

## When Functions Collide

Abstract: The aim of this paper is to deal with interactions that can occur between human constructions and the physical world. These interactions will be important to understand some outcomes in human relations, and will be particularly interesting for the analysis of financial markets. In the first part of the paper I will introduce the concepts needed using John Searle's account of the construction of the social world. Secondly, I will present the main idea of the paper showing how those social constructions can interact with other social constructions and the physical world. Finally, I will present George Soros' theory of reflexivity, and compare and contrast this with the model I propose earlier in the paper.

This paper is concerned with the interaction that the "social world" can have with the "physical world" in a way that produces outcomes that are not predictable. Understanding these interactions can help us understand various human relations. It is important to note that when saying "social world" and "physical world" I am not suggesting a metaphysical dualism; this distinction is only being used to separate a reality that can only be created by human interactions and a physical reality that exists independently of human beings. The social world is created by human beings but it is part of the physical world and bottoms out in the physical reality and principles of physics, chemistry and biology.

The construction of the social world can be considered using John Searle's system. The system as proposed by Searle does not postulate two or more worlds and only assumes one world to explain everything from physics to human interactions. Also, it has a strong condition of adequacy; the account respects the basic facts of the structure of the universe. Searle's derivation then moves from physics, chemistry, and biology – the basic facts – to the construction of social reality. All mental phenomena derive from those basic facts and consciousness and intentionally derive from these mental phenomena. For the purpose of this argument I will take for granted the first part of

the derivation, and have intentionality as the starting point. The first part of the paper will be dedicated to explicating important features of this system in order to understand the interaction social institutions can have with physical facts.<sup>1</sup>

In the second part of the paper, I will introduce the idea of how the social construction can impact the physical world and yield unexpected results. In this section I try to develop a model to understand some social outcomes that are especially relevant for understanding financial markets.

Lastly, I will introduce George Soros' theory of reflexivity and contrast it with the theory I proposed in the second part of the paper. Some similarities will be apparent from the beginning, like the presence of self-referential functions in both models. But the differences are much more important and ingrained in the very basis of the models. Soros' model is based on beliefs and desires and therefore does not require language to exist, while the model proposed in the second part of the paper cannot exist without human institutions hence cannot exist without language.

#### 1. An Explication of Searle's Work

Mind-dependent phenomena are mental, and depend on the mind to exist. Mind-dependent phenomena can be intentional or non-intentional. For example, beliefs, desires, memory and imagination are all examples of intentional mental phenomena, while anxiety, pain, and sorrow are examples of non-intentional phenomena. Other phenomena are mind-independent when they do not depend on mental states to exist, including such things as rocks, atoms, birds and fire. In addition, there are some types of phenomena called intentionality-relative that are not located in the mind but are mental all the same. Private property, cash, and night clubs are all examples of those phenomena called intentionality-relative.

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<sup>1</sup> For a detailed discussion on social ontology see *The Construction of Social Reality (1995)* and *Making the Social World (2010)*, both by John Searle

All functions are intentionality-relative, an object will have a function imposed to it when it is used for a certain purpose. A distinctive feature of human beings and some other animals is that they have the power to assign functions to objects.

When the function being imposed is based on the physical structures of the object they are called “agentive functions”. For example, a glass serves the purpose of holding water for drink, or a knife serves the purpose of cutting a rope. The functions of these objects are based on their physical structures.

When human beings perform speech acts, they can impose what Searle calls “status functions”. Those functions are not based on the physical structure of the object but are assigned in virtue of collective imposition and recognition of a status. An important feature of status functions is that they carry deontic powers. These powers can be rights, duties, obligations, authorizations and etc. So, for example, money can only be useful if there is collective recognition of its value, given that the paper in which a dollar bill is printed carries virtually no value. An example of deontic power carried by money, once the status function is assigned, is the entitlement of being legal tender for all debts, public and private.

