero.

With these relationships we can illustrate several cases. First of all we can see how high levels of threat and low levels of efficiency will lead to rejection. This can be intuitively understood since high levels of threat might be causing some kind of avoidance of the fear and low levels of efficiency will lead β_p to a high perception level. We might also arrive to the rejection of the protective action with very low levels of threat and low levels of efficiency.

Continuing assessing the relationships within the model we stated before that the message content $\widetilde{m}$ is more efficient in making an event salient and effect of the frequency of messages $\widetilde{n}$ will be efficiently targeted into individual's accessibility to relate to an event. We might consider them as complement goods in increasing the attention of people, but there might be some types of threats for which harsher message content might place the fear levels quicker in a negative return zone. Examples of this kind of fears might be murders, presenting gruesome images and high threatening messages might lead to a rejection of the message at quite low levels of $\widetilde{m}$. Since $\widetilde{n}$ is more efficient into making a threat available we would expect for this type of threats a low level of $\widetilde{m}$ and a high frequency of messages $\widetilde{n}$.

In the other hand, there are some types of threats that are so common and which we can relate with ease that an increase in frequency $\widetilde{n}$ will not bring

any significant improvement for the acceptance of the preventive action. Examples of this specific type of fear might be the smoking health threat which we can relate very easily and we have been flooded with all sorts of messages concerning it. In this type of fears we would expect a high level of $\widetilde{m}$ and lower levels of $\widetilde{n}$. This happens since these types of threats are so general that they turn faceless and a need to personalize it enhances the importance of the content $\widetilde{m}$. Recalling for ease equation 2.7) and considering that $h(\bullet) = h(H, y, \widetilde{k})$:

$$2.7) \quad (\beta_N - \beta_p)\text{H} + \left[\beta_N A_N(\widetilde{m}_T, h(\bullet), \widetilde{n}_T) - \beta_p A_p(\widetilde{m}_E, h(\bullet), \widetilde{n}_E)\right]h(H, y, \widetilde{k}) \geq P$$

What might be some relevant socioeconomic implications of fear? Imagine that we are in an economy where there is just a single consumer, fixed level of income Y and a couple of goods. The first good is the preventive good which dynamic will be represented by equation 2.7) and the second good is any saving active. You are willing to buy a preventive measure for which you are willing to pay your reservation price as defined by P_R (F). This reservation price will be influenced by the variables described under equation 2.7). The money you do not spend on the preventive measure will be saved for future consumption. The relation that ties all this up is given by:

$$2.8) \quad P_R\left(\widetilde{m}_{T,E}, \widetilde{n}_{T,E}, h(\bullet), \widetilde{k}, H, y\right) + S = Y$$

Intuitively it can be very easily seen that as long as the institution has the power to influence the reservation price it will be able to divert money into its own account; money that should otherwise be efficiently saved. This phenomenon should draw a lot of attention into growth issues, since it has been widely accepted the importance of an efficient saving rate for development. Strong cultural institutions with economical interests might be using fear as a tool to mould people's preferences and with this create

economical inefficiencies through the savings rate. We can find some empirical evidence supporting this claim, we can relate to Slemrod (1988) on his inter-country study about differences in the saving rate due to fear of nuclear war.

Another implication of the model might be found in bargaining issues. Being able to expand the reservation price of an agent, the institution finds itself in a unique position to expand the contract zone and get a better price for the preventive act good or merchandise that is being offered. It should be noticed that the institution issuing the fear enhancer messages needs not to be the same one that is offering the preventive act. As long as, a firm ties his interests to the molding interests of certain institution then this firm will benefit from any action of the institution. In the case of media it becomes quite easy to do this since sending messages and media itself is open for any offer from the private sector.

Holistically, imagine that instead of a firm being the one that is selling a good now it is a country. Countries with institutions so powerful to be able to influence the public opinion in other countries will be in a position as the one we have described above. They could be scaremongering the population of a fellow country in order to expand the contract zone for some of their goods or for some trade concessions. Fear enhancing messages need not to be sent directly from the government (although it could be) but instead through institutions that have the same interests.

This may raise some answers and new questions according to how cultural institutions may influence and enhance the economy of a country. It is almost clear that if a country specializes in fear related goods (such as weapons, financial services, etc…) media is strong enough so as to transcend frontiers, earning income abroad and benefit also from the fear of the outsider population; they will both have common interests. Through fear, media will be gaining more and more international audience and also the country will be exporting its goods; and as seen from the model, they

will be obtaining a higher price for them due to fear. Supporting this idea we can relate to Herman (1986) and Chomsky and Herman (1979). This couple of researchers have published a series of substantial studies of the US mass media and their role in the foreign policy process.

It is expected that stronger institutions will have the most influence on population and could benefit more from the fear process we have described. As we said before as long as an entity ties its interests to the molding interests of certain institution they will benefit from any action the institution undertakes since fear is a non rival good and we could find positive externalities and very probably a mutual positive externality. It might not be completely an accident but more like a collusion of interest the findings of Blomberg, Hess and Weerapana (2002) in which they find that terrorism occurs more frequently in countries with powerful institutions.

In this chapter we have seen how fear is used to modify the reservation price on individual economic agents and how this might lead to some socio-economical inefficiencies. In the following chapter we will draw some analysis over the process that a monopolistic institution will follow when deciding how much fear they should inflict to their product demand and what implications this process entails in the overall social welfare.

C h a p t e r   3

FIRM LEVEL: MONOPOLIST DECISIONS REGARDING FEAR AND
IMPLICATIONS ON WELFARE

> "In the state of nature profit is the measure of right".   --.**Thomas Hobbes**

> "People react to fear, not love - they don't teach that in Sunday school but it is true".
> --**Leonardo Da Vinci**

We value and create our perception of the utility of goods based on the information we possess concerning the use, quality and characteristics of a product. Information in this sense might work as a complementary good for some products. Any intake of info will enhance the sale of the good for which it is complementary of; in the same way that the sale of cars may enhance the demand for gasoline. But contrasting from physical complementary goods that usually are supplied by different producers, the production decision concerning info might be taken by the same firm that produces the good. This is the case of advertising and, in the spirit of what we have spoken so far, also from fearsome messages.

Advertising in this sense might be defined as a source of information whose main aim is to influence the demand for a product in order to increase the profits of the producer. The spirit or objective of advertising is quite clear, the debate starts when we analyze and try to differentiate or generalize over the different types of information used in ads to fulfill its search for profit. The content of information provided by advertising varies in nature, spirit and consequences they bring. An advertising message can embrace a wide range of content due to the few constraints that place a limit over it. An advertising message will, in general, say whatever the seller of a brand wishes with the aim to get an edge in the struggle for the consumer's wallet.

In order to be consistent with the focus we have given in Chapter 2 concerning cultural institutions, we must think in advertisement not only as a way of selling physical products but instead of selling any type of merchandize, idea, values or behavior. Institutions such as the ones we have been referring like religion, media, the political system, education system, etc not only sell products. The concept of advertisement should be extended to cover the way in which they promote their specific type of produce.

The overall focus I am taking is consistent with Nelson's (1974) view who also considers advertising as information. He distinguishes between two different qualities of the goods: search qualities, which are qualities that the consumer can determine by inspection prior to the purchase of the good and experience qualities, qualities that are not determined prior to the purchase. An example of a search quality might be the specification of a new laptop and an example of an experience quality is the taste of a soda. Because people can review the information prior to purchase when dealing with search qualities there will be greater incentives for misleading advertising or information for experience qualities.

By doing this distinction we shall not forget that there might be goods that create utility for the consumer through both types of qualities. Misleading advertising in this case will more likely focus its attention on experience qualities of a good since they are the ones that could not be verified prior to purchase. Even though this is the case, search qualities are not exempt of being advertised through misleading information, especially since there might be costs related to the search of data prior to acquisition. The firm could exaggerate any search quality up to equalize the total costs the consumer had to bear to find out the truth. There are some cases in which getting the real view of the search quality is so expensive for the consumer that it pays to the firm to mislead him.

