NEVER ENDING IRREGULAR WARS AND INFORMATION: A CONJECTURE

By Boris Salazar[1]

Abstract

An alternative conjecture to the never ending wars puzzle is introduced here. It is argued that the way in which information flows through the social structure of war determines its duration. The key point is that irregular war changes the underlying social network structure and the way information flows through it, blocking informational cascades about its outcome. Local outcomes do not become global and universal, winning coalitions do not emerge.

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Introduction

Wars create order through destruction and chaos. The uncertain expectations of warring factions, their political plans, their designs for probable futures become - with time and death - definite structures, stable results, new forms of domination and hegemony for the victorious side, and the eventual disappearance of the defeated ones. But war - both irregular and conventional - being a human phenomenon, fully dependent on the actions and conjectures of human beings organized according to different social arrangements, requires information to generate order out of chaos and destruction. Defeat, for instance, can only be accepted over the basis of knowing that there is no better course of action than to admit the impossibility of keeping offensive or defensive actions under the current circumstances. Direct experience does not sensibly improve the situation: soldiers, civilians, military leaders, observers, strategists cannot always know, from action and real fighting, the global effects of what they are doing or have done in the near past. In chapter V of Sthendal's classic novel, The Charterhouse of Parma, Fabrice, who badly wanted to fight on the side of his much admired Emperor, manages to fall in the middle of one of the Emperor's regiments during the battle of Waterloo, rides along mythical Marshall Ney's escort and even kills an enemy's soldier, but two weeks later, after recovering from his wounds, he still did not know if in fact he had been in the battle of Waterloo. He muses:

“What he has seen, had it really been a battle at all? Was that in fact the battle of Waterloo?” (Stendhal 1973, 92-3).

Although Fabrice had been in the battleground, risking his life, and learning from direct experience what war was all about, he was not sure if what he had watched and lived was really a battle, and if that was indeed the famous and decisive battle of Waterloo. Granted that Fabrice could not have full information about the global result of the battle, granted too that he was only a very excitable, dash and emotional young man trying to see, through his own eyes, the destiny of Europe in the admired figure of the Emperor, but his predicament was a real one, shared not only by civilians and casual observers, but also by the very experts and military leaders involved in the real confrontation---even by the Emperor himself. Fabrice did not know if all the events he had lived were part of a real battle and if that battle was Waterloo. Had he been asked if he had fought at Waterloo he could have not answered with “yes” or a “no”, for he was uncertain about a seemingly simple fact: Was the chain of events he had been involved in part of the famous battle? The Emperor himself in the morning preceding the battle was sure of his army's superiority and of the clear inferiority of British soldiers. Experts writing from the vantage point of the future contend that had the Emperor's army regrouped and attacked some hours earlier the result of the battle would have been the one predicted by the Emperor in the dim hours of that morning. The main question remains the same: Do we know now better than Fabrice?.

I am afraid we are in an even more helpless situation than Fabrice himself. For in Sthendal’s times wars were fought in large and crucial battles, with both sides' best men and weaponry facing each

other in a momentous duel. One, two or three days of intense killing would define the outcome and its consequences would pass along the political and geographical space until new territorial and political arrangements emerged. There is no such thing as a decisive battle in contemporary warfare: hundreds, thousands of small battles, combats and skirmishes have replaced it, making the broadcasting of its results a difficult and uncertain process and giving the political, media and negotiation spheres a headway it never enjoyed in a non -- too -- distant past. If there is no decisive battles anymore, and if the outcomes of war do not pass along in the smooth, hierarchical way they used to pass in the glorious times of Napoleon, Alexander the Great, Hannibal, Bolívar and their like, how do contemporary wars manage to diminish uncertainty and thus create order out of destruction and chaos?

War and uncertainty

Though uncertain in nature, war has been traditionally thought as a costly and complex process aiming at diminishing uncertainty. One of the greatest paradoxes of war lied there: it was capable of reducing uncertainty through the production of uncertainty, achieving new states of order over the ashes of old regimes. But not all wars were equally effective at doing it. Huge, interstate wars, with hierarchical flows of information, and clearly defined friends and enemies, were pretty effective in reducing uncertainty at the highest of prices: total devastation of entire countries and millions of deaths and casualties. War World II is the epitome of this type of war. In the tradition started by the Greeks (Keegan,) all warring states fought almost until its last man. Every participant was willing to take as many deaths and casualties as victory would require. The sixty million people killed stood as a sad confirmation of how seriously war to death was taken. Irregular, civil wars are not as effective in achieving results in short periods of time. They may become endless and painfully long. Uncertainty is preserved along the process creating the informational conditions for long duration, almost never ending wars.

There is indeed no shortage of explanations for the emergence of endless wars. But, to my knowledge, there is no general explanation for the duration of any type of war. This essay is an attempt to introduce an alternative explanation for the duration of wars from the vantage point of how information is broadcasted, exchanged and channeled in warring contexts. In those wars in which information flows from the top to the bottom, and there is no uncertainty concerning friend and foe, civilians' behavior, and geographical heterogeneity is overcome by the scale of the war effort, uncertainty may be effectively reduced to the point of reaching an end to the war in a limited number of years. Now picture the opposite situation: civilians keep changing alliances and switching sides, information does not stop flowing in a decentralized way from many sources, and geographical heterogeneity dominates the war effort. As the underlying informational structure keeps all sources of uncertainty active, war does not come to an end.

An informational theory of the duration of war must cover both situations and all the events in between. How to relate the duration of wars and its informational

structure is the main question this paper attempts to address. Here it is the basic intuition. Imagine war as a mechanism to reduce the uncertainty concerning its final outcome. As those who initiate or trigger war do not know the final outcome of their actions, they played the highest of all stakes hoping for the best without knowing for sure what is going to be the net result of their efforts and plans. Even the most lopsided of wars, the one with the highest gap in troops, military might, morale and technology, does not come to this world with a sure thing result attached to it. Consider the ongoing US war against terrorism in Iraq. The first phase was easily won due to the sheer superiority of the American troops and technology, and the political decay of Saddam Hussein's regime. But the subsequent phases have proved more difficult to assess in terms of the proximity of its likely end. The US army, and its indecisive allies, cannot tell friend from foe, civilians (in their many tribes and political leanings) keep changing coalitions and alliances, information flows from everywhere in a contradictory, sometimes mutually canceling way: the outcome of war is anything but near or clear.

Consider Joe Klein's (2007) *Time* piece on General David Petraeus' new strategy to secure at least an honorable exit from Iraq. Klein tells us how exhilarated General Petraeus was about the incorporation of 500 new recruits for the Iraqi police force. Petraeus' exhilaration had a promising strategic foundation: all of them were recruited with the help of local sheiks of Sunni lineage, and linked in the recent past to the Sunni anti-American insurgency. But the Iraqi police' bent for corruption, duplicity and collaboration with the militias made Petraeus' strategy dubious to say the least. The General's solution to the duplicity predicament is a telling instance of how to fight informational wars: all the new recruits have got retinal scans and have been fingerprinted. That way any treacherous action from them would be detected and the culprit readily identified. In an informational tone Petraeus states the long run implications of his biometric mechanism:

"We're beginning to build a fairly significant database".(Klein, 16)

All this is of course paradoxical in its very nature. As Luttwak (2000) has eloquently insisted that understanding war requires a paradoxical, non-linear logic. My contention is that the paradoxical character of war strategy also applies to the relationships between information and war duration. A first difficulty in building up a general theory of the duration war from an informational point of view is that there is no a unique underlying process producing all wars. Each war is an independent phenomenon with its own particular conditions and history. However, what it is doable is to associate to every war an informational structure as general and flexible as it could possibly be. Then a mapping taking informational structures and sending them on to the set of all wars' duration will establish a relationship between the informational structure of every war and its specific time duration.

Let us construct a spectrum of wars according to its informational structure. In one extreme one can find regular, classical wars, in the other extreme irregular wars. Between them, in different

degrees of informational transparency, all wars would order themselves. Three main criteria will be used to situate each war on a specific point of the spectrum.