To understand how status functions are created it will be important to go through some basic concepts: individual and collective intentionality, deontic powers, constitutive rules, and institutional facts. It will also be necessary to briefly consider speech acts.

### 1.1 Individual Intentionality

First, it is important to characterize what Searle means by intentionality. For Searle, the common used definition of the word, deliberate or purposive, is actually only one type of intentional state.

The concept of intentionality has a broader meaning characterizing the capacity of the mind to be in states which refers to, or is about, objects and state of affairs.

Intentional states can be represented by the notation  $S(p)$ , where “ $S$ ” is the intentional type and “ $p$ ” is the propositional content. For example, I can believe it is cold, fear it is cold, or desire it be cold and what these all have in common is the propositional content “ $p$ ”, that it is cold.

Different intentional states can have different directions of fit. A belief has the mind-to-world direction of fit ( $\downarrow$ , downward direction) while a desire has the opposite direction, the world-to-mind direction of fit ( $\uparrow$ , upward direction). Belief, perception and memory – the cognitive faculties – have the aim of representing how things are in the world, and thus try to have the mind fit the world. The volitional faculties – desire, prior-intentions, and intention-in-action – have the aim of changing the world or to represent how we like the world to be, and thus try to have the world fit the mind.

For intentional states that have a direction of fit and whole propositional content, we can represent their conditions of satisfaction. In the case of beliefs these represents their truth conditions, and in the case of desire these represents their fulfillment conditions. Only intentional states with conditions of satisfaction are necessary for this paper, but it is important to note that there are other kinds of intentional states that do not have conditions of satisfaction or do not have whole propositional content. For example,  $\text{Love}(p)$  or  $\text{Pride}(p)$ , are intentional states where the aim is not to represent a fact nor to bring about something. In these intentional states the fit is presupposed, for example if I am proud of writing a paper I am not trying to represent the fact I wrote a paper or to induce writing a paper—in these states you only presuppose I wrote a paper.

But intentional states do not arise as single units separated from everything else. When I form the intention to climb a mountain I have to believe that one gets to the base of the mountain by taking a certain path, I need to believe that there are certain instruments that are needed to climb, and I also

have to believe that I am able to walk down the path to get to the base of the mountain, and that I am able to operate the instruments of climbing properly.

Unlike other “intentional states”, intentions to perform actions (using the common definition of the word) are divided in two parts: prior-intentions and intentions-in-action. Prior-intention is the intention one has prior to the performance of an action, and intention-in-action is the intention one has during the performance of an action. This distinction is important because these intentional states have different conditions of satisfaction, although they are related.

All actions require intentions-in-action but do not necessarily require prior-intentions. For example, an elite navy SEAL sniper during combat does not form a prior-intention to shoot X, Y and Z. He simply recognizes the threat in a split second and pulls the trigger. This is different from reflex actions, such as the knee tap. The difference is that in the first case the bodily movement is caused by the intention-in-action, while in the second case it is not. In order for conditions of satisfaction of intentions-in-action to be satisfied, the bodily movement needs to be casually related to the intention-in-action.

The same goes for prior-intentions. If I form the intention to run one mile but forget about it and for some unrelated reason (maybe there is a hurricane coming, or I am being chased by a ferocious animal) I decide to sprint and run one mile, my action was not casually related to my original intention and therefore its condition of satisfaction is not satisfied. In order for conditions of satisfaction of prior-intentions to be satisfied, the action needs to be casually related to the prior-intention. A common feature of both, prior-intention and intention-in-action, is that they must function casually in the achievement of conditions of satisfaction in order to be satisfied. This means there is a self-referential aspect in intentions and conditions of satisfaction.

Using “pi” for prior-intention, “ia” for intention-in-action and “BM” for bodily movement we can represent the above relationships as:

(action) = (ia → BM) (the intention-in-action needs to causally produce the bodily movement) and

pi →(ia → BM) (the prior-intention needs to function casually in the production of the action).