I will like to point out that we humans extract meaning out of a quite broad type span of symbols at a time. The de-codification of these symbols is what we will consider as messages. We could extract meaning not only of what is said, but also of color, images, what is implied, what we feel, music, appeal, social roles, mood state of the seller, relationship between the characters, non-verbal language, subliminal messages, etc. Each of these symbols may represent an understated quality of a product, these codes we use are infinite and naming all of them is impossible. An advertisement normally does not only present information under a single defined and specific symbol, they usually sell the products with the help of a mixture of them. Because of this, throughout the advertising message mixture, the products showed will be represented and sold by its "experience" as well as "search" qualities.

This thesis focuses on fearsome messages or fearsome advertisements. We can use indistinctly the term message or advertisement since we are considering them both as providers of information. As a first approach to the definition of a fear related advertisement we will state that it is a misleading ad that uses fear as its leading force. As a misleading ad and pulling some conclusions from the above paragraphs we would expect fearsome messages to focus more on experience qualities.

Misleading advertising in general could be used to force the consumer to purchase a good. Once the consumer buy the good and experience it, he could realize that he was cheated and decide not to repeat the purchase. This might cause a decline in credibility for future advertising. The brand might get a bad reputation and hence the people that were not cheated into buying in the first advertisement may find out from the first costumers about the quality of the product. In this sense the opportunity cost of cheating for advertising firms might be quite high. Quality firms will have high costs of cheating. This rationale will lead some researchers like

Milgrom and Roberts (1986) to analyze advertising as a signal of product quality.

Milgrom and Roberts (1986) as well as Nelson (1974) arrive to the conclusion that advertising may signal quality firms and products. Consumers get a hint of the quality of a brand by the volume of advertising and the expenses a firm undertakes while buying publicity. This aspect of advertising in Nelson words: "will help consumers by directing them to the better buys as determined by their tastes". He arrives to the conclusion that this is efficient and it is worth the cost since if consumers where paying search costs for themselves to find about the quality of brands they will spend more funds overall than otherwise. This conclusion backs up the claim that even some slightly misleading advertising might be healthy or might make economical sense improving overall welfare.

Unfortunately for us, the costs of cheating under this scheme will only work with verifiable characteristics, at least verifiable for the consumer. Once they try the product they can verify if the characteristics fulfill the expectative created prior or after the purchase (i.e. taste). You can verify if you like the flavor of a new soda by trying it the first time, if you don't then you discard buying it a second time.

 The messages we are conveying to, alas, allude to non-verifiable characteristics. If you fear something, you will not like to experience it first-hand regarding experience qualities (you will not like to experience if anthrax leads to such a gruesome death as publicized) or in the other hand we will have to undertake huge amounts of money to find out the relevant search data to make an informed choice. As an example of the latter, if we are offered a vaccine, we could go on searching for the data on the effectiveness of it, but, unfortunately labs treat this data as private and privileged info and would not give it away. Hence we will have to undertake our own research if we wanted to know the data beforehand.

This of course is not worthy and we will at the end trust and rely on the cultural institutions we refer to in the 2nd chapter, in providing us this data.

As we explained before, normally an ad will present diverse messages through assorted codes and symbols. Therefore, even if a product presents a primary and key easy-verifiable search quality not subject to exaggeration or fear, seller may focus the fear related message to a non verifiable message code. A clear search quality may be the style of a dress, but the seller may focus on presenting the dress with a smiling gorgeous model. The consumer may decode the presence of the model as a symbol for success, social acceptability and happiness, three experience qualities that present threatening, efficiency messages [2] and non-verifiable characteristics since they are personal interpretations of social life. These codes might be even self fulfilling to the mere act of buying a product. The consumer may feel happy, successful and accepted just by buying the dress and then the promise of the seller will be proved to be true in the eyes of the customer.

I will name as a pure healthy, objective and non-biased advertisement to the one that will focus only in providing the correct information regarding "search" qualities. Unluckily when we refer to experience qualities we have to place qualitative and non-objective adjectives to the description of the experience. These adjectives will be biased towards a safe-heaven rent seeking image of the product. Advertisement referring to experience qualities therefore will not be able to portrait accurate or objective information on the product and cannot be described as non-biased advertisement.

Even if they can not be non-biased they might be cost reducing. As proposed by Nelson (1974) and Milgrom & Roberts (1986) they may be a signal of quality and reduce consumer's costs and improve overall welfare.

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[2] Following chapter 2, threatening since they might be decoded by the shopper in the form: "if you don't buy, then…", and at the same time efficient in the sense that they might be interpreted as an exaggeration of the real level of success, social acceptability and happiness.

This effect opens the possibility of allowing certain degree of deceptiveness, but this deceit is a second best choice. The best would be to be presented with the right information about quality without any deceit; this would be a pure informative advertisement. I will use the definition of pure informative advertisement as: an objective and non-biased ad that provides the relevant info to consumers without any exaggeration or deceit (throughout all the mixture of messages present in an ad) about the qualities of a product.

The main difference I will point out between a non-biased advertisement and a fear related one is that fear will signify a cost to society and a saving to the firm that sends messages enhanced by it. Fear in this sense, works in the same way as a pollutant. Firms will have a negative cost from providing fear to society since the effect of their advertisement will be enhanced and therefore the social cost of it will be in excess of the private cost to the firm. Indeed, fear has been considered as a pollutant in the form of stress for a long time but very little attention has been drawn to it as a byproduct of the economic process and decisions.

In this thesis, particularly on the subsequent chapters, I am going to focus solely on the negative side of fear in which the costs to society surpass the possible benefits. Although we must realize that as stated by Caplin and Kfir (2003) in certain cases such as AIDS, tobacco and alcohol the enhanced attention by fear may as well pay back. I am focusing on the case in which fear may increase demand for the product such as pharmaceutical and not the converse as in the case of tobacco.

To understand a bit better the way in which fear will mean a saving for a firm; recognize that the costs of a firm providing a non-biased and a fear related ad are exactly the same; there is no significant difference in cost between them. Firms could enhance their sales by providing non-biased advertisement that would provide accurate information. Nevertheless, fear related ads will provide the firm with a higher attention level and therefore

will yield a higher level of sales than that of a non-biased[3]. The firm is obtaining more sales for the same price only due to the attention drawn by a threatening and/or an efficacy message in its ad.

Societal fear represents a cost solely by itself. There are a great number of consequences that fear unleashes in any society and unfortunately most of the consequences have direct repercussion on human life and health. Fear will command persons into undertaking injudicious efforts to secure their safety. A parent may be concerned of letting her daughter visit a friend whose dad owns a gun, because the examples he can recall of kids dying by gunshots are salient for him. The same parent will instead let her daughter visit a friend with a swimming pool. This is completely irrational since more kids have died in swimming pools. A similar example was provided by the terror caused by 9/11; people quit using airplanes and instead decided to go by bus or car. The fully rational assessment of the statistical risk shows that there are significantly more chances of dying for a road accident than from a plane crash or terrorist attack. This irrational actions end into having more life loses than in the case we did not have the presence of fear. In the same spirit, irrational actions may also represent more than needed costs in other non-life threatening circumstances.

When fear as a pollutant is added to the social pressure in the form of stress, it has very serious health repercussions in people. Lately the numbers of sicknesses that have been found to be related in certain way to stress have increased dramatically. Cardiovascular, psychological, gastrointestinal, respiratory problems seem to be enhanced by stress circumstances. Costs are not only directly related to the loss of life and security payments in the form of medicines, doctors, hospitals, death related expenses, but also have an indirect effect on work performance of the labour force. A stressed labour force will not perform with the same

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[3] This effect has been explained in detail along Chapter 2.

efficiency as a content one, and this effect might be mistaken for lack of preparation or education of the workers.

Another consequence by any means less important is the lack of trust that fear causes among the standard citizen and also in both the national and international investing spheres. If economic units fear each other they'll end up with a lack of trust among them and thus no partnership could be formed. This lack of confidence expands against governmental institutions and leaks into the investing environment which is deeply affected. If society is flooded with fear from its cultural institutions this could lead to societal hate, or in a lesser scope, from certain groups of society against their own institutions. This can have quite a lot of repercussions, terrorism could be one.