The first criterion is the uncertainty, or certainty, concerning friend and enemy. In wars between national-states or coalitions of them, friend and enemy are clearly discernible, and the uncertainty associated with them is almost nil or nil. In irregular and civil wars is very difficult to tell friend from foe. Moreover, this is what irregular wars all are about: knowing who is your friend and who is your enemy is knowing what to do and how likely your victory or your defeat is. Parties to an irregular war walk over this high rope all the time. That is why information is at the center of stage in irregular wars.

The second criterion is how hierarchical is the flow of information in both sides of the war. When information flows from the top to the bottom and civilian population at large accepts the orders given at the top one can attach a very small uncertainty to this variable. Nazi Germany, during World War Two, is a good example of a national state involved in a total war, with a strong hierarchical structure, in which the word of the Führer was followed by the whole nation. Dissidents were punished with death, since they were considered as traitors to the national effort. Of course some information would flow through independent channels to the highest risk of the individuals involved. The recent movie Sophie Scholl is a good example of how costly was to deviate from this hierarchical line of information: the youths involved in the innocent writing and distribution of pamphlets against the doomed German war effort in the eastern front were arrested, prosecuted and readily executed in three days. Note that information has a very special meaning in this context: it strictly means that the state---and first and foremost its armed forces---is the only legal and legitimate source of information concerning the state of the war, the enemy's capabilities, and the most probable outcome of war. All other sources of information are considered as potential venues of treason and confusion and are punished with execution. Under this criterion we can include how unified is the command of the parties at war, and the scale of the resources in their hands. Although some irregular wars may have parties with unified commands and huge resources to be thrown into the war effort, they still are irregular wars from the vantage point of civilians' key role in them.

Consider the Soviet Union's performance in World War II. The destruction of social networks achieved by Stalin's regime has created a full hierarchical society with Stalin himself at the top of the hierarchy enjoying a virtual monopoly of the whole war operation against the Nazi invasion, and having total control over the life and death of his own fellow country men. The horrible carnage, the massive killing, the destruction of millions of lives in a ill conducted war were only possible because the only information soldiers, families and prospective soldiers have was the one produced at the top of the state and the communist party. In *Ivan's Army. Life and death in the Red Army* is superbly established how only this hierarchical information structure and the destruction of social networks allowed for the heroic, almost suicidal actions of the Soviet people during WWII. Had they

known the reality of the destruction and killing at the beginning of the Nazi offensive in 1941 the solid front the Soviet people made and their will to fight would have crumbled.

A third criterion is how deep and uncertain is the role of the civilian population. Civilians are crucial to irregular wars and they can change allegiances, break down old coalitions, switch sides and inform on their current allies. Civilians are a permanent and strong source of uncertainty. As a matter of fact, the strongest dividing line is the one separating wars depending crucially on the civilians' actions and strategies, and those in which civilians are an obedient party to the hierarchically organized war effort.

Information is action and there is no action without information. By the same token the expected consequences of actions have an effect over decisions concerning the transfer of information. If transferring information changes an individual's position with respect to his survival and increases his own payoff, information will be transferred. On the contrary, if transferring information diminishes the expected payoff, in terms of survival and potential economic gains, the transfer of information will not ocurr. It is easy to infer that these relationships generate an unexpected causality's direction: causality will run from the expected consequences of the actions that will follow after the exchange of information to the decision concerning the transfer of information. And the ways in which information is exchanged, retained or revealed determine the occurrence, and the reach and strength, of actions. At the same time, action is information. For is there a more effective way to convey information than real, observable actions? This essay is precisely about how action and its outcomes are transformed, through information, within the context of contemporary irregular wars.

I want to develop here the consequences of the following conjecture for the study of irregular wars - and even of conventional ones: the outbreak, development and duration of irregular wars are informational problems. How potential rivals perceive each other, how they “create” each other - through conjectures, mistakes and misrepresentations- as enemy or friend, or how they cannot tell for sure friend from foe, how much they know about the real capabilities and strength of each other, how they perceive the potential threat they represent to each other, how they choose to magnify or reduce the threat embodied in a potential rival are all valid informational questions whose answers are helpful in addressing classical questions about war: when it starts and why, how it develops and for how long and why and how it endures in time. How much this approach will add to the already available knowledge about war can only be known in trying it. What kind of predictions would yield this type of theory? Would it predict, for instance, the outbreak of war, given the basic information concerning perceptions, threats, strength and conjectures? Or would it predict in advance the long, medium or short duration of war? As information is changing in time answers must be negative.

I will concentrate in the long duration part of my conjecture. Here is the specific

conjecture for never ending irregular wars: *wars in which information stays in a state of flux, in a middle point between full disorder and order, are prone to become never ending or to last for longer than armed conflicts with different information structures*. Before defining states of information, order and disorder, I will justify the role of information in the outbreak, development and ending of wars. Consider the following basic questions about irregular wars: Who is perceived as a threat? To whom? Grouped with whom? With which strength? Who should I group with in order to survive? And, most difficult of all, who is the knowing agent in all these processes? Who is the one who knows--the individual agent, the organization, or the social networks, social groups, political parties, and nations to which individuals belong? Now consider the same questions at different levels of social complexity, starting at the neighborhood level and going up the ladder through villages, hamlets, regions, until arriving to the global level.

Note the increasing complexity involved and the insurmountable difficulty to any human being, no matter how well informed and how brilliant and powerful, to understanding and knowing the global state of the war process. The interesting thing is that at every one of those levels individuals, organizations, parties, guerrillas, state forces are capable of taking decisions using the information available at each one of them. But nobody of course knows the global result and nobody takes the decisions at hand knowing the full state of the war. In a way all of them act under some state of myopia: they take decisions of life and death on a local level without knowing what is the global state of the war. Even military and political leaders must take decisions under the spell of some basic myopia. My hunch is that the key to this elusive aggregation process is information. What flows through rumors, conversations and actions is information contributing to the making of myriads of new decisions all over the space of war---both local and global. Differences as to how, by what ways, with what speed, information travels through agents must have an impact on the global result of war and on its duration. In all cases the speed at which information is transferred through the social structure, if in fact it is at all, depends on the specific pattern of social relations: how people are related to each other, how densely, through which paths, according to what type of social organization - hierarchical or horizontal - living in Asimov's Solaria or in the Caveman's world Watts (1999). As irregular wars destroy social structures, break social networks down, and decrease in general the social connectedness of the enemy, information will not be transferred with the speed and strength required to have a definite outcome, generating never ending conflicts. This of course announces the main methodological setting I will be working in here: the analysis of war as an informational problem within a context of social and complex networks.

In a nutshell: in irregular wars social structure is endogenous to the war process. The implication is key to understand the main claim of this essay: if social structures do not remain stable during war, the flow of information concerning war's outcome will be dependent on the same changing social structure, and so it will be its very final

outcome. Thus predictions about war's outcomes will hinge around the direction of change on social structures. For the moment I can introduce two main types of final structures. The first one covers those wars in which the number of components increases and disconnection becomes a structural phenomenon. The second one reflects a successful process of adding or aggregating nodes to a main network leading to a definite outcome. The first type of structure implies a highly fragmented and divided territory with geography keeping events local and universal coalitions remaining a very improbable and distant event.

Wars that rapidly and effectively aggregate decisions through information until creating states closer to order are short and decisive, with a clear victor and a clear loser, and no ambiguity whatsoever about who is who. This type of war requires unified command, huge resources, unified national states or strong military and political alliances. Enemy and friend are clearly defined and national states, or coalitions of them, are the main warring agents. Information ideally flows from the top to the bottom of military and political hierarchies, and national or international leaders mobilize millions of people in their efforts to prevail in war. The control of civilian population is not an issue here and those who dare to disagree with the war effort are swiftly proclaimed as traitors and summarily executed. This type of conventional, hierarchical, and national state wars tend to have shorter lifes as decisive outcomes are reached through sheer military superiority and information cascades.[2]

Irregular wars do not fit that pattern. As the control of civilian population is a central goal in civil and irregular wars, local interactions, individual decisions and its grouping through social networks are crucial to understand its dynamics. The switching of sides by civilians and military men, the emergence of changing alliances between armed agents and civilians, the reversal or destruction of working regional or local alliances, the constant shifting in local control contribute to a state of permanent flux, in which is very improbable that a pattern of order, that is, a pattern of victory and defeat emerges. If this is joined by multiple business interests and venues, and by the growing number of economic agents connected to the war effort within a global context, the picture becomes even more blurred and less decisive [3] .