The conditions of satisfaction of prior-intentions and intention-in-actions are self-referential. In the case of climbing a mountain, I may form the prior-intention of climbing but this prior-intention is only satisfied if the climbing of the mountain is caused by my prior-intention of climbing the mountain. Similarly, my intention-in-action to climb the mountain needs to cause the bodily movement of climbing in order to for its conditions of satisfaction to be fulfilled.

This example brings us to the idea of complex intentions and actions—when someone does something “by way of”, or “by means of”, doing something else. When I intentionally climb a mountain I do that by way of grabbing the rocks and pulling myself up. This is an example of what Searle calls a “constitutive by way of relation”, whereby grabbing the rocks and pulling myself up constitutes the act of climbing—they are not two separate actions. Similarly in “casual by means of” relations you do something intentionally that causes something else to happen. In the case of the SEAL sniper, he shoots the target by means of pulling the trigger. So, in this case the act of pulling the trigger causes the gun to fire, and it is an example of a “causal by means of” relation.

Giving the relation between intentions and actions in complex cases, one can expand and contract the account of the action. Searle calls this the “accordion effect”. The boundaries of this effect are, in effect, set by the conditions of satisfaction of the complex intention-in-action. All the repercussions of an action that are outside its conditions of satisfaction are not included in the action. For example, the killing of an enemy target by the SEAL operator may cause retaliatory

measures by the group, but those actions are outside the condition of satisfaction of the complex intention-in-action of shooting the enemy and therefore are not part of the action.

The last important aspect of Searle's account of intentionality is his discussion of the experience of a gap in intentional action. Right before the formation of a prior-intention based on beliefs and desires a causal gap may manifest itself for the first time. This is because even though these beliefs and desires are necessary for the formation of the prior-intention, they may not be sufficient. For example, I may have the belief that a certain girl at the bar is interesting and I may even have the desire to talk to her, but that does not guarantee I will. There may also be a second manifestation of a causal gap after the formation of the prior-intention and before the intention-in-action. Continuing with the same example, I may have the belief I want to talk to the girl, may have the desire to do it and set my mind on doing it (formation of the prior-intention), but I may just not stand up and go there. There is still a third time when the gap may manifest when there is an extended action or series of actions, whereby the intention-in-action is not sufficient for the continuation of the action up to completion. If I decide to climb Mount Everest, I may have the prior-intention and the onset of the action but I can only actually summit, and therefore climb Mount Everest, if there is a continuous effort up to the end of the task. This gap (that can be experienced three times in the process) is called "freedom of the will". The failure to complete the action due to the experience of these gaps can be called "weakness of will".

## 1.2 Collective Intentionality<sup>2</sup>

Searle claims that collective intentionality bottoms out in the particular individual. By this he means that there are no social phenomena that are not reducible to individual phenomena. There are no mental properties that are not properties of individual human beings. But that does not mean that

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<sup>2</sup> There is no consensus about Collective Intentionality in Philosophy, for the purpose of this paper I will continue to adhere to John Searle's account of the term

all cases of what Searle calls 'collective intentionality' can be reduced to individual intentionality plus something else.

Searle gives an example of what constitutes collective intentionality in *Making the Social World*: imagine there is a group of Economics graduates that are educated on the doctrine of Adam Smith and they believe in the mechanics of free markets, whereby individuals pursuing their self-interests results in desirable outcomes for the society as a whole. After graduation they decide to go and pursue their self-interests, and all of them know that others in the group are doing the same thing. This is not considered to be collective intentionality because even if the graduates share the same goal and have the knowledge others are doing something to achieve that goal there is no cooperation involved. The key to collective intentionality is not just sharing a goal and knowing that others are pursuing that same goal but to actually cooperate in the activity.