Fear unleashes human's most primitive instincts; under panic we can react irrationally without measuring the consequences. Fear cause instability in a society and as Blomberg, Hess and Weerapana (2002) pointed out, terrorism tend to occur more frequently in countries with powerful institutions. Probably this relationship is not consequence of a mere accident but more a matter of coincidence of interests. Powerful institutions could benefit as proposed in chapter 2 with the use of fear; the consequent accumulation of stress could unleash terrorist acts, but also, terrorist acts would be weak without the huge scope of the promotion that these big institutions I have addressed give them.

This long exposition over the consequences of fear aims at emphasizing the importance of understanding fear in every aspect of human life as a cost in itself and to measure fear consequences at its full and big magnitude. It signifies a cost to society as a whole and also for individuals; it also represents a burden for economical development and growth. To back up this claim I developed a model based on the one presented by Dixit & Norman (1978) to assess the welfare effects that fear understood as a societal cost might have.

We start defining the social welfare function, in which we will encourage the reader to forget the mere hedonic view he might have of utility but instead view it as proposed by Dixit and Norman (1979-80) as a "mere numerical representation of a preference ordering[4]". The social welfare function will be given by:

$$3.1) \qquad U(y, q, \psi) = y + u(q, \psi) - \mu[\psi]$$

The variable (q) will refer to the fear-related advertised good produced by a monopolistic firm. Variable (y) refers to the quantity consumed of all other goods and ( ) will be the quantity of fear related advertising. We will assume that the advertised product is a good and society will obtain positive utility out of the consumption of it. Fear-advertising   will be defined as promoting messages that will shift the demand through threatening messages. In the social welfare function we will be assuming that the preference ordering of a product will be positively affected by the amount of advertisements and also from the fear level . The damages to society created by fear will be gathered into the social cost or disutility provided by $\mu[\psi]$[5].

The social budget constraint will be determined by:

$$3.2) \qquad y + F + cq + (P_A - s_\psi)\psi = e$$

The production of the fear-advertised (FA) good will involve fixed costs F and constant marginal costs c per unit of output. The price of y which represents all other goods present in the economy is assumed to be normalized to 1 and e will refer to total resource endowment. The good q, could be advertised either by a healthy advertisement (HA) or by fear

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[4] This definition was given after Fisher and McGowan (1979) criticized the accuracy of using the term utility when speaking about fear.

[5] For a premise on fear cost assessment we refer to Adler (2004)

advertisement, there are no significant differences in cost in providing either one of them. FA is more efficient in attracting attention to the product due to the fear element when compared to HA.

The resource gain or saving represented by fear is given by 2 sources: first due to the increased attention[6] to the ad through fear and in second place, the firm is not internalizing the damages that fear is causing to society represented by fear pollution or $\mu[\psi]$. These couple of effects produced by fear will cut the costs down for the firm. This marginal savings for the producer are assumed to be constant and equal to s . Fear is having the same effect in production as any pollutant. It is enhancing production through the use of an environment good while at the same time is not bearing the costs of distressing the milieu. The difference is that the environmental good is psychological rather than physical. Firms are using human mental capability boundaries to increase their awareness while distressing their sense of security.

The consumer budget constraint which establishes that what consumers spend on consumption of the advertised good and on other goods (y) must not exceed the total endowment of resources in the economy:

$$3.3) \qquad y + pq = e$$

For simplicity I will also assume a Cobb-Douglas type of utility function given by:

$$3.4) \qquad u(q,\psi) = A(\psi)q^{\alpha(\psi)}$$

where $0 < \alpha(\psi) < 1$. This function will yield an isoelastic[7] demand curve independent of the quantity produced q, but that will shift for any given

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[6] Recall that in Chapter 2 we represented this increased attention through the so-called attentional multipliers.

[7] The elasticity of demand for this function will be given by $1/[1 - \alpha(\psi)]$

level of   . We assume that as we increase the FA level the elasticity for that product will decrease, hence we will make the assumption that $\alpha'(\psi) < 0$.

From 3.1) and 3.3) we can obtain the inverse demand curve for the fear-advertised monopolized good, which will be given by:

$$3.5) \qquad p = U_q(q,\psi) = \alpha(\psi)A(\psi)q^{\alpha(\psi)-1}$$

Since this utility form will provide us with a broad array of demands, the maxima will depend on the proportional shifts in the demand curve as the fear level increases. The steeper the demand becomes the less consumer surplus the monopolist will absorb. The rationale behind this is due to the fact that advertising is typically associated with greater output, which is usually thought of as welfare improving. At the same time it also creates higher prices or price-cost margins, which will be welfare reducing. As long as fear affects the steepness and increases the willingness to pay of people proportionally more than the negative effect of the increase in price, the welfare reducing effect will be decreased and consumer surplus may increase. This is why we will be interested on the proportional shifts from demand relative to   .

For a better understanding of the problem faced by the monopolist, a simplistic graphic representation taken from Chamberlin (1933) might come at hand.

Figure 1
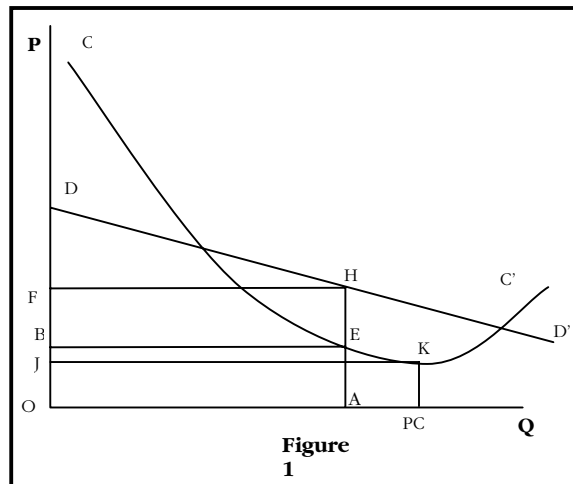
The discrepancy from the demand curve for the institution's product and the horizontal imposes upon the seller a price problem that would, under pure competition, be absent. In the case studied we are able not only to vary the price but also the product. Information being the product, we will be able to add more fear-intensity to it or decrease it at will. Complete equilibrium must consider stability with respect to both: "price" and "product". Starting to analyze Figure 1, think of the product variables as completely independent and fixed. Line CC` refer to the curve of cost of production, the shape of it hints some scale economies of production that reach a minimum point at K and then raise again. DD` is the demand curve faced by the monopolist. The demand curve that a firm under a pure competition regime will face would be completely horizontal and the price and quantity produced would be equal to the points OJ and PC respectively. This is the point in which consumers will have the biggest consumer surplus since the price charged will be exactly equal to the minimum marginal cost.

In Figure 1 the cost curve CC' crosses the demand in two points which means that between these points the monopolist will be able to obtain profits. In the case depicted the profits are given by BEHF, these profits aim to represent the point of maximum gain for these specific product qualities. For each product offered we will be able to find a price that will

maximize the profit of the monopolist, but in this case we are also searching for the most efficient product that will, over all the different types of products available, create the greatest gain. As we should already be used to, the maximum profit point, letting the product qualities fixed, will be given by the equality of marginal costs and marginal revenue, later represented in our model by equation 3.10). This condition will represent the equilibrium in price.

Under the assumptions and statements made in Chapter 2 fear will be able to change the shape of the demand function. Product variation will normally involve a change in the cost function, which will represent a shift on the CC` curve up if the product becomes more expensive to produce or down if it becomes cheaper. In this case we are studying the difference of providing a fearsome message and an objective one. The use of fear will have the property to reduce costs thanks to the marginal savings from polluting with fear. Hence the attraction of fear driven ads, they shift demand up at the same time as driving the cost function down through fear savings as described by s_ψ.

So far we have assumed s_ψ to be constant but savings can change and affect the cost curve driving it down, accordingly with each level of fear. Consequently the decision of a monopolist will be to choose the amount of fear to maximize profit with the maximizing level of savings, price, and quantity. A monopolist facing this circumstance shall find the point that will provide them the greater profit given their power to influence demand and cost curve through fear, increasing area BEHF to its maximum.