[2] Fujimori's government crackdown on Shinning Path guerrilla is in the middle of the extremes introduced here. The Peruvian state effectively defeated Shinning Path and created a huge victorious coalition. It was not a war between states, but enemy and friend were clearly defined.

[3] The meshing of business and war has developed at a remarkable speed, creating diverse ways and paths to accommodate business interests within irregular war contexts. Multinational corporations exploiting natural resources have managed to achieve more or less permanent and working agreements with rebel and irregular forces, on one side, and with paramilitary and state forces, on the other. All those exchanges involve money changing hands and contributing to the financing of irregular and state forces. This has been happening in Africa, Latin America and Asia. As national states are weaker in Africa oil and diamonds companies have relied more heavily in secret and not-so-secret agreements with rebels, warlords and irregular forces. Specialists in intermediation are in charge of the relationships between multinational corporations and irregular forces. They know the required information and contract out their services to both sides. All this of course contributes to the long duration of war.

War is not capable of producing enough destruction so as to yield a clear victor or to lead all parties to recognize their impotence to achieve working victorious alliances. Or, in an even worse turn of events, destruction can achieve high levels without diminishing the basic ambiguity with respect to the global outcome of war.

Information and Netwars

Contemporary irregular wars have undergone an additional major transformation. The specific network structure of a terrorist organization or of a state secret organization has become a strategy within the set of strategies of warring parties. How are its members related to each other, how sparse their relations should be, and how crucial is the existence of a key player are questions that strategists have to answer in order to improve the lethal power of the war structures they are conducting. This transformation is informational in its essence. Arquilla and Ronfeldt (2002), for instance, linked the advent of what they labeled as Netwar to the information revolution and the way in which it has favored and strengthen networks forms of organization over the traditional hierarchical forms used by armies all over the world. Let themselves make the case for the major transformations introduced in warfare by the advent of Netwar:

“Major transformations are thus coming in the nature of adversaries, in the type of threats they may pose, and in how conflicts can be waged. Information-age threats are likely to be more diffuse, dispersed, multidimensional nonlinear, and ambiguous than industrial-age threats. Metaphorically, then, future conflicts may resemble the Oriental game of Go more than the Western game of chess. The conflict spectrum will be remolded from end to end by these dynamics” (Arquilla and Ronfeldt Op. Cit., 2).

Two of the major points made by Arquilla and Ronfeldt deserve more elaboration. The first one is the nature of adversaries. Whereas in conventional wars there was no doubt about who the enemy was, in irregular wars, and particularly in netwars, it is not clear who the enemy is. A current ally can become an enemy in a very short notice. Or former enemies can become active allies against a newly found common enemy. The classical division between friend and enemy, at the heart of Carl Schmitt's theory of war and politics, becomes blurred and diffuse. If you do not know who your enemy is, you are uncertain with respect to what is to be done. The clear-cut connection between information and action suddenly breaks down: if nobody knows for sure who his enemy is, his actions can become uninformed, imprecise and even downright irrational. States, warlords and rebels must thus face a classical informational puzzle for which they were not prepared: with limited information they are forced to "pick" their own enemies, and in doing so they may create new enemies. A very recent example can be found in the actions of President George W. Bush with respect to Afghanistan, Irak and the so-called war on terror. As US’ enemies did not have a defined and precise face, he had to pick who was the real enemy giving him a name, a story and a face. He picked two: Osama bin Laden and Saddam Hussein. Although defeating the second proved to

be an easy target, the consolidation of victory became a classical nightmare. US' enemies multiply inside Irak and what was supposed to be a short and clean war, defined by technology and sheer military power, became a dirty, blurred and unfinishable one, with multiple enemies and rapidly changing alliances.

The second main transformation is related to the character and strength of potential enemies' threats. In irregular wars the type and extension of enemies' threats become uncertain. An uncertain threat is the most effective of all threats for uncertainty raise the threat to a positive power, depending on the enemy's military capabilities, imagination, and sheer lack of knowledge about their purposes and values. The exponential growth of a threat's magnitude is related to fear, loss of well being and the general perception of insecurity inflicted on the potentially threatened party. Is there a more dangerous threat that the most uncertain of them all? I guess not, and this links irregular war and information in a crucial way: as threats are an informational issue too, national states must learn how to evaluate and deal with diffuse threats. The informational complexity of the task at hand grows in an exponential way and calls for new strategies like the creation of social networks and the infiltration of already existing ones. But by doing so enemies and friends have to look and act alike. Networks meshed and the methods and actions at hand tend to converge. The most important implication of all this is the higher complexity costs involved in choosing strategic actions for any warring agent. Central state agencies, no matter how technically endowed and trained, cannot extract, process and transform into actions all the required information. As the complexity costs involved in this type of exercise are clearly insurmountable, decision making and war outcomes must become spontaneous. It is the aggregation of multiple, local informational decisions what finally will lead to a definite outcome - be it of short or long duration.

Alternative explanations

The conjecture I have been trying to introduce here must compete with a number of alternative hypothesis or theories. I guess that most of them are non-informational in character and method, though they inevitably merge in some local points with the above conjecture. My hunch is that a good informational theory of war must deal with three connected issues. First, it must deal with the emergence of contentious parties, and of their perceptions, conjectures and threats. Second, it must address the social structure capable of broadcasting or blocking those perceptions. And third it must deal with the informational structure that allows for longer or shorter wars.

James Fearon's theory fearon is a case in point. His theory revolves around a crucial point: if the duration of war depends on the guerrillas' survival, a good theory of war should address on what that survival depends. Fearon contends that their survival depends on "their controlling the information about who and where they are" (Fearon 2005, 1). This, of course, is informational both in content and in perspective. He chose to use a game theoretical model with a contest success function to find equilibrium results for a contest between a central state and guerrilla forces. Given

the very well known limitations of contest success functions Fearon decided to open its structure up. He obtained a low level equilibrium that ensured both a long duration war and the unfeasibility of negotiated arrangements. But his theoretical choice prevented him from treating information in an explicit way. The author recognizes this fact at the end of this paper for he commits himself to

"(…) go further in this direction, developing a more explicit model of the information contest between rebels and government in this case of guerrilla war." (Fearon 2005, 27)

Though I am sympathetic to the intuition of Fearon's theory I differ from his approach in dealing with the information issue in state-guerrilla wars. It is my hunch that models based on contest success functions and in classical game theory are not the most appropriate ones to deal with the complexity of information in guerrilla wars. However, Fearon's model is capable of dealing with a crucial issue in irregular wars: the dynamics of recruitment for guerrilla forces. He found a very elegant way of justifying both the long duration of war and its low intensity, derived from the informational fact that visibility is lethal for guerrillas and thus their expansion into the cities is too costly to be seriously considered.

How and when to transform private information into public one is a crucial issue in irregular wars. Kalyvas' (2000) theory of the logic of civil wars effectively covers the relationship between political or organized actors and individual civilians, and is one of the first explicit theoretical treatments of the complex relationships between armed and political actors, on one side, and civilians, on the other, within a civil war context. In those settings civilians have private information that is lacking on the side of political actors, and the effective channeling of that information involves denouncing neighbors, using it as a means of getting even in feuds going well back in time, and even informing on friends and relatives if some individual advantage, or old offense, is associated to it. Note that indvía civilians only act here as a source of information for political agents. There are some hints as to why they would provide information to political or armed agents within an irregular war. The foremost motive is survival, with revenge and personal advantage as second motives. However, this does not cover the whole spectrum of civilians' actions or motives regarding the transfer of information in irregular wars. As survival becomes the foremost goal of civilians within an irregular war, all actions that most likely contribute to that goal would be chosen and carried out. In order to see those expected actions materialize civilians and political operators use information for their own advantage.

Stephen Biddle's point on the distinction between communal and ideological wars provides a good context to discuss the role of information in civil and irregular wars.