Also, although all intentionality needs to bottom out at the individual, this is not to say that the individual cannot have intentionality in a plural grammatical form, like “we intend to elect a presidential candidate” or “we intend to fight a battle”. And note that individual intentionality when voting for a specific candidate is homogeneous in the first case, while individual intentionality when engaging in battle will be different since each asset will be probably performing a different task.

In the same way that an individual can have complex intentions and actions, so can collective intentions. So in the previous examples, the collective intention-in-action of electing a specific candidate was performed “by means of” individuals casting their ballots, while the collective intention-in-action of fighting the battle was performed “by way of” individuals performing their appropriate tasks. This is the apparatus that allows us to understand how collective intentions can move individual bodies.



The relation “constitutive by-way-of” can be represented as follows: ia collective B by way of individual A (this ia causes A, causes B). For example, let’s say that the SEAL elite sniper is part of a battle where the regiment has the intention-in-action of fighting. The relation “constitutive by-way-of” would be represented: ia collective (B: fighting the war) by way of (A: shooting valuable enemy targets), this ia causes A, causes B. So, the operator shares the collective intentionality of fighting the war (B) “by way of” individually contributing his part (A), shooting valuable enemy targets. In this way, the collective intention-in-action B is attempted by the operator performing individual intention-in-action A, that in the context constitutes its being the case B. Note that other actions performed by different parts of the regiment are not referred to inside the parentheses since the sniper cannot know what the individual intentions of the other individuals are. Although cooperation is implicit in the idea of collective intentionality it does not figure in the individual propositional content.

There is also another type of complex action called “casual by-means-of”, which can be represented as follows: ia collective B by means of individual A (this ia causes A, causes B). For example, I have the collective intention of electing candidate Jack White, and for that my individual intention-in-action (A) is voting for Jack White. Therefore, voting for Jack White (A) causes it to be the case that he gets elected (B). Again, there is no need to account for other individual intentions in the propositional content of the collective intentionality nor do I need to know of their contributions. I only need to assume that the others are cooperating with me.

A weaker form of collective phenomena that does not require cooperation is called “collective recognition”. This is also important in social ontology when looking at institutional structures. For an institutional structure to be functional there is no need for cooperation but there is a need for collective recognition. Only in particular instantiations of the institution is cooperation necessary.

For example, the institution of money needs only to be recognized in order to exist but individual transactions require cooperation to happen.

### 1.3 Deontic Powers

Status functions carry deontic powers, and these consist of rights, duties, obligation, requirements, etc. These powers can be “positive deontic powers”, like rights, permission, and authorization; or “negative deontic powers”, like duties, obligations, and requirements. Just like any other kind of power, deontic power is an ability or capacity to do something. That means that the power exists even without being exercised. Deontic powers also usually provide independent reasons for action. This means that deontic powers can provide reasons for acting independent of inclinations and desires. For example, when I make a promise to give a friend a tour at Times Square, I have an obligation to carry through even if by the time I am supposed to take him I do not want to go. Once deontic powers are recognized they provide desire independent reasons for action.

### 1.4 Constitutive Rules

Constitutive rules have the form “X counts as Y in C”. For example, because the piece of paper is legal tender for all debts public and private (X), it counts as a dollar bill (Y) in the United States of America and international markets. Unlike regulative rules, which are just used to regulate prior behavior (like rules of traffic), constitutive rules create the behavior they are trying to regulate. Card games are a good example of this — the rules in a specific card game not just regulate but constitute the game.

### 1.5 Institutional Facts

The difference between brute facts and institutional facts is important for understanding how status functions can interfere with agentive function. Brute facts exist independently of any human

institution, while institutional facts cannot exist without them. So, for example, Mount Everest is 29,029 feet tall at its peak is a brute fact, and Ram Baran Yadav is the president of Nepal is an institutional fact. If, for example, there was no institution of government then Ram Baran Yadav could not be president.