Analyzing the dynamics of the demand function when affected by fear we shall analyze the movements in price and in quantity. The vertical shift analyzing the change on price through fear will be determined by:

$$3.6) \quad \delta = \partial \log p / \partial \psi = u_{q\psi} / u_q.$$

The horizontal shift analyzing the change in quantity will be determined by

$$3.7) \quad \partial \log q / \partial \psi = -u_{q\psi} / (x u_{qq}) = \delta / (1 - \alpha(\psi))$$

As stated before a monopolist producer of the advertised good will select q and   to maximize its private return.   Monopoly profits will be described by the relationship:

$$3.8) \quad \Pi(q,\psi) = [p(q,\psi) - c]q - F - (P_A - s_\psi)\psi$$

The profit-maximizing values will be given by the FOCs

$$3.9.1) \text{ and } 3.9.2) \quad \frac{\delta\pi(q^*,\psi^*)}{\partial q} = \frac{\delta\pi(q^*,\psi^*)}{\partial \psi} = 0$$

First, analyzing the equilibrium condition 3.9.1 for the demand function 3.5) we find through a very simple algebraic treatment, the ever present relationship that states that marginal revenue should equal marginal cost:

$$3.10) \quad p = \frac{c}{\alpha(\psi)}$$

We can realize from 3.10) that there will be a fixed price level for each amount of   and consequently different values for q and y. Therefore in order to find the profit maxima for the monopolist we have to determine the level   *, the level of fear that will be profit-maximizing. Relationship 3.10) reflects the association between p and   and will obey the dynamics described by the difference:

$$3.11) \quad \theta = d \log p / d\psi = -\alpha'/\alpha$$

In Chamberlin`s (1933) words "the problem becomes that of selecting the "product" whose cost and whose market allow the largest total profit, price being given". Now we are able to define the effect of fear on the overall profits since we now can take as given the optimal level of pricing. With this we will round up the requirement of having equilibrium on both, price

and product. This is possible in real life thanks to the daily experience institutions get by trying out different mixtures of messages. They obtain feedback and learn from the different responses of the market. Algebraically with the help of the envelope theorem and some simple substitutions we obtain:

$$3.12) \quad d\Pi/d\psi = pq\delta - (P_A - s_\psi)$$

The maximum level of profit for a monopolist will set $d\Pi/d\psi = 0$ and hence the monopolist choice of fear will be determined by equating:

$$3.13) \quad pq\delta = (P_A - s_\psi)$$

This would be the same as equating the marginal revenue of fear to its marginal cost. As we stated before, fear messages entail a saving for the firm due to its enhanced efficiency in attracting the attention of customers resulting in a lower marginal cost for fear ads. The marginal revenue thus, will need to be lower and for this the quantity has to increase. Comparing result 3.13 with the result presented by Dixit and Norman (1978) for normal type of ads, we can see that fear messages in the profit-maximizing state will yield a higher level of production for a monopolist. At the same time we can intuitively see that[8] ceteris paribus, the profits for a monopolist who uses fear enhanced ads will be greater than from one that does not.

The savings might not be measured with precision but it is clear that out of a process of learning-by-doing cultural institutions have learned that frightening messages are more efficient in attracting consumers. Then, we can clearly see that the level of frightening messages will be greater than

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[8] Just as we proponed in the relationship 5 in the second Chapter, where we concluded that it will pay off not to send objective messages. We proposed that fearsome messages would indeed increase profits.

that of the pure informative ones even though they may represent exactly the same monetary net costs.

Equation 3.11) stated how the whole price equilibrium changed with the level of fear , conversely in order to see how the output equilibrium changes we obtain the comparative static derivative for output. This relationship will be obtained by differentiating the demand function and using some earlier definitions, thus we obtain:

$$3.14) \quad d\log q / d\psi = (\delta - \theta)/(1 - \alpha)$$

From 3.14) we can see how equilibrium output will be increased with the presence of fear iff the increase in the demand price at the initial output level (given by) is bigger than the price increase that the monopolist finds profitable (given by). We assume that $\delta > \theta$ so that increases in fear lead to a higher equilibrium output.

To finish our analysis of fear derived messages we have to answer the question: what implications have fear on overall welfare? For that, suppose for the moment that fear is fixed at an arbitrary level. Then the FOC 3.9.1) can be solved for q*(*), the profit-maximizing output level, given . Using 3.1), 3.2) and 3.8), we can obtain a social welfare combination of (y, q*(*),).

$$3.15) \quad W(q*(\psi*),\psi) = u(q*(\psi*),\psi) - \mu[\psi] - F - cq*(\psi*) - (P_A - s_\psi)\psi + e$$

Every change in fear shifts the social welfare function. Keeping the standard of judgment fixed at an arbitrary level $\overline{\psi}$ in $u(q*(\psi*),\psi)$ and allow the actual level of to change. We can find the change in welfare as determined by:

$$3.16) \quad W[q*(\psi*),\overline{\psi}] = u[q*(\psi),\overline{\psi}] - \mu[\psi] - p[q*(\psi),\psi]q*(\psi) + \pi(q*(\psi),\psi) + e$$

Differentiating 3.16) with respect to fear and keeping the second argument in $u(q*(\psi*),\psi)$ fixed at $\overline{\psi}$ to keep the welfare function static.

3.17)
$$\frac{\partial W(q*(\psi),\overline{\psi})}{\partial \psi} = ...$$
$$\{u_q[q*(\psi),\overline{\psi}] - p\}\frac{dq*(\psi)}{d\psi} - q*(\psi)\frac{dp[q*(\psi),\overline{\psi}]}{d\psi} - \mu_\psi(\psi) + \frac{d\pi[q*(\psi),\overline{\psi}]}{d\psi}$$

This equation will provide us with the effect that a small change in fear messages will have on welfare, measured according to level $\overline{\psi}$. If we let $\overline{\psi}$ be equal to the profit maximizing level *. Being $\overline{\psi} = \psi*$ now, $u_q[q*(\psi),\overline{\psi}] = u_q[q*(\psi),\psi*] = p$ and hence the first term to the right will drop, also in the profit-maximizing equilibrium we see that $\frac{d\pi[q*(\psi),\psi*]}{d\psi} = 0$ and hence the last term will also be equal to zero. Then 3.17) will become:

3.18)
$$\frac{\partial W(q*(\psi),\overline{\psi})}{\partial \psi} = -pq\theta - \mu_\psi(\psi) = -q*(\psi)\frac{dp}{d\psi} - \mu_\psi(\psi)$$

Fear as previously defined is a non-excludable and non-rival bad. Being a feeling it has no physical representation, cannot be seen nor measured. As a feeling or mood, it can be reproduced or magnified by human interaction, turning it no longer into a personal feeling but into a society's chain effect. People could turn into panic in the same way as insects turn into a swarm. For effects of the present paper we will have as an assumption that fear will have an increasing effect $\mu_\psi(\psi) > 0$ but declining over time $\mu_{\psi\psi}(\psi) < 0$. Although as we explained the consequences can rise into a swarm or cascade catastrophe and the damage will increase as more and more fear is drawn into society.

It is important also to notice again that there might be some fearsome messages that may bring attention to important topics or threats and for which a quick and sudden response of the public is needed. In some of these cases the benefits of enhanced attention may outweigh the damages of fear. The clearest example may be AIDS and the informative campaign based on threats to the general public.

Continuing with the analysis, from the assumptions of the damage function and from equation 3.18) we can draw several interesting conclusions. Firstly, we can conclude that if the effect of fear is to increase price then $\frac{dp}{d\psi} > 0$ and there will be negative gains in welfare due to advertising. From our previous discussion in Chapter 2 of how fear influenced the reservation price on people we can presuppose that indeed this will be the case and fear will enhance prices leading to welfare losses. If this is the case we could arrive to the conclusion that welfare will be improved by restricting fear messages below the profit-maximizing monopolist level. Note that the results that we are presenting in this chapter for monopoly can be drawn in the same terms for a full colluded institutional arrangement.

Fear is a bad and as such it presents negative costs of production at zero cost, hence any producer of it will be running under a budget surplus. Letting the monopolist act under the rule of "the invisible hand" he will have an incentive to over-provide it. Unfortunately this overproduction of fear creates a disutility since it affects the whole population causing damages. These damages are not taken into account by the monopolist and hence the complete burden of them lay on the people. This is what is entitled under equation 3.18). The term $\mu_\psi(\psi)$ which refers to the marginal damage of fear represents a heavy loss on welfare. In the following chapter we will analyze if this can be solved by market competition.