"Albanian Kosovars, Bosnian Muslims and Rwandan Tutsis knew whose side they were on. The fight is about group survival, not about the superiority of one party's ideology or one side's ability to deliver better governance" (Biddle 2006, 5).

Fair enough, but his argument does not capture the dynamics of irregular and

civil wars. The fact that Rwandan Tutsis knew whose side they were on, and that they were readily recognized by foe and alike, only covers part of the relevant information exchange. For what was crucial in Rwanda was not that Tutsis were readily recognizable as Tutsis and that they themselves knew on whose side they were on, but the sudden fall of the boundaries separating a vaguely perceived annihilation threat - coming out of their old foes and friends, the Hutus - from the unleash of the real genocide. What a theory of war must account for is this sudden shift from a vague threat, and decades of relative peace, to a full blown genocide. Here of course an information cascade was set in action on a very short notice. After the assassination of president Habyarimana, the process of coordinated destruction by Hutu mobs that ensued ought to be explained by means of the social network structure of both Hutus and Tutsis, the hierarchical structure of their social organizations, and the messages effectively and lethally broadcasted through those hierarchical structures. Ethnic rivalry and conflict does not suffice as an explanation.

As Kalyvas and Kocher (2007) point out one of the key implications of Biddle's model is the impossibility of defection between rival sides. In ethnic wars nobody can escape from his ethnic origin and label, seems to be its crucial statement. But even granting the general truth of this implication it is not clear that the dynamics of war can be explained by the initial ethnic cleavage. In fact switching sides is not the only way of changing war's outcomes and tipping off the balance between parties in civil and irregular wars. Events that unleash huge waves of collective and coordinated violence, along with the network structures that make them possible, can effectively change the outcome of a civil war. My main point is that informational processes in irregular wars are far more complex than substantive theories of war would accept. Ethnic cleavages without the "right" network structures and without the "right" and sudden shifts in boundaries and in coordinated violence may remain mild and inoffensive. Ideological divisions without the social structures and events required for their transformation into a war may remain as anecdotes easily overcome by political means and accommodations.

Non-expanding information cascades

What is at the root of these huge differences in the production of order in irregular and conventional wars? My hypothesis is that irregular wars, due to the decisive role of civilian population and social networks structures, do not produce, as fast as conventional wars do, the information cascades that would lead to a final, definite outcome. In conventional wars, with unified commands, huge political and military alliances and active mass media, although information flows in both directions---from the top to the bottom of society, and from the bottom to the top---it is pretty clear that decisions flow from the top to the bottom, through clearly defined hierarchical structures, and forcing the perception of victory and defeat to flow in the same direction.

Both in games theory and in social and complex networks traditions there has been serious attempts to model how the

social interaction of individual agents, with private or public information, converge to collective action or fall into herd behavior [Granovetter 1973, 1978; Schelling 1971, 1973, 1978; Hirshleifer et al. 1992]. Writing within the recent wave of formal work on social learning and collective action, Gale and Kariv (2003) summarize what standard models of sequential social-learning (SSLM) have accomplished in this way:

Once the proportion of agents choosing a particular action is large enough, the public information in favor of this action outweighs the private information of any single agent. So each subsequent agent "ignores" his own signal and “follows the herd” (Gale and Kariv Op. Cit., 2).

But as the authors themselves point out some of the SSLM assumptions are not realistic and impose a very lopsided structure on the problem of social learning. The first assumption to be dropped is the one establishing that all actions are public information. This assumption is not only unrealistic, it gives away the problem at stake: How people with only private and local information can converge to herd behavior? Assuming that all actions are public information takes complexity out the situation: if everybody knows what everybody is doing, it is not surprising that some kind of coordinated behavior emerges. The second assumption is related to the sequential character of the interaction. Sequentiality makes coordination easier: every agent knows what others have chosen in the past and chooses in consequence. Gale and Kariv dropped this assumption and chose to have agents making decisions simultaneously. Dropping those two key assumptions was bound to have serious theoretical implications. To begin with, once agents choose simultaneously and on the basis of pure local information, some kind of social structure is needed to model the interaction process and its outcome. A natural first choice is social networks. That is the authors' choice and the new structure they favored to work on is labeled as the social network model (SNM).

How to link SNM modeling to the informational dimension of irregular wars? Irregular wars and herd or collective behavior have in common the social networks structures within which they exist. The interactions of civilian population, political operators and entrepreneurs, and violence specialists that make up for irregular wars occur within a definite social network structures. The crucial question is this: How irregular war changes the basic properties of the underlying social network structure? And in changing them, How it will affect the transfer of information and the final outcome of war?

In irregular wars local exchanges are conducted by different armed agents, in interaction with civilians and local political factions, within a context prone to switching sides and the destruction or remaking of political and military alliances. This occurs at the same time in different regions, villages and neighborhoods. The state of war, and its perception by civilians and armed agents, differs from one region to another, and from one village to the next one. How probable is, for instance, that an information cascade initiated in region can expand itself over neighboring regions, and even to distant regions? Geography, changing alliances, switching

sides by civilians and military men, and armed agents' divergent preferences over geography would tend to stop or break, at different moments of time, the information cascade initiated in region

Now imagine that all war actions, with a positive probability, directly or indirectly, change the social network structure. Be it changing alliances, or switching sides, or geography, or the emergence of boundaries, or a combination of all of them, or just of a few of them, let us assume that all are bound to happen in a situation of irregular war. The intuitive result is that it is very difficult for an information cascade to expand itself to neighboring and distant regions for there will always be, in any of them actions that destroy social networks and create, in passing, obstacles or boundaries to flow of information. Take, for instance, the class of geographical obstacle or boundaries. The probability that the effects of actions occurring in local neighborhoods expand themselves towards the whole network is almost nil. Geography and loss of connectedness operate together keeping the effects of war strictly local. In countries like Colombia, with a very diverse, changing and complex geography, the territorial control of armed agents, and its capabilities to expand information cascades, will change with its geography. If, on top of that, the distribution of geographical roughness is more or less homogeneous, meaning that the probability of having a rough terrain region neighboring to a flat or mild geography region is more or less the same all over the country, the complexity of the situation grows in consequence (Castillo et al. 2007). Please note the strongest implication: the fact that is highly probable to find rough terrains---prone to guerrilla successful activity and survival---nearby the largest cities implies that information cascades coming out of the largest cities do not expand into rural, rough spaces, with sparse populations and some degree of loyalty to rebel forces. The reverse proposition is also true. It is not possible that information cascades coming from rural areas can expand into the cities changing the perceptions of the military, the government and the citizenry.

Loss of connectedness

Why irregular wars, waged within social network structures, do not produce definite outcomes and tend to last longer than conventional, hierarchical wars? My contention is that the impossibility of arriving to definite outcomes in irregular wars is related to the loss of connectedness due to the violent changes imposed by warfare on the underlying social structure. This condition is dependent on the way information is used by civilians, military men of both warring sides, and political operators and entrepreneurs to improve their own positions within a context of irregular war. It is not an isolated fact or the effect of the informational whims of some civilian and military agents. As a matter of fact, irregular wars, in meshing social structure and warfare in a permanent way, have created a more difficult and complex matter, for it requires the joint explanation of the effects of warfare on social structure and the impact of social networks on warfare, creating in the meantime a whole new different puzzle for researchers in both fields.

Stathis Kalyvas' work on the logic of civil wars is a clear precursor of the systematic study of the complex interactions between social life and irregular warfare. Although his work has concentrated itself on the logic of violence in civil wars - its intensity and means of production - the inner logic it has been trying to reveal naturally overlaps with the master lines of the problem I have been trying to address here: How social structure and life, restrained by war and survival, determine, through multiple paths and ways, the levels of violence, the type of warfare and the very outcome of war? It is not a coincidence that information is at the center of his work on civil wars. As underlying social structures have an impact over war outcomes whereas war transforms those social structures, understanding this mutual interaction is crucial to understand the logic of irregular wars and the role of information in their development. Stathis Kalyvas's work on the logic of violence in civil wars has sharply revealed the relationship between information and civilian behavior within that context. Quoting Kalyvas at length:

> "Selective violence is difficult to achieve because it requires information---typically private information. Private information is asymmetrically distributed between political actors and individual civilians. This is a fundamental problem of rule: "The Sovereign can punish immediately any fault he discovers, but he cannot flatter himself into supposing that he sees all the faults he should punish", remarked Tocqueville. Although some information can be extracted violently, there is no substitute for consensual provision. However, channeling such information to political actors often hinges on intra-community dynamics. These dynamics are rarely studied. Indeed, the best insights can be found in either social anthropology or literary works. The most obvious cause of this neglect is the difficulty of researching or collecting systematically data at this level" (Kalyvas 2000, 7).