Institutional facts are epistemologically objective but because they can only exist within human institution they are ontologically subjective. They are epistemologically objective in the sense that they are independent of anybody feelings or attitudes, like the statement “Jimi Hendrix died at age of 27”. But they are ontologically subjective in the sense that they exist only as experienced by the mind, like anxiety or pain.

It is important to note though that although brute facts do not require human institutions to exist they do require human institutions in order to be communicated. For example, it is a brute fact that Mount Everest is 29,029 feet tall at its peak, but it is also a brute fact that it is 8,848 meters tall at its peak. The elevation of the mountain is a brute fact regardless of what measurement unit one uses, and the measurement unit is an institutional fact. This is going to be important when looking at company earnings—regardless of which currency those companies’ earnings are recorded in, they carry a value that is a brute fact.

## 1.6 Speech Acts

All institutional structures and status functions are created by the performance of “declarations”. These are specific speech acts that have simultaneously the world-to-word and the word-to-world direction of fit. Speech acts, like intentional states, have propositional contents, conditions of satisfaction and directions of fit. Assertives, just like cognitive intentional states, have the aim of representing how the world is and therefore have the downward direction of fit or word-to-world direction of fit. Directives and commissives, just like volitional intentional states, have the aim of

influencing how the world is and therefore have the upward direction of fit or world-to-word direction of fit. Expressives, just like love or pride, have a presupposed direction of fit. Declarations are unlike any intentional states. This special form of speech act makes something the case by declaring it to be the case, and therefore have both directions of fit. It has the world-to-word direction of fit when it makes the case, and the word-to-word direction of fit when it declares it to be the case. This can only happen when using language.

### 1.7 Status Functions are Created by Speech Acts and Maintained by Collective Recognition

Status functions are created with the aim of assigning deontic powers by the performance of declarations, and function only on the basis of collective recognition. For example, we can make it the case by declaration that the Y status function exists. It is important to note that status functions can be created by many forms of status function declaration and not only by the constitutive rule form “X counts as Y in C”. For example, because the piece of paper is legal tender for all debts public and private (X), it counts as a dollar bill (Y) in the United States of America and international markets (C). But, limited liability corporations are created by the form of “freestanding Y term”, where there is no physical reality to it (X) but does exist as a status function (Y). In this case, there is no object or person (X) to whom the status function is assigned. Limited liability corporations are created to assign complex power relation between people but are not the same as the people that constitutes the—that is why they are called “limited”.

## 2. When Functions Collide

During the first section of the paper the aim was to understand agentive functions and status functions. Now I will present the idea that those functions influence each other in specific situations, and try to give an account of the types of interactions and their resulting effects.

There are mainly two types of process that the interaction between functions can create. The first I will call “Sustainable Reinforcement Process” and the second I will call “Unsustainable Reinforcement Process”. In both cases, the onset of the process can start either with the agentive function, and have the form agentive → status → agentive; or they can start with the status function and have the form status → agentive → status. There are even some cases where the agentive function is not in play and what we get is an interaction where a status function of a higher (or lower) order influences another status function at a lower (or higher) order. Regardless of which function starts the process, only the interaction between the functions will be relevant for understanding the types of processes that result.

## 2.1 Sustainable Reinforcement Process

A sustainable reinforcement process is one that does not follow an explosive dynamic. In his 2008 *Outliers: The Story of Success*, Malcolm Gladwell tells the story of elite hockey selection in Canada, in which the majority of Major Junior A hockey league players in the country are born between the months of January and March. Most probably even without being aware of it, Gladwell gives an account of a sustainable reinforcement process.

In Canada, boys start playing hockey at a very early age and are separated in age classes before kindergarten. The cut-off date for age classes is January 1<sup>st</sup>, and every year kids are evaluated and selected to make up an “all-star” team. Two things should be noted. Firstly, boys born in January are tested alongside boys born in November. At such early ages, this means there is a large physical gap. Secondly, the elite squad of all-star players receives better coaching, better teammates, thirty to fifty five more games than the “house” players who only play 20 games an year, and practice twice to three times more.