Dramatically, fear can be accumulated by society and unfortunately this loss in welfare will be increasing as more and more fear is poured into society. Fear has also a time span of life that might last for quite some time. The monopolist institution might want to seed more fear before the attention drawn to its own produce from the last harvest of fear finishes. If this is the case (and normally it is) fear will accumulate and follow an exponential growth as it builds up. This accumulation process will obviously carry its own accrual of fear related damages, for which no one can be accounted for.

In this chapter we have seen how a monopolist institution will react and which decisions it will take when having the power to scare and attract costumers through fear. We have also seen which the repercussions that fear might have on the overall well-being of society are. With no one being held to blame and the attractiveness of the savings represented by fear some other institutions might want to join and ride the scary train. An expansion of this model might come at hand for more than a single monopolist. The next chapter will expand the presented model for the case of an oligopoly institutional industry.
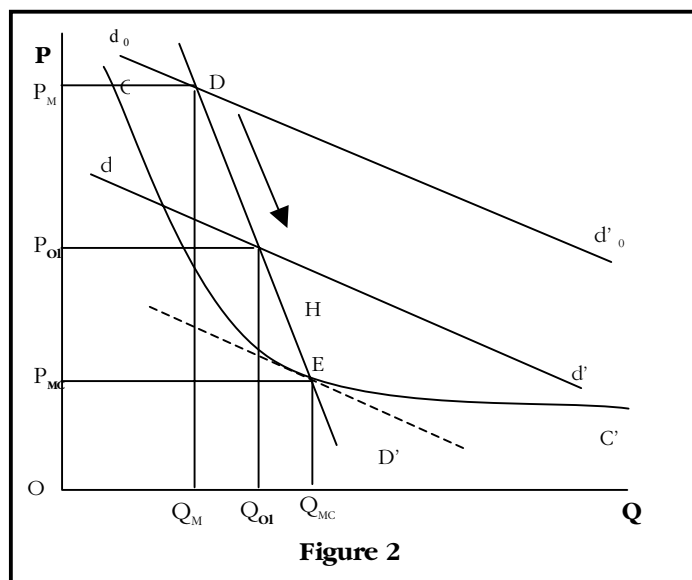
C h a p t e r   4

INDUSTRY LEVEL: OLIGOPOLISTIC FEAR COMPETITION AND
IMPLICATIONS ON WELFARE

> "To found a great empire for the sole purpose of rising up a people of customers, may at first sight appear a project fit only for a nation of shopkeepers. It is, however, a project altogether unfit for a nation of shopkeepers, but extremely fit for a nation that is governed by shopkeepers".   **--.Adam Smith**

The present thesis aims at the study and behavior of Social Institutions, institutions that have direct influence on society's culture and henceforth preferences. A main premise for the thesis argument is the claim that these institutions compete against each other in an indirect way for the information-consumer's attentiveness. We will assume that each producer within the group is a monopolist, yet his market is not isolated from those of his competitors. In the struggle, they will have no consideration in using any means. Just as firms that will no doubt in polluting and decrease costs to get the edge in the competition for the market, institutions will have no doubt in flooding society with fear while fighting for an audience.

Institutions such as the Religious system, Media, the political system, etc behave as monopolist when providing their goods. Even within themselves, (i.e. Media) each institution that comprise the system has such a high degree of differentiation that the economical structure that fits them the best is monopoly. Each institution directs its messages through its very own and specific channel, each transmitted message aims to differentiate the source from the others. They present the message with a specific color, tone, character, mood, environment, etc. The codification of symbols has as a main target to provide the institution with a personality and a personification. We all know that there are no 2 men alike; this will also apply and be especially true with institutions.

Before we start with the algebraical analysis and model in order to visualize and get a better grasp of the rationale of the problem and what we are expecting to find, a graphical analysis might prove quite useful.

Figure 2

The curve DD', just as in the previous chapter, represents the demand function for each monopolistic institution. It will describe the increase in sales that any producer could achieve by cutting prices given that all the other producers keep their's fixed. The position of DD' will depend upon the number of producers in the industry, it will lie further to the right as there are less number of producers. The curve dd' in the other hand represents the curve that will result if all the other competitors react and set their prices identical to him. As Chamberlin (1933) states: this curve "will be a fractional part of the demand curve for the general class of product, and will be of the same elasticity". It will represent a 1/n part of the total demand at the price. The curve CC' still represents the cost curve that all producers are facing. An assumption we are making is that the costs are equal and constant to everyone, which in our case is an acceptable assumption.

Notice that as firms react to the shape of dd' they will be tempted to move further to the right, decreasing the price and increasing the produce quantity. This will happen thanks to the lure of obtaining greater profits. This same incentive will lead the others to follow and curve DD' will be the one actually occurring. The increased profits will lead other institutions to join and drive the curve d_0d_0' down, till dd' or to the tangent dotted line, with equilibrium conditions being given by $Q_M P_M$, $Q_{Ol} P_{Ol}$, and $Q_{MC} P_{MC}$ respectively. The first case depicts the case of a sole monopolist; the intermediate will be that of an oligopoly structure (which directly concerns us) and the last the one for monopolistic competition.

From a close inspection we can realize that as far as we are concerned with prices, out of the structures studied, monopolistic competition will be the one that will provide the lowest price, followed by oligopoly and last by monopoly. Given that institutions assume their rivals' amounts as constant, under oligopoly, equilibrium will settle somehow in between point E and D in Figure 2. The effects on quantity are somehow more uncertain since oligopoly may show an increase in quantity over the monopolistic competition case, as can be seen in the following figure:

Figure 3
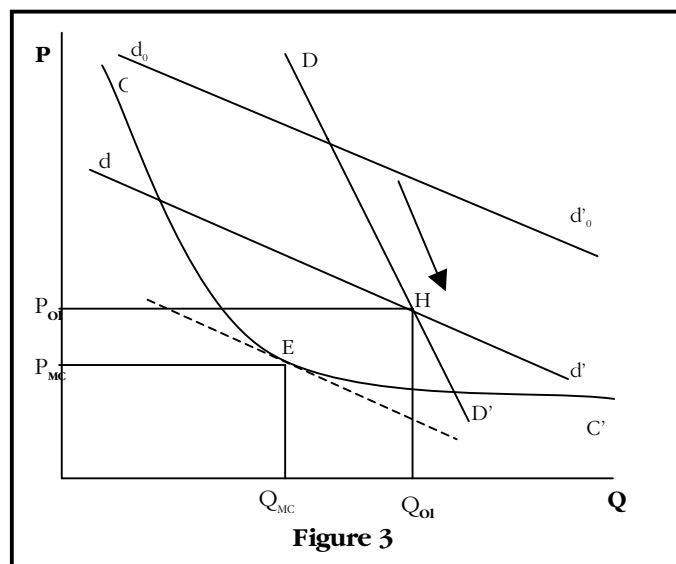
As can be seen the equilibrium of oligopoly might lead to a greater amount of produce than under monopolistic competition dependent on the slopes and shapes of curves dd' and DD'. Since the shape of DD' will lay more to the right as there are less competitors it may agree with the actual arrangement of the cultural institutions we are studying. This arrangement might lead production to be greater and mistaken with a welfare improvement. If we associate a greater production with greater fear messages, following from conclusions in Chapter 2, the overall production increase might prove to be welfare reducing. Examples of this phenomena are shown daily on media. We can see how competition among a couple of big TV channels might lead to endlessly production of information around an event, with minute coverage and excessive detail. This irrational and masochist flood of info, eventhough it is increasing in quantity, when associated with fear and its side effect might as well not be welfare improving.

In order to become an institution which could influence consumers' decisions through fear it is needed to pool a huge initial investment in order to obtain the appropriate channels, size and repercussion needed. Big corporations might be compared and have the same effect as any institution since they are capable of hiring the channels needed to propagate its fearsome messages. With this in mind we can realize that in order to get the power we are studying it is needed a big investment that will work as a huge barrier to entry and will keep the numbers of institutions low. This may lead a case such as the one depicted in Figure 3 to occur.