How irregular war contributes to this loss of connectedness? There are two main sources: armed agents and civilians. Both of course mesh and transform each other within the social structure emerging from war. As armed agents' actions have the main objective of controlling civilian population, any massacre, assassination, threat, and rumor has the effect of breaking links between the victims and their organizations, and between those victims and friends, relatives and acquaintances. If the victim is a bridge, a middle level operator, or a political entrepreneur, the loss of connectedness becomes higher. As a matter of fact the killing of a top leader may have smaller effects, in terms of connectedness lost, than the killing or switching of sides of middle level operators or bridges. Something similar can be said about the effects of civilians' actions on connectedness. Informing on an enemy, a former friend, a not-too-much-liked-person, a business associate, or a rival may have negative effects on the social connectedness linked to that person. Although the choice of the victim by civilians does not depend on his importance in the social structure, the choice of the victim by organized armed agents has a closer relationship to the importance of the victim in the social structures they are trying to destroy.

Working on information obtained from its links with civilians, an armed faction may order or perform a killing with the clear purpose of propitiating the highest damage on the enemy's structure and connectedness. The damage level depends of course on the local situation and on the organization's reach. The possibility of getting closer to an important operator, depends on the social links of the killers, and on their ability to mesh with the victim's social milieu. In all cases the actions of civilians and armed agents in an irregular war have, as a not always looked for effect, the consequence of destroying social connectedness and adding more uncertainty to the perception of the state of war.

In order to reach definite results in social network structures, theoreticians [Gale and Kariv 2003, Kearns et al. 2004] have assumed that there should be a simple path between any pair of agents belonging to a network. This is the property of connectedness. The lack of connectedness has a strong implication: global results are not possible anymore. Now imagine a situation in which the actions of agents, both armed and unarmed, contribute to the destruction of social networks. This is the situation corresponding to irregular wars. Any agent, in any place and time, acting on the offensive or on the defensive, through rumor, killing, threat or betrayal is prone to destroy social links and to stop the transfer of information. My suggestion is to apply the same logic to the issue of irregular wars' duration. Here is a proposition that summarizes the effects of systematic losses of connectedness on the duration of irregular wars:

Proposition 1. *In irregular wars systematic losses in connectedness---due to the deleterious effects of irregular war on social networks---block information transfer and stop information cascades, thus preventing irregular wars from converging to definite outcomes.*

The model

Let us try to build the simplest model of information within a war context. There are two rival coalitions, identified by tags *I* and *J*. These coalitions are made up of armed and civilian agents. All civilians must choose one of the two coalitions. They can choose also not to belong to any of the two. Trying to stay on a simplicity course let us suppose that the only information flowing between them is the one concerning the state of the war or war outcome. That information is only based upon what is going on his or her neighborhood or location. Nobody enjoys global or full information. There are two reasons for this. First, there is no process, known and available, that allows the most informed individual to find the true state of war. And if somebody had it, it would be most probable that he would be taken for an informed fool: most agents would not take that process as the true one and would not change their beliefs because of it. The second reason is just a call from realism: we are not linked to everybody, but to a limited set of individuals.

Following Gale and Kariv (2003) agents are located in neighborhoods represented by a finite set of locations indexed by $i = 1, 2,\ldots, n.$. A set of locations $\{N_i: = 1, 2,\ldots,n\}$ is a social network represented by a family of sets Each agent belongs to a location connected to other locations by

the social network structure, which in turn determines how the information about the state of war flows within society. But this social network structure does not stay the same along the war process. The turning point of this essay is *that all the actions of agents within an irregular war do affect the social network structure*, and thus the way in which information about the state of the war flows.

Let ω be the true state of war. Agents have private information about the outcome of war within their own location, but they do not know the true state of war. As a matter of fact the true state of war depends on the information reached by all agents through their own social networks. What does it mean that the social network changes? It just means that current links are severed, decreasing the level of connectedness and preventing information about the state of war to flow throughout the social network. For instance, people in location may be under the impression that coalition is winning the war, whereas neighbors in location know for sure that coalition is trumping their enemy, and people at location unconnected to the other two locations, think that the outcome of war is indecisive. is it possible to aggregate information in that situation? Is it possible to converge towards one and just one outcome? The model should answer negatively all three questions, and establish that enough divergence with respect to the war outcome is preserved via the destruction of social networks generated by the war.

Depending on the state of war they perceived through their neighborhoods, agents decide which action to take in the next round. They can either join one coalition or the other – a decision that includes leaving the other one.

All agents have private and local information about war's outcomes in their neighborhood, and thus they only know what their local network let they know about the state of war in their own location. If war did not affect at all social network structures, information would pass along a growing social network until a common war outcome prevailed. But war does affect social network structure.

Balancing condition

The loss of connectedness thesis is bound to face an immediate objection. If the loss of connectedness occurs in a lopsided way, only destroying the social structures and networks related to one of the parties to the war, and replacing them by new social structures, a natural implication is the emergence of a growing advantage for that party. It would be only a question of time to approach a definite outcome for war. Why is that irregular wars do not often yield lopsided losses of connectedness? Which underlying forces contribute to balance out the destruction of connectedness all along the space of an irregular war? Geography is one the most important balancing forces working within an irregular war. If geography is heterogeneous and the preferences of armed agents over territory are also heterogeneous, short or medium lived information cascades in one region are balanced by the emergence of short or medium lived information cascades in other regions, with a different geography and under the control of a rival agent or coalition.

A besieged coalition in one region of the country, counterattacks by showing force and strength in a geographically different region, probably under the control of central state. Beleaguered guerrilla forces, attacked in their own sanctuaries by a coalition of state army and paramilitary troops, would respond either by means of spectacular attacks on military headquarters or high class places in the largest cities of the country, or through rapid attacks on state or paramilitary forces in places akin to the guerillas' geographical preferences. The strategic effects of information becomes trickier to understand in the first type of actions for running against immediate logic the central state broadcasts and amplifies the importance of guerrilla's responses. However there is some logic to this seemingly irrational broadcasting of the enemy's threat. In purely informational terms a central state besieged by smaller guerrilla forces must magnify sometimes the importance of its enemy's threat in order to mobilize the will and minds of its citizens to wage war against the common enemy.

Proposition 2. *If both sides to an irregular war, respond to offensive actions of its enemy with actions disruptive of the other's social networks, and if geography, switching sides, and "bridging" operators allow this counterattacking actions to happen at any space point, thus the probability of a lopsided destruction of connectedness is very low and war may endure.*

As definitive battles, of the Waterloo type, are very unlikely to happen in contemporary wars, war moves itself into the micro world of small actions, launched by small forces, with informational purposes, and balanced destructive effects on social connectedness. But balanced destructive effects on both sides do not imply damage equality. It is not a problem of relative forces, military strength or numbers superiority. In relative terms rebel forces endure heavier losses, both in connectedness and troops, but as long as they are capable of launching operations in other places of the country, recruiting new men, and recreating social networks [4] the balancing property of irregular wars still holds.