What is happening here is that the small physical advantage boys born on January had over boys born on November becomes larger and larger with the sustainable reinforcement process. Boys at an early age had very similar physical structures and therefore very similar agentive function. But once some of them are assigned the status function of being the “all-star” team players, they also carry the deontic powers of better coaching, teammates, more games and practice. And the status function of being the all-start team player transforms their physical properties in the long term, therefore affecting their agentive function. This is an example of a *sustainable* reinforcement process because the onset of the process does not causes it to be explosive—better players get access to evermore status function that will only make them better.

The sociologist Robert Merton calls this phenomenon the “Matthew Effect”, drawing from the Gospel of Matthew that says that the most successful will be given the best opportunities to achieve even higher success<sup>3</sup>. If those opportunities are given by way of status function declaration there will be some kind of reinforcement process that relates agentive and status functions.

## 2.2 Unsustainable Reinforcement Processes

Moving on to the second type of process, an unsustainable reinforcement process is one that has an explosive characteristic as part of its development. This process is extremely important for understanding the financial markets. But before going into an example, it will be necessary to give a brief explanation of what is meant by financial markets in this account.

### 2.2.1 Financial Markets

Financial markets can be defined as either the physical place where the activity of buying and selling financial products take place, or the mechanism that allows agents to buy and sell financial

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<sup>3</sup> Another example given by Gladwell concerns the tax breaks rich people receive.

products.<sup>4</sup> We will be concerned with the latter definition, and the word *markets* will be used to abbreviate *financial markets* unless otherwise stated.

Financial markets differ from other markets in the sense that participants do not deal with real assets<sup>5</sup> that are only affected by supply and demand dynamics. Markets for real assets were first dealt with in Adam Smith's *The Wealth of Nations*. The book presented the idea of the free market as a self-regulating market where supply and demand are in equilibrium when cleared at the market price. In these markets there is a clear separation between what affects supply and what affects demand, and it is very rarely the case that any kind of interference needs to be considered. Without going in to too much economic theory, those prices can be said to be affected by fundamentals of supply (input prices, productivity, etc.) and fundamentals of demand (utility, price of other assets, etc.) with very little affects by expectations, i.e. beliefs of possible future outcomes. Conversely, in the financial markets, agents are trying to discount possible future outcomes in the present. Suffice to say those markets are mainly driven by expectations and biases. Those speculative markets are the ones of most interest to us here.

### 2.2.2 Unsustainable Reinforcement Processes in the Financial Markets

The markets for speculative assets can be divided in to four groups: equities, fixed income, currency and commodities. In the fixed income market we can be looking at corporates or sovereign products, while in equities we look at mainly corporate assets, and currencies are sovereign assets. The commodities markets will not be used as part of the examples since they are not exclusively speculative and sometimes they present dynamics of real assets markets where supply and demand curves influence the setting of prices.

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<sup>4</sup> Financial products can be delta one or derivatives of mainly four asset classes: equities, bonds, currencies and commodities

<sup>5</sup> Important to note that some commodities can be deliverable and that would impact the dynamics prices in this market

When looking at corporates we can divide the analysis into two parts: the first concerns brute facts, and the second concerns status functions. Let's assume that company A has E in earnings. These earnings can be denominated in dollars, euros, pounds or any other currency. Regardless of which currency those companies' earnings are recorded in, the real value of those earnings will still be a brute fact.

The second part of the analyses refers to the status function of companies. Status functions can be assigned to companies through collective recognition and individual intention-in-action of buying or selling this company's equities or debts. There are generally two types of status function that can be assigned to financial assets. When the status function is beneficial I will call "positive status function" and when it is prejudicial I will call "negative status function". This feature is not exclusive of financial markets; for example, a status function of being a president can be seen as a positive status function while the status function of being a convict can be seen as a negative status function. It is important to note that this classification of positive and negative status function is not related to the classification of deontic powers: a president can have a positive status function while having positive (rights) and negative (duties) deontic powers.