The current chapter's model will be based on Dixit's (1979) and the model developed will follow a similar procedure as in the former chapter portraying the monopolistic case. It will be an extension from the former case monopolist case into an oligopolistic structure. We keep the same nomenclature definitions as in the previous chapter but now the subscript i

will refer to firm i's output (q) and fear level ( ). Variable (y) still refers to the quantity consumed of all other goods. The utility function in the oligopoly case trails and expands equation 3.1):

$$4.1) \quad U = y + F\left[\sum_{i=1}^{n} u(q_i, \psi_i)\right] - G\left[\sum_{i=1}^{n} \mu(\psi)\right]$$

Functions F, u, G and μ are assumed to be increasing. We assume concavity for u in q and also on U in $(q_1, q_2, \ldots q_i)$ At first glance we can realize that u(0,) • 0, indeed u(0,) = $-G\left[\sum_{i=1}^{n} \mu(\psi)\right]$. Thus even though there might be no production (or purchase) of the good, the sole presence of fear to enhance the purchase will cause a disutility or damage to society[9]. The function u, the utility function that represents the utility created by the data-production of each individual institution, will be assumed to obey the same assumptions as in Ch. 3 and to take the same form:

$$4.2) \quad u(q_i, \psi_i) = A(\psi_i)q_i^{\alpha(\psi_i)}$$

This utility function shall be controlled by a consumer budget constraint:

$$4.3) \quad \sum_{i} p_i q_i + y = e$$

We are assuming that the price for other goods y is being normalized to 1. Parameter (e) refers to the total endowment. This budget constraint states that the money actually spent on goods must not surpass the total endowment of the economy. With the help of 4.1) and 4.3) we can find the inverse demand functions given by:

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[9] This follows from a conclusion we arrived to in chapter 2, nevertheless a consumer might not raise its reservation price up to the level of purchase he will still experience a disutility created by the sole presence of fear.

$$4.4) \quad p_i = \frac{\partial u}{\partial q_i} = F'(v) u_q (q_i, \psi_i)$$

$$4.5) \quad v = \sum_{i=1}^{n} u(q_i, \psi_i)$$

Oligopolistic interdependence will arise and will be channeled through v. As v increases (either by an increase in production (q) or by an increase of fear ( )), F'(v) will decrease and therefore the inverse demand function that all the firms face will also decline. Some assumptions will be taken for simplicity. We will assume symmetry throughout the institutions that will be contending. They will provide the same price and quantity of their goods, the same fear level, and will face the same utility function for their goods: $v = nu(q, \psi)$. We will further assume F(v) to be isoelastic and the goods offered substitutes, that is we assume $F''(v) < 0$ and $F'(v) = v^{-\varepsilon}$ with > 0.

In the same way we will assume that all firms face equal fixed costs F, equal constant marginal costs c, equal marginal costs of advertising P_A and equal savings for sending fear related messages s . Social budget constraint now will be determined by:

$$4.6a) \quad y + \sum_{i=1}^{n} \left[F + cq + (P_A - s_\psi) \psi \right] = e \text{ or assuming symmetry across firms}$$

$$4.6b) \quad y + n \left(F + cq_i + (P_A - s_\psi) \psi_i \right) = e$$

To understand the dynamics of the prices when the institutions change their production decisions it might prove useful to revise the following properties of the market structure:

$$4.7) \quad -\frac{\partial \log p_i}{\partial \log q_i} = 1 - \alpha + \alpha\varepsilon/n \approx 1 - \alpha$$

$$4.8) \quad -\frac{\partial \log p_i}{\partial \log q} = 1 - \alpha + \alpha\varepsilon$$

The effect of a change inaugurated by any one seller might be spread over such a large number of competitors that the last term, represented by the cross elasticity between firms ($\alpha\varepsilon/n$), could be negligible for each firm. We are going to assume that this is the case either because there are a lot of institutions or because of Systemic blindness[10]. The cross elasticity between firms do not disappear in the aggregate industry, it adds on and have a direct effect on the whole industry, the effect on price by the aggregate production decisions of the industry will be given by 4.8). Equations 4.7 and 4.8 represent the elasticity of the dd' and DD' curve in our graphical analysis and we can realize that the former is more elastic than the latter.

We have seen how prices change with the quantity, now assessing how the demand curves will shift as fear levels change. We will find again that the effects that individual institutions face and the general aggregate effect will differ:

$$3.6) \bullet 4.9) -\frac{\partial \log p_i}{\partial \log \psi_i} = \delta - \frac{\beta\varepsilon}{n} \approx \delta$$

$$4.10) \quad -\frac{\partial \log p_i}{\partial \log \psi} = \delta - \beta\varepsilon$$

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[10] Systemic Blindness refers to a psychological phenomenon in which individuals can not foresee the repercussions that their actions are having on interrelated organisms throughout the system.

Equation 4.9) resembles 3.6) on the previous chapter which described the effect of fear on price by a monopolist and will be assumed to be equal or very proximal. This means that institutions are reacting as if they were independent monopolists. When assessing the vertical shift through equations 3.6), 4.9) and 4.10) $\delta = u_{q\psi}/u_q$ and $\beta = u_\psi/u$. With equations 4.7) – 4.10) we can find the horizontal shift or in other words the effect of fear on the quantity produced, we notice that $\dfrac{\partial \log q}{\partial \log p}\dfrac{\partial \log p}{\partial \log \psi} = \dfrac{\partial \log q}{\partial \log \psi}$.

$$3.7) \bullet 4.11) \quad \frac{\partial \log q_i}{\partial \log \psi_i} = \delta \Big/ (1-\alpha)$$

$$4.12) \quad \frac{\partial \log q_i}{\partial \log \psi} = (\delta - \beta\varepsilon) \Big/ (1-\alpha+\alpha\varepsilon)$$

From the last couple of relations we can draw the conclusion that 4.12) is going to be smaller thanks to a smaller numerator and a higher denominator. When all firms change their fear level at the same time, the demand of any firm will face a smaller effect than if a single firm changes the fear level while all the other firms stay put. All firms will react blindly thinking that they are facing 4.11) but when everyone takes the same measures relationship 4.12) actually occurs. The dynamics presented by fear are exactly the same as the ones that any product will face under advertisement as can be seen when comparing the model presented by Dixit and Norman (1978) with the results of this thesis. Nonetheless, the equilibrium that the industry will achieve and the implications on welfare will differ. In order to see this we have that the profit for any firm will be given by:

$$4.13) \quad \Pi(q,\psi) = \big[p(q,\psi)-c\big]q - F - (P_A - s_\psi)\psi$$

Differentiating equation 4.13 with respect to q and   we are able to find the following First Order Conditions, which consent with the ones we found in the previous chapter for the case of a single monopolist. These conditions are equal since we are assuming that firms are behaving noncooperatively.

$$3.10) \bullet 4.14) \quad p = {}^{c}\!/\!_{\alpha(\psi)}$$

$$3.13) \bullet 4.15) \quad pq\delta = (P_A - s_\psi)$$

Together with equations 4.4)-4.6) we can find the equilibrium levels for price, product quantity and fear level.   As stated from the graphic representation we will find a lower price and higher production than under monopoly but since fear is making the products appear more different to each other the price will be significantly higher than under perfect competition.

The effect that fear has on price is akin to that of the previous chapter for monopoly and thus the term for the proportional change in the equilibrium price from a change in the industry's common level of fear will be the same. At the end this is the same as stating that the whole industry is colluding and deciding as if they were a monopolist, hence it is not surprising that this expression is the same:

$$3.11) \bullet 4.16) \quad \theta = d\log p / d\psi = -\alpha'/\alpha$$

Expression 4.16) should be positive since we assumed that $\alpha' < 0$. This expression should be subtracted from $-\dfrac{\partial \log p_i}{\partial \log \psi}$ in order to obtain

$\dfrac{\partial \log p}{\partial \log \psi}$ and hence expression 4.12), the proportional change in output of each firm, will be given by:

$$4.17) \quad \frac{d\log q}{d\log\psi} = \frac{(\delta - \beta\varepsilon) - \theta}{(1 - \alpha + \alpha\varepsilon)} = \frac{(\delta - \beta\varepsilon) - \theta}{1 - \alpha(1 - \varepsilon)}$$

Conditions 4.16) and 4.17) tell us how the whole equilibrium and the pair of variables q and p change as the level of fear   switches. Expression 4.16) appears unchanged relative to the monopoly case, which should be assumed by the equality with 3.11). Expression 4.16) however shows a difference when compared with 3.14). The overall change in quantity will be affected by the interaction between firms defined by the terms where the elasticity   appears. When together, the fear level of all firms who are attracted by the lure of increasing profits change, the shift on price is determined by 4.10) and not by 4.9). The same happens with the quantity produced which will obey 4.12) and not 4.11).