Offensive actions occur in regions outside the core territory of the incumbent armed agent. Take for instance paramilitary actions in guerrilla protected territories. They attack small villages, killing selected people, community leaders and suspected guerrilla allies. As they penetrate deeper into the enemy's territory they become weaker and more exposed to the enemy's strength. Their advance is their demise too: deep into the enemy's territory they can fall under its fire power and higher territorial knowledge. At the end what looked as a very successful incursion may become a huge defeat. Their strategic expansion, both in information and in actions, has strict geographical limits: offensive actions in

[4] For guerrilla and paramilitary forces, the recreation of social networks surpasses all ideological or social boundaries. Due to the structural difficulty of creating social networks in the cities, guerrillas contract out local hoods, small violence specialists and even wholesale bands to conduct terrorist and offensive operations. Paramilitary forces have never refrained from recruiting former guerrilla members, including middle level commanders, in order to wage war against the guerrillas and its allies.

the enemy's core territory are too expensive to be taken. So geography and strategy mix to stop the expansion of order. At the same time, offensive reactions from the originally attacked incumbent do not occur in the same place. It occurs in other places. The final outcome is that the original information coming out of one party's offensive does not expand into neighboring regions and spaces. On the contrary offensive actions in one territory are balanced out by enemy's actions in the attacker's territories. Geography allows for a such a action-reaction function repeated all over the war space.

Why coalitions do not produce definite outcomes

A natural setting to model the emergence of order in irregular wars is the destruction and creation of coalitions of agents. A coalition is a grouping of agents---armed and civilians---whose main objective is to overcome all other competing coalitions. If there are only two competing coalitions we have a classical conflict with two parties fighting for victory. As agents move out and in of the original coalitions, they change them, shifting the balance of power and strength, and transforming the global state of the war. What distinguishes irregular wars from conventional ones is this state of permanent change in the numbers and composition of coalitions. Whereas in conventional wars coalitions tend to be stable in time, in its irregular counterparts coalitions are always changing, due to the shifting decisions of civilians and armed agents.

In contradistinction to models of rational choice I will consider here all kinds of agents---civilian and armed---to the conflict, and not only the organized and military ones. All agents live in local neighborhoods where they interact with a small subset of the full set of agents. Of course all agents have different weights according to their capacity to make credible threats. Agents do not know either the global setting within which they are interacting, nor the global state of the war. Thus they are taking decisions and involving themselves in risky action without knowing the state of the war in other regions, and ignoring the global turn of events. Their decisions are myopic in this precise sense: they only know what they see through their neighbors' actions. It is indeed possible that larger organizations and social networks yield information about the state of the war in other neighborhoods and even render approximate evaluations of its global state. However agents' basic ignorance remains the same all along the war. When the war's social structure reveals to any agent the global state of affairs the war is indeed near its closing.

Although advanced for different purposes, Arthur De Vany’s treatment of the emergence of order within a network coalition context is informational in its essence and method. Arthur De Vany has used effectively the dynamics of coalitions to show the emergence of order out of agents' spontaneous actions, and not out of their reasoning or knowledge. In a simulation context he convincingly shows that agents locally interacting within a network structure, and following a probabilistic process with noise, can reach global optima and attain order. Paradoxically it is noise that allows them to search different costly paths to the optimal global coalition. All paths, no

matter how costly, take agents to the optimal coalition. De Vany states his main point in this way:

> "One of the keys to achieving high fitness was the presence of noise. Noise promotes discovery and learning. Noisy, error-prone processes produce extreme outcomes. Noisy evolution produces a log normal fitness distribution and selection drives organizations into the extreme upper tail, where power laws hold. Selection trims the low outcomes and preserves the high outcomes. The result is that the diversity produced by noisy evolution leads through selection to the most fit organizations". (DeVany 1995, 439)

But the evolution of irregular war, of course, it is not equivalent to the evolution of markets, economic organizations, and economic networks. No doubt irregular war is an information-theoretic problem with economic and organizational dimensions. And no doubt order must emerge out of noise and spontaneous interaction. But how does in fact noise leads to order in irregular wars? Or, to put it in another way, what are the implications of the hypothesis that order come out of noise in irregular wars? Note that this result in fact contradicts my main conjecture about the tendency of irregular wars to lock-in in an intermediate state between disorder and order. A natural implication is that in never ending irregular wars noise and the making and destruction of coalitions do not lead to order. Why is so? Why irregular wars must end up in stalemate situations if they too use noise? Why noise does not lead to order in some irregular wars?

Here is an intuitive explanation. The rules of the game of irregular wars are changing and uncertain. Unlike other type of contests in which the end of the game is crystal-clear, the end of the game in irregular wars is hard to define and spell. Let us see it from the point of view of coalitions. If a group of agents create a very large coalition, short of the universal coalition, should the smaller coalition considered itself defeated? Should it surrender to its larger rival? The answer is negative. Holding on to war is still an alternative as long as the smaller coalition is capable of recruiting new combatants, keep territorial control over some regions, and survive as an organization. The difference with electoral contests is pretty obvious. In these contests the set of rules stipulate that the largest coalition of all is the winner. In irregular wars being capable of forming the largest coalition short of the universal one is not good enough, for if the smaller coalition is still capable of some activity and has the will to keep on the fight, war will endure. Both the will to fight, even in a very lopsided situation, and the way in which the transfer of information allows the weaker side to hold on to war explain why creating the largest coalition of all is not enough to achieve the end of an irregular war. [5]

The intuition behind the idea that not even forming the largest coalition, just short of the universal one, is not enough to end an irregular war is this: uncertainty

[5] In computational terms, a program with the informational properties suggested here for an irregular war should face the test of an algorithm capable of telling us if that particular program will halt after a finite number of steps. The hypothesis is that a program with the informational properties of an irregular war should not halt in a finite time.

with respect to the outcome of war does not homogeneously decrease all over the space of war. If at least some uncertainty remains in some places, and if this uncertainty is matched up by the weaker coalition's ability to keep some recruitment and some minimum level of action, irregular war will endure.

Informational venues

There are at least five different informational venues in irregular wars: switching sides, informing on foes, friends or former allies, making bridges between rival parties, or between power structures and civilians, creating new alliances, broadcasting rumors or perpetrating actions that ignite social unrest against a potential enemy. All of them create, destroy or change social connections, transforming war's underlying social structures. By doing this they help to achieve crucial features of irregular war: the social creation of the enemy, the broadcasting of threats---real or imagined---, the inception of fear and the drive for survival on both sides of the developing war. Now I will turn to illustrate these information venues and its impact on the never ending Colombian irregular war. Consider first the role of rumours and threats in building up Colombian current war and a previous episode of violence and irregular war: the so-called Violencia.

Rumors and threats

In the Colombian *Violencia* rumors play a key role in determining the levels and intensity of violence. The most effective ones were originated in the highest echelons of politics and organized religion. As the conservative party consider itself a minority with a gloomy electoral future in a country in love with elections and its burocratic bounty, their leaders decided to trump up an imaginative hoax: they said that one million and a half of the liberal party's members' identity cards were false. For an electorate not larger than 4 million potential voters, the figure was enormous and terrifying. And indeed it terrified conservative political operators and militants creating the base for a large, national-scale onslaught against the liberal party members and sympathizers. If the conservative party will be denied forever electoral victory due to the existence of one million and a half false identity cards in the hands of its rivals there was no other option than launch total war against the perpetrators of such a horrendous crime against the purity of elections. As so they did. With the help of local social networks made up of political operators, catholic priests, real believers, and violent specialists, a war of extermination was launched---with variations in style, motives, and processes---in most regions of the country. The myth of the one million and a half false identity cards was accompanied by smaller myths and prejudices: liberals were communist at heart, anti-catholic, priest-haters and atheists. Laureano Gómez, the foremost leader and ideologue of the conservative party, coined a monstrous image to represent the combination of all fears for conservative souls: the Basylischus, a mythological monster branding communism as his head and the liberal party as his body. In a very isolated country, under heavy influence of an extremely backwards Catholic church, Gómez' creation had a powerful effect.

Another piece of effective information at *La Violencia* had to do with the creation of a massive military threat in order to launch a preemptive campaign of annihilation of the supposedly dangerous enemy. In the city of Tuluá, in the center of the province of Valle del Cauca, conservative political operators disseminated, within their rank and file, a rumour that had the liberal party regional chief, Francisco Eladio Ramírez, as the organizer of an army of 700 men with orders to annihilate the city's conservative party members (Alvarez 1988, Molano 1885). The figure could not but grow in conservative militants' minds and fears, and with time it rocketed into the thousands. This piece of information contained its own action: conservative political operators and their violence specialists launched right away a full campaign of terror against liberal party members and sympathizers, with total killings going rapidly into the hundreds. Even knowing how unlikely was that the liberal party regional chief had organized an army in a few days, they needed the rumor and the potential threat it involved in order to take action. Expected action precedes information but information determines the reality of action.