In the case of corporates, a positive status function is assigned when the expected earnings are high and the company is taken to be performing better than expected. With the assignment of this status function comes positive deontic powers of cheap financing and easier access to credit, and negative deontic powers of having to perform according to expectations. The status function will influence the agentive function when the deontic power of cheap credit actually changes power to generate earnings. This is an example of an unsustainable reinforcement process because it cannot continue indefinitely; the expectations of earnings will start to diverge from the brute facts and eventually the company will not fulfill its duties of performing according to expectations, thereby losing its status



function. And with that the company loses its deontic powers of cheaper financing and the price of equity and debt will correct to levels that are in line with the brute facts.

This process can also occur in negative status functions. A prison inmate has a status function that can be classified as negative, but once the sentence is over he loses this status function and the deontic powers that come with it. The only way to keep that status function is to commit another crime and become an inmate again. In the corporate world a negative status function is assigned when expectations of earnings are low and the company is considered to be performing badly. The deontic powers that come with the assignment of that function are expensive financing, hard access to credit, and the duty to deliver earnings as low as expectations.

A good empirical example of a negative status function in an unsustainable reinforcement process can be found by looking at the 2008 crisis. With the burst of the credit bubble and the entanglement of banks, the expectation of earnings for those banks fell dramatically. The negative status function started impacting its ability to finance and started affecting brute facts concerning the banks, in particular, their capacity to generate earnings. In this case, if there were no government intervention the banks might have gone bankrupt. With the intervention in the markets, and stabilization in expectations, the negative status function was removed from the banks, stopping the fall in asset prices.

The difference between corporate markets and sovereign markets is important when considering how brute facts and status functions relate. The corporate world has earnings as brute facts and status functions are assigned on top of these facts. But when looking at sovereign markets like currencies and sovereign debt, the assets in question are purely status functions and there is no value in the brute facts of these assets. So, understanding the creation of status functions is much more important for understanding sovereign markets than corporate markets. We can even say that

for private equities that are not very exposed to speculation, the only important analysis concerns the brute facts, while the analysis of public equities and other tradable securities are much more susceptible to speculation and therefore to the creation of status functions.

### 3. On Philosophy and Markets

When talking about philosophy and markets it is hard not to touch on work by George Soros. Soros is a successful investor and philanthropist who based his ideas on a philosophical framework he called the “theory of reflexivity”. He uses this framework to address issues concerning the markets, and while a hedge fund manager he has performed better than the market average for more than 30 years – something that conventional theory of finance does a poor job explaining. Given the self-referential relationships introduced in this paper, it is important to give an account of Soros’ theory of reflexivity and consider the similarities and differences between his theory and the account I have presented here.

#### 3.1 George Soros’ Theory of Reflexivity

Soros' theory of reflexivity is based around human fallibility—human beings can be wrong in their beliefs about the world and therefore act on the basis of misguided knowledge. Although somewhat similar to Karl Popper’s account of scientific method, Soros argues that when the subject of study involves thinking participants, the methodology must be changed to account for this.

In cases where thinking participants are not just interacting with the subject of study but are the subjects of study, there are two interconnected functions at play. One function is called “cognitive function” and represents the thinking participant as trying to understand the situation he is involved in. The other function, where the thinking participant is trying to make an impact on the situation, is called “causative” or “manipulative function”. Reflexivity occurs when both functions are at work at

the same time and when one is a function of the other. In human interactions reflexivity happens all the time. When thinking participants try to understand a situation, the independent variable is the situation. And when participants try to make an impact on the situation, the independent variable is participants' views. Reflexivity occurs when the participant's view of the world influences the events in the world, and these same events will influence the participants' view of the world.