We can see that given the assumptions that we have made, specifically that (> 0), we can notice that the denominator will be greater than in the case of monopoly and conversely the numerator will be smaller. This tells us that under the condition that the institutions at stake produce supplementary goods, the proportional shift in the demand as fear increases will be less.

Now it is turn to sum up and analyze the effects that competition has on social welfare. Welfare will be represented by the following equation:

$$4.18) \quad W(\psi,\overline{\psi}) = y + F\left[\sum_{i=1}^{n} u(q,\overline{\psi})\right] - G\left[\sum_{i=1}^{n}\mu(\psi)\right] - \sum_{i=1}^{n}\left[F + cq(\psi) + (P_A - s_\psi)\psi\right] + e$$

Assuming symmetry 4.18 turns into:

$$4.18b) \quad W = y + F\big(nu(q_i,\overline{\psi}_i)\big) - G\big(n\mu(\psi)\big) - n\big(F + cq(\psi) + (P_A - s_\psi)\psi\big) + e$$

We allow $\overline{\psi}$ in F to stay fixed at a specified level in order to have a standard of judgment. This equation specifies that social welfare in order

to be positive should account for the utility obtained by the consumption of the produced goods by institutions, and this in turn, should be in excess over the total costs incurred while producing them. Total costs must include the social costs caused by fear externalities. These costs will be represented by $G\left[\sum_{i=1}^{n} \mu(\psi)\right]$. Function G allows us to study and to realize that there might be also interaction effects in the production of damages across institutions.

Fear messages created by institutions might have complementary effects amongst them when it comes to damages. This might be the case when institutions try to take the opportunity to get on board on a fear upheaval or circumstance and make the most out of it by issuing paired and somehow related fearsome messages that will just increase public awareness. People, as intended, relate the messages and have an increased perception of the real danger[11]. Fear messages might also be substitutes in damage when they have counteractive effects. An example of the latter might be for instance that the fear of separativity that is sent in order for girls to get plastic surgery, can be counteracted with the threatening message advertised on media of the increasing risk of having troubles with the surgical procedure.

The fact that institutions may have complementary or counteractive effects on damages do not necessarily connote that institutions' products will be complements or substitutes across them. Institutions may add up for the overall public awareness of the threat but may still be direct competitors and their production may substitute for each other's. For the moment we are going to assume that $F'(v) = v^{-\varepsilon}$ and $G'(s) = s^{\xi}$ with , >0. The interaction effects intend that firms produce substitute goods but are

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[11] An easy way of relating it to Chapter 2, will be that because of the increased number of messages, issued by institutions to compete against each other, the availability of the threat will be increased.

complementary in damages. Following up with the welfare analysis we differentiate 4.18b) with respect to   .

$$4.19) \quad W_1(\psi, \overline{\psi}) = n\left[\left(\lambda(q, \overline{\psi}) - c\right)\frac{dq}{d\psi} - \gamma(\psi) - (P_A - s_\psi)\right]$$

The shadow prices $\lambda(q, \overline{\psi})$ and $\gamma(\psi)$ are defined by:

$$4.20) \quad \lambda(q, \overline{\psi}) = F'\left(nu(q, \overline{\psi})\right)u_q(q, \overline{\psi})$$

$$4.21) \quad \gamma(\psi) = G'\left(n\mu(\psi)\right)\mu_\psi(\psi)$$

They represent the shadow prices of the good and also the shadow price of the damage caused by fear. When we let $\overline{\psi}$ be equal to the firms' profit maximizing level, the shadow $\lambda(q, \overline{\psi})$ and the market price (p) match.

$$4.22) \quad W_1(\psi, \overline{\psi}) = n\left[(p - c)\frac{dq}{d\psi} - \gamma(\psi) - (P_A - s_\psi)\right]$$

If we differentiate the expression for profit of the typical firm given by 4.13) and use 4.16) we find that:

$$4.23) \quad \frac{d\Pi}{d\psi} = pq\theta + (p - c)\frac{dq}{d\psi} - (P_A - s_\psi)$$

Substituting in 4.22):

$$4.24) \quad W_1(\psi, \overline{\psi}) = n\left[\frac{d\Pi}{d\psi} - pq\theta - \gamma(\psi)\right]$$

Equation 4.24) shows us the main determinants of welfare under the scheme we have created. In first place, as long as fear contributes to

private gain, $\dfrac{d\Pi}{d\psi}$ will be positive. In equilibrium this shall be equal to 0. In the negative side, welfare will be lost from two different sides. First, fear will have a tendency to increase prices and hence reduce welfare. This tendency is represented by the term pq . In the other hand fear creates damage to society; this will be represented by the shadow price given by $\gamma(\psi)$. Since we assumed symmetry n $\gamma(\psi)$ will represent the total damage caused by all the institutions.

We must focus our attention on the determinants of this damage function; the shadow price is equal to $\gamma(\psi) = G'\big(n\mu(\psi)\big)\mu_\psi(\psi)$. We have assumed complementary effects between institutional threatening messages. The presence of complementary effects among institutions under competition will present greater damages when compared to a monopolist or a fully collusive scheme. To compare both cases we shall refer to its simile as represented by equation 3.18).

The similarity though is misleading since the term $\dfrac{d\Pi}{d\psi}$ present in equation 4.24) refers to the common level of advertising by <u>all</u> firms. As stated by Dixit and Norman (1978), "this effect will be relevant to a fully collusive oligopoly equilibrium, but not directly to the Cournot-Nash equilibrium we have been considering".

We shall take into consideration the effect given by $\dfrac{\partial\Pi_i}{\partial\psi_i}$ which as stated before is equal to $pq\delta - (P_A - s_\psi)$. Equilibrium occurs when this turns to be 0 as given by 4.15). Using this condition along with 4.14), 4.16) and 4.17) we can find after simplification that

$$4.25) W_1(\psi,\psi) = -n(P_A - s_\psi)\left[\frac{(1-\alpha)(\beta\varepsilon + \theta) + \delta\alpha\varepsilon}{\delta(1-\alpha+\alpha\varepsilon)}\right] - n\gamma(\psi)$$

Once more as in 4.24) the effect will be negative as long as the effect on price by fear is positive and also if there are social damages as represented by the shadow price $\gamma(\psi)$. These two effects will not be the only ones affecting welfare, now we have also to consider the interaction between institutions as represented by the terms affected by . After a close inspection of equation 4.25) we can see that we will have a stronger tendency to have excessive fear from a social welfare point of view in an oligopoly structure than under monopoly. This will be the case thanks to the interaction effects given by and also by the term $G'(n\mu(\psi))$ in the shadow price of fear, absent both in the monopoly case.

Equation 4.24) refers to the fully collusive equilibrium. We saw that it is quite similar as the equilibrium we found under the monopolistic case, and in the same ways both will provide excessive fear. The internalization of the interaction effects and also the results presented by Dixit and Norman (1979) will make us conclude that collusion will yield a maximum average and total profit when compared with oligopoly. Notice that collusion needs not to be in the production line but on the threatening message transmit. Collusion and thus maximum average profit can be achieved by sending the messages through the most efficient channels. Interaction effects are internalized in this case and maximum profit will be achieved. This possibility raises some interesting questions as to the power of certain institutions and information channels.

This claim is related in nature to Haller and Chakrabarti's (2002) study on comparative advertising wars. In this paper they analyze the effect that ad wars have on a noncooperative framework. They find that it might be possible under certain conditions that firms' advertising efforts neutralize each other. They allow for a third party and find out that the only one

making a gain out of this war is in fact this third firm. Too many resources are spent neutralizing each other and in the end they arrive to the same conclusion, that a collusive arrangement will provide maximum average profits.