Why did so inept myths and hoaxes work out so well in Colombia? Do not forget that in the ‘40s and ‘50s Colombia was a mostly rural society, isolated from the external world, with a limited contact with modernity, where the Catholic church play a key role as an organizing force, a bridge between different social classes, and an ideological lighthouse. In more technical terms, the Catholic church was the best connected organization in the whole country, the only one capable of reaching most people in any place at any time. Most of its members chose to take sides in the developing war, losing some its connections and concentrating its social and ideological influence on the conservative side of the political divide. Would the electoral and military rumors of *La Violencia* work out today? Not at all. Rumors and threats have evolved with the war's long duration. They do not involve ideology, religion or political allegiances anymore. They still may involve electoral outcomes, but without any relation whatsoever to political, ideological or religious allegiances. Today's rumors and threats are pragmatic and rational, centered around survival, economic advantage and informational struggle.

Switching sides

The scene has been described by many authors (Arteta 2007, Uribe 2004). Paramilitary or vigilante troops, sometimes state army forces, command villagers and peasants to the village's main plaza or square. The squad leader has a list in his hands. On his side there is a hooded man. It is the informer. Names are called, villagers respond to their names, and the informer gives a "yes" or a "no" to a simple question: Has this person been a collaborator to the guerrilla forces? The informer has the final word in deciding the faith of the accused. A “yes” is equivalent to a death sentence in the hands of paramilitary groups, or a jail term in the hands of state forces, a "no" means salvation, for now at least. Who is the informer? It is of course a person from the community, someone with enough command upon who is who in the region. The most damaging and dramatic turn of events involves a former guerrilla member who has switched sides and

become an informer for his former enemy. Or an army officer that becomes a guerrilla member or collaborator. In some occasions the switching is collective. A number of guerrilla combatants and collaborators switch sides; the effect is devastating for they know all the contacts and relations the guerrilla keeps with civilians in the regions they have acted in the past. Guerrilla militants, collaborators, economic providers and sympathizers will be the target of retribution and annihilation. Selective killings or massacres will follow and long-run social networks violently disappear in some days.

There is huge evidence concerning the role of massive switching sides in the Colombian war, mostly from guerrilla organizations into paramilitary or self-defense ones. In the north coast, in the traditional left-leaning heart of Colombia's oil industry, Barrancabermerja, and in the Magdalena Medio region, a huge chunk of self-defense' military organizations was made up of former guerrilla structures, including key middle level commanders.

The fact that middle level operators and commanders switch sides is very important in understanding the transferring of information in the Colombian irregular war. On the one hand is pretty effective in destroying, in a few days, whole social structures and networks built up during years of secret, patient work, and on the other it increases and levels off, for all sides, the social learning of military, political, social and informational technologies of irregular war. Both sides learn from each other diminishing the probability of surprise and leveling whatever technological advantage one of them would have accumulated.

Burning bridges: traitor types

Informers and traitors and their relatives face the deadly risk of retaliation. Guerrilla forces execute traitors and informers and sometimes reach their relatives. The key question here is why guerilla, army or paramilitary members and sympathizers decide to switch sides knowing the high risks involved? An irregular war spanning some generations must produce individuals whose family connections are nil or have lost its importance. Due to the war most of those individuals' relatives may be living in the cities or out of the country or, in some cases, they may be dead already. Following Schelling's Schelling06 concept of commitment, or credible threats, I suggest that these individuals may have already burned down the bridges to salvation and family lives. They are thus in a post-Schelling's commitment state: in any case, be it that their families are already safely overseas, or that they do not have a family at all, or that they just do not care anymore about their families' faith, the deadly consequences of their actions are innocuous to them. They accept the perspective of death for themselves and do not count into their payoffs or expectations whatever can happen to their families. This has a very dark global implication: if war's evolution create a critical number of individuals of this type, the perspective of switching sides may crystallized all over the spectrum of armed agents, propitiating most sources of noise, destroying social networks, and

making more distant a definite outcome for war.

There is another option to be considered: individuals become informers or decide to switch sides once the power of the new dominant armed agent is so overwhelming that they do not afraid anymore of the incumbents' potential retaliations. This, of course, begs the process preceding the rise to dominance of this new alliance: what was the critical mass required for individuals to safely switch sides? At some point in time some individuals must have faced the risky decision of switching or not switching sides. At this juncture the effects of learning and the burning of bridges must have been crucial. An immediate intuition is that the rise to dominance of a new alliance or coalition should be fast and overwhelming, with loyalists to the defeated coalition going into hiding or leaving the region.

Bridges

Bridges are relationships that link otherwise separated or isolated worlds, individuals and social structures. In more technical terms, bridges are the links that fill in the structural holes Burt that isolate agents, organizations, firms and even armed enemies. What makes them so crucial in informational terms is its capability to provide non-redundant information, for there are no alternative venues to communicate the agents or worlds at both extremes of the bridge. Note that at both ends of the bridge it is possible to find one individual or two of them. In the first case an individual is related to individuals in both organizations. He or she is the bridge linking the otherwise isolated organizations or worlds. In the other case at both ends of the bridge it is possible to find two different individuals, whose relationship allows the two organizations to have a permanent channel of communication.

What could be the role of bridges in irregular wars? Pretty important, sometimes even crucial. First, in irregular wars the gap between, for instance, the rural and urban world, or between different ethnic groups, is so large as to not having any kind of communication at all. Bridges may be the only way of knowing what the other side is thinking, or of transferring information within organization structures situated in opposite sides of the war boundary. For instance, the state and paramilitary forces need to have bridges connecting them to rural communities. Sometimes those linkages end up being informers whose links to the community have been severed, or are about to be severed, by their own activity. Guerrilla organizations are in need of bridges that link its rural forces and structures to the forbidden cities. Finding, training and keeping active those bridges are costly, difficult and risky. Each time that individuals making those bridges are killed or imprisoned, isolation and the loss of a long-run work are the costly consequences. From the informational perspective, informations ceases to flow through this channel and the end of war becomes more distant.

There is still another type of bridges in irregular wars: some individuals, ideally unrelated to the sides in war, create for themselves such high levels of confidence on both rivals (not always equal, of course) that they are capable of keeping

communication between them at no cost to those individuals' lives and prestige. They can transfer information, proposals and threats from one warring faction to the other. How they phrase proposals, how they interpret the reception, on both sides, of proposals coming from the enemy can be instrumental in the success or failure of potential negotiations. Though is very difficult to appraise their real influence in the mutual creation of perceptions, it is not difficult to suspect that they have a saying in how warring parties perceive each other.

Mary Roldán, in her very important book on La Violencia in Antioquia, suggests the following linkage to explain the emergence of violence in that Colombian region.

> "La Violencia surgió, más que como resultado de la muerte de Gaitán, a raíz de la intrusión de forasteros---policías y alcaldes nombrados por los municipios por el gobierno central y regional en 1949, cuya presencia perturbaba las redes del poder local - ambiciosos de convertirse en gamonales" (Roldan 2003, 48).

Roldán is pointing out to the social and political linkages that create the required social machinery to unleash violence in Antioquia. Instead of interpreting violence as the result of the master cleavage dividing conservative and liberal, she tries to reveal the social linkages and the kind of political operators and violence specialists that effectively develop violence in some subregions of the Antioquia province. The middle level agents of the regional government were the political operators that effectively used violence to consolidate their power in the name of the central state. Further on Roldán specifies her main thesis:

> "Una de las premisas centrales de este libro es que la violencia en Antioquia estuvo íntimamente ligada a las luchas entre los gobiernos departamental y central, entre el departamento y los habitantes de las zonas periféricas por el derecho a imponer sus propias prácticas políticas, sociales, económicas y culturales". (Ibíd., 49.)

Roldán's thesis links three main factors in the development of irregular wars: the social network structure, the role of political operators and entrepreneurs linking the central state and peripherical regions, and geography, in the guise of the role of peripherical, non-yet-conquered regions. Note the role of political operators and entrepreneurs as an effective way of transferring information from the center and to the periphery, or of blocking that transfer of information and initiating new confrontations between the regional state power and the aspirations of peripherical communities.

