

The Role of Spontaneous Order in Video Games: A Case Study of *Destiny*

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Abstract: Complex and uniquely human spontaneous orders are central to the Austrian understanding of the market process and price system. Yet, these spontaneous orders are often difficult to study with traditional empirical methods. Since virtual worlds serve as extensions of our own world, video games offer alternative methods to empirically study spontaneous order. To that end, this paper presents a case study analyzing the role of spontaneous (or emergent) order in facilitating enhanced value for players. Through exploring the emergence of social institutions in *Destiny*, I provide evidence of the benefits of decentralized decision-making within virtual worlds. Given the theoretically limitless number of game elements from which to draw, this analysis utilizes the most basic and highly representative examples from the *Destiny* universe to showcase the phenomenon of spontaneous order within this context.

Keywords: Spontaneous order, emergent order, *Destiny*, video games, Austrian economics

JEL Codes: B53, P49, Z10

“The curious task of economics is to demonstrate to men how little they really know about what they imagine they can design.”—F. A. Hayek (1988, p. 76)

I. INTRODUCTION

While paramount to the Austrian understanding of the market process and the price system, complex and uniquely human spontaneous orders are difficult to study in the experimental laboratory or with computational economics. While these methods are useful in advancing our understanding of spontaneous order, as are historical case studies and comparative institutional analysis, the rise in popularity of video game platforms provides a unique avenue for studying the formulation and effect of spontaneous order in complex environments inhabited by diverse agents with varied, and often conflicting, intentions.

Having risen immensely in popularity over the last three decades, the interactive worlds of online video games have developed into richly detailed universes that display many

of the same features inherent in our own. For example, many of the triple-A games—typically those which are heavily promoted and possess the highest budgets—released today showcase lush environments, a large variety of character interactions, and complex economies, thereby making some of their worlds hard to distinguish from reality (beyond their inherently fantastical nature). Furthermore, with the advent of online multiplayer gaming, these universes have become extensions of our own in which social networks, money, and learning fluidly transfer back and forth between the virtual and real world.

Video games provide an appropriate research methodology to evaluate economic theory and the accuracy of economic observation for at least three primary reasons. First, while informative, the choices made by players in laboratory experiments, and the resulting consequences, often have

little to no direct effect on the world in which we live. Video games provide a more consequential, but admittedly less controllable, laboratory. Second