Notice as well, that this just accounts for the efficiency on profits but not on welfare. Complementary interaction effects will still be affecting fear damages to society. Competition or increase in the number of firms will only accrue stress and social costs. With no one to be accounted as the culprit, these social costs will represent a burden to society and economy as a whole. We shall also realize that due to the international nature of some of the institutions we are studying, trans-boundary issues and costs may arise. Consider that due to the nature of the pollutant we are studying (information), it can be spread in an immediate way worldwide with the possibility of creating global damages. The opportunity that massive institutions have of being able to affect other countries' demand for its products is without any doubt, a huge comparative advantage.

C h a p t e r   5

CONCLUSIONS

We have showed how fear in the form of threatening messages can be used by institutions that have this power as a distorter of the demand. Through the experience acquired by the day by day learning process, they have learnt how to use this power and cold-bloodedly they do. Fear or stress has been show to inflate beyond rational behavior the reservation prices we all have. The tools we have pointed out as the ones used for this purpose by institutions were plenty.

The first tool at their disposition is the full freedom on deciding the content of the messages. They can draw people's attention into the threats that are least known (k) and hence the rational assessment of risk cannot be performed accurately. Within this freedom of choice, not only they choose the threat but also they can direct their informative messages towards two paths: to the efficiency (E) of the product against the threat and on the threat (T) itself. These messages, being of any type described above, can at the same time present a big intensity in the message (variable m). This variable will in turn make the message more salient. A second variable used is the number of messages (n). Increasing the number of messages will make the threat or efficiency measure more available for the public mind, under the available heuristics approach.

All these variables or tools at the full disposition of certain institutions are used to influence people's reservation price and hence in a more aggregate level the overall demand the institution faces. With this in mind I found by extending Dixit and Norman's (1978) model that under a monopoly structure the monopolist institution will use excessive fear from a social welfare point of view. This will be not only through the increase in prices

caused by the manipulation of fear but also from the marginal damage that it causes to society.

We further extended the scope of our analysis and examined what would happen with welfare and efficiency on a more competitive frame. While analyzing an oligopoly structure we noticed that the drawbacks of fear not only were kept but increased substantially. The reason for this is that monopolists do not take into consideration the cross-effects that exist, both: with fear in the production process as well as with the current cross-effects on social damages.

Some other conclusions can be made from the present thesis but I hope that the main aim of it was achieved. I hope it can raise questions towards the role of fear as an economical phenomenon and the consequences that this implies for society as a whole.

AFTERWORD

"Since love and fear can hardly exist together, if we must choose between them, it is far safer to be feared than loved". –
Niccolo Machiavelli

It is hard to understand fear as an economic instrument or even to fit it into a label that embraces all its characteristics. It cannot be considered as a "good" since it clearly represents no good to anyone, yet, people's reservation prices may be affected and increased. It cannot be considered as a bad either even though the utility of people seems to be affected by it. The common definition of a "bad" is a thing that consumers are willing to pay in order to get it removed or must be compensated to have it, in opposition a "good" is something you are willing to pay for. Fear, as studied under the present thesis cannot be completely fit for any of these definitions. But as unclear an agent as it is, it is its ever lasting presence and influence what made me study it. Also uncertain and unexplored are the effects that it may have on the economy but it is clear, as showed by the present thesis, that certain institutions have the power and the incentives for using it.

The overall effects that fear has are hard to assess since not only it affects the economy but goes deeper into the core of humanity. Actions taken by economical firms through fear not only may influence directly the economy but also will have repercussions on other spheres of human structure. This influence may be so strong that could be able to set changes and reshape society's features and individual's behavior. As a chisel, fear may be striking hard the marble giving it shape to what Hobbes called the Leviathan. Institutions may be institutionalizing fear and its effects, as a norm of behavior and reality. This is exactly what concerns me the most.

Probably with a couple of examples I will make my point clearer. Blanchflower (1990) expresses in his paper the idea that fear to

unemployment depresses substantially the pay of workers[12]. Fear in this case increases misleadingly the perspective of unemployment by workers and makes them lesser their expectation relative to wages. As another example, it has already been showed by Lenain, Bonturi and Koen that fear[13] has had as a repercussion to create higher trade costs. In a world with increased globalization, more trade agreements, less political barriers for trade, and less opportunities of levying tariffs fear could be used as a barrier to entry, or a way to increase the costs of imports[14]. As you can see fear can become with ease a control tool. The consciousness of these acts is what scares and should be subject of study.

Under this possibility the panorama seems not very promising. Fear may enhance the profitability of firms but; at what cost? Does it pay back? Fear erodes trust and without any trust, no productive partnerships can be made between people. Trust is the cement that unites society, and it's the core of social capital. The lack of trust leads to other social drawbacks like discrimination, hate, social resentment, etc. The spillovers effects of societal fear caused by institutions keep on and have full influence on the economy and on individuals' "well-being".

Economics main concern is to increase the wealth of society as a whole. One of the greatest social scientists of our times, Amartya Sen, gave us a broader and nicer interpretation of what economists shall pursuit in their quest for the "*well*-being" of society through his "capabilities approach" and the increment of freedoms. He states that "the usefulness of wealth lies in the things that it allows us to do — the substantive freedoms it helps us to achieve", this is quite a radical change of the merely accumulative,

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[12] Blanchflower finds that "UK workers who say they expect their plant to close earn 12% less than those who do not".

[13] They base their study on the aftermath of September 11th..

[14] Leonard, J. (2001) even give measures of the effect, he says that the "cost of security inspired measures could amount to between 1 and 3 per cent ad valorem". This data added to the findings of Limao and Venables (2001) in which they calculated the elasticity of trade flows with respect to transaction costs to be between -2 and -3% supports my worry.

shallow and superficial view in which we have focused our theories. Concerning freedom, he divides it in 5 main components or 5 distinct types of freedom: 1) political freedoms, 2) economic facilities, 3) social opportunities, 4) transparency guarantees and 5) protective security[15].

In my personal opinion Sen`s view on the last type of freedom (protective security) misses the fact that being "safe" is not the same and as important as *feeling* "safe" and is the latter concept the one that counts for "**well**-being". Fear intertwines and affects every single freedom on this list, directly or indirectly and in a big scale. It is even changing the rules from which our societies where traditionally based upon and restrict all the freedoms Sen refers too. Hence fear affects wealth in every single aspect explored by him.

Fear is even changing the laws that rule and direct our society. Thanks to the "precautionary principle" isolated events or even the sole idea of a possible event which may cause fear to the public is able to end in a written law to prevent the events from occurring[16]. Not even scientific evidence is needed to legalize, under the shadow of this principle, law can very easily been manipulated under the presence of fear of a threat. Written law!

Fear affects so many spheres of human life and well being. It represents factual costs for society (this is a fact) and a further theory development and research are needed on its effects in order to impulse normative measures to improve social welfare. Considerable effects of terror exist on a vast span of economic and social phenomenon and opportunities of research arise in every single one of them, theoretically and empirically.

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[15] Sen, Amartya, "Development as Freedom", ps. 10, 14. Anchor Books, New York, 1999.

[16] The closing Ministerial Declaration from the UN Economic Conference for Europe as stated by Sunstein (2005) says: In order to achieve sustainable development, policies must be based on the Precautionary Principle… Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation".

Probably the thesis at hand may seem very metaphysical and philosophical while dealing with human sentiments such as fear. This may be the feeling especially under the light of present mathematical and pragmatic economics where everything that is worth studying has to be subject of measure[17]. We are risking ignoring non measurable things such as values and feelings. Even if fear and other variables are not measurable they still affect economical results and welfare. Is the argument that something is not measurable, enough to ignore it? I doubt it and indeed in my humble opinion, Economics should come back to its roots and stick closer to Philosophy, Ethics and Sociology where this type of non measurable effects are considered.

I hope this thesis feeds the inquisitive and restlessness spirit of some or any reader towards the effects of fear. Indeed, the effects of fear on economics may be so vast that I would not be surprised if in the near future we find a branch of our Science called Fear Economics.

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[17] Some initial attempts to measure fear have been proposed recently by Adler (2004)

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