Consequences

Let us listen to the top ideological leader of the Colombian paramilitary, Ernesto Báez, explaining why it has been impossible to find an end to Colombian irregular war. His hypothesis is related to the impossibility, shared by all political, economic and military agents to tell the truth and accept its consequences. He found a huge distance between their public statements and their real actions. Here is Báez's position:

> "Mire señor le voy a decir cuál es el problema más grave que tiene hoy

> nuestro país, que es el elemento fundamental por la cual la paz va a ser muy difícil. Lo peor que tiene esta guerra que nosotros libramos y en general la vida corriente de nuestra nación Colombia, es la mentira, es la ausencia de la verdad, aquí miente el gobierno nacional, mentimos nosotros los paramilitares, miente la guerrilla, miente el Ejército, miente la Policía, miente la justicia, todos mentimos" (Serrano 2007, 155).

This could be an opening point to understand how noise does not lead to order in irregular wars. If nobody is willing to tell the truth and face its consequences, it is almost impossible to reach a final outcome to war. Báez' statement seems reasonable, even truthful and deep in its meaning. However, it does not inquire into why all agents to the Colombian war systematically lie and evade truth. From the perspective of information, rational agents will tell the truth if the payoff coming out of it is larger than the ones coming from alternative actions - all the shades or variations of lying with respect to their actions and intentions. My contention is that in Colombia coalitions, negotiations, military strength, territorial control and sheer violence have all failed to put an end to the war because a mix of information, social structures and economic gains have created a situation that favors low intensity, irregular war over competing alternatives. A quick review of some of the peace negotiations conducted in Colombia in the last three decades can shed light upon my statement.

In Colombia the ups and downs of irregular war can be traced back to certain political events that have changed the agents' perceptions of the state of the war and consequentially the information upon which they were taken decisions. Take for instance president Belisario Betancur's peace conversations. He tried to develop agreements and ceasefires with most of the rebel organizations active by 1984. The perception for the hegemonic classes and its allies in some regions was very negative: they saw in the president's initiative a way of giving in power to the guerrillas and to new alliances between rebel forces, leftist politicians, and the lower classes. Information did not convey a message of peace and tranquility. On the contrary it unleashed a very violent process of political annihilation and genocide, followed by desesperate answers from guerrilla organizations as the late M-19. What was supposed to be a peace initiative and the dawn of a new age of peace and development became the lethal deepening of war and its expansion to new regions of the country.

A similar analysis can be advanced with respect to the effects of the peace conversations between the government of Andrés Pastrana and the Farc. The surprising rise of Farc, from a small and almost forgotten rural guerrilla, to a major political and influential actor rapidly accelerated the rhythm of the war and propelled the lethal activity of paramilitary forces to several regions of the country. New, more aggressive and effective political alliances between rich landowners, cattle growers, drug traffickers, traditional and new political entrepreneurs and specialists in violence (Tilly 2003, Duncan 2006, Romero 2003) fueled irregular war to higher levels of violence and lethality. By 2001 irregular was extended to most of the country and the guerrillas, on one side, and the

paramilitary and state forces, on the other, wage the most intensive war fought so far in Colombia. The signal of a sudden surge on Farc's military and territorial power was perceived by the hegemonic classes and paramilitary forces as a new and more decisive threat to their power. From the perspective of my informational model, one can interpret the peace conversations initiated in 1999 as a change in the state of information to the relevant agents. Farc strategists perceived a closer opportunity to reach power and the hegemonic classes and its paramilitary allies interpreted it as a very dangerous threat to its hegemony and acted in consequence. As a matter of fact both coincided in perceiving a turning point looming in the very near future and acted in a predictable way. However, and this remains to be explained by the model, no full and permanent order followed from the upsurge in military competition and bloody dispute over the control of territories and people.

Consider now the following political and informational conjecture. The main actors of the Colombian war do not have any confidence in changing, through negotiation, the rules of the game they have been playing in. They seem to accept the non-written rules of the real game they are playing in now, showing extreme confidence in their capacity to adapt themselves to the changing rules introduced by their enemies, but they have no confidence at all in openly negotiating permanent changes to those rules. That is, they have extreme confidence in their adaptative powers, but a very small, almost nil, confidence in the outcomes of negotiation processes that involve changing the full set of rules of the game.

This conjecture implies agents' preferences for non-agreed, non-binding, changing rules over agreed, binding, fixed rules. The informational consequences are crucial. In the first setting war's end depend strictly on the spontaneous evolution of war and on its capability to produce order out of armed conflict. From its multiple local points changing information emerges as the rules of the game shift according to the evolution of war. Coalitions are created and destroyed and local powers emerge and disappear. In the second setting, with fixed and binding rules, all maneuvering should be political and bounded by the law. If armed agents, of diverse ideological perspectives, do no prefer fixed rules is natural to infer that they obtain higher payoffs, or rewards, from a changing, anarchic world than from a more structured one. This has another decisive implication: agents making higher profits from a non-binding situation are those with weapons, resources and knowledge. In Tilly's language they should be violence specialists, political entrepreneurs and war time businessmen.

Tilly's description of the social machinery leading to collective violence is apt to understand the ways in which information changes the actions of agents within an irregular war. Here is Tilly's eloquent rendition:

> "A rapid move from scattered attacks to broken negotiations, for example, illustrates a rise in coordination. It results from processes in our incorporation cluster, notably network-based escalation, setting-based activation, and brokerage. Mechanisms of certification and upward object shift also regularly increase coordination, as outside

> authorities lend recognition to one or more participants in violent interactions and as the boundary separating antagonists moves from local to regional, national, or even international divisions. Conversely, disruption of connecting networks, blocked access to violence-prone settings, disappearance of political entrepreneurs, severance of ties among them, and downward object shift (e.g. when local divisions begin taking priority over national divisions) all reduce levels of coordination among participants in violent interaction. We have seen a devastating version of this downward shift as opportunism took over from coordinated destruction in Rwanda. Changes in uncertainty about interactions across established us-them boundaries exert strong effects on switching between violent and nonviolent interaction" (Tilly Op. cit., 226).

Conclusions

This essay focused on the logical consequences of a simple idea: What if the long duration of irregular wars is related to the ways and paths through which information is transferred between armed agents and civilians? In following the logical consequences of that conjecture I have established three working propositions. First, as irregular wars are heavily dependent on the control of civilian population, the interaction between civilians and warriors passes through the social networks in which the first lived in and the second ones try to penetrate and use for their own purpose. This simple fact, already perceived by other authors, has not been used in its full methodological consequences. Social networks are information carriers and within an irregular war they become the preeminent stage in which the real, daily battles for dominance are fought.

Second, the main difference between hierarchical wars and irregular wars is that in the first ones there is no transfer of information between warring parties---but for the espionage output of its intelligence agencies. This means that informational complexity is smaller and that sheer military power and the will to victory define the outcome of war. What makes irregular and net wars more complex is the fact that allegiance to national states does not determine the behavior of civilians. As they can switch sides, serve as informers and spies, and change alliances at any moment, final outcomes loom distant in the future. A conclusion to be discussed and analyzed in the future is this: without clearly defined enemies and friends irregular war may endure forever. As the enemy has no face, no center and no banner, national states will be fighting in the dark. The last illusion of a clear-cut enemy's face was Hussein's statue falling down in pieces to the masses joy in Baghdad at the beginning of US's invasion. But now that illusion is broken and gone and the only memory left in the few people that will remember those events in the future is the face of a man saying some words to his executioners before being hanged down.

Third, the systematic loss of connectedness and the balancing of one side's offensive actions with its enemy's actions in different places of the war space explain why irregular wars tend to endure much more than hierarchical, conventional wars. Geography and armed agents' heterogeneous preferences for

localization, plus a minimum capacity for survival and action on the weaker side are clearly behind this property. In looking for a more general proposition I contend that a combination of geography, social network structures, and economic gains determines that uncertainty with respect to the outcome of war does not decrease with violent confrontation: never ending irregular wars will naturally follow.

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