When reflexivity is in play it can cause boom/bust processes—self-reinforcement that eventually becomes self-defeating. If the participants' views becomes so far away from the actual state of affairs that it becomes unsustainable, the self-reinforcement process ends and a new bias is created in the opposite direction from the original bias that began the process.

### 3.2 Similarities

There are some similarities between the reflexivity theory and the earlier idea I explored—that status functions interact with other functions creating reinforcement processes.

The first and most obvious similarity concerns the reinforcement relation itself. On the reflexivity theory, the cognitive and manipulative functions interact with each other creating divergences between participants' views and reality. So, here there is an idea of an empirical reality underlying the participants' view and interacting with it to form boom/bust process. In the interaction between status functions and other functions there is also some kind of empirical reality, or physical reality. In other words, in the reflexivity theory there are two functions that are self-referential and therefore can result in a reinforcement process. Similarly, when status functions interact with agentive functions they also become self-referential and can cause a reinforcement process. And, in both models, there is an underlying assumption of a physical world as the basis for the higher level interactions.

The other important similarity is in the process itself; the boom/bust process is another name for an unsustainable reinforcement process. The end result of this process is an unsustainable self-reinforcement process that eventually becomes self-defeating. Although these theories come from different backgrounds, the effect they are trying to explain is very similar. When those self-referential functions interact they can be self-reinforced to a point where these interactions can produce unsustainable outcomes that will eventually burst and revert.

### 3.3 Differences

Although similar on the surface these theories are also quite different. In the reflexivity theory there is a cognitive function interacting with a manipulative function. If we look at the description of the cognitive function – the thinking participant is trying to understand the situation – it appears reasonable to say that this cognitive function has the aim of representing how things are in the world, and thus trying to have the mind fit the world. Also, it appears reasonable to say that the causative or manipulative function - where the thinking participant is trying to make an impact on the situation –corresponds to volitional faculties – desire, prior-intentions, and intention-in-action – that have the aim of changing the world or of representing how we like the world to be, and thus try to have the world fit the mind. In this case we can then say that the theory of reflexivity is trying to account for the interaction cognitive faculties have with volitional faculties.

The idea of status functions interacting with other functions is somewhat more complex. As already detailed, status functions are created by the performance of status function declarations. These are speech acts and will only assign the required deontic powers in the presence of collective recognition. The first thing to note is that the existence of status functions is only possible because of language, where representations that have double direction of fit – “declarations” – can exist. The reflexivity process between cognitive and volitional faculties does not require language to occur,

because they occur in much more basic level of intentional states. Whereas the financial markets are institutions created on top of other human institutions like money, government and private property and these institutions can only exist on the basis of a language. Given that the financial markets are composed of institutions that can only exist because language exists, an account of the study of financial markets requires a theory of speech acts and intentionality. It is very hard to assume that there could be any kind of trade in pre-linguistic societies, even harder to assume speculative trade, given that there would be no basic idea of private property.

In addition, the theory of reflexivity deals with interaction between functions that are epistemologically objective (cognitive faculties) as well as with functions that are epistemologically subjective (volitional faculties). When looking at the interaction between status functions and other functions, be it agentive or other status functions, we are dealing only with epistemologically objective functions. This distinction is important because the model proposed in the paper is trying to achieve understanding of the human interactions and social outcomes in an objective manner using only one world, without resorting to dualism, trichism or any other form of ontological construction.

#### 4. Conclusion

This paper aimed to present the idea that status functions can interact with other functions be it agentive or other status functions and create reinforcement processes. Classifying these reinforcement processes as sustainable and unsustainable was also important for understanding the different outcomes that interaction can provide. A second objective of the paper was to show how this apparatus can be used to understand the financial markets, which are ultimately the quantitative product of human interactions. The contrast with Soros' theory of reflexivity was

important for showing where some of the intuitive motivations for this model came from, and for highlighting the new ideas proposed in the model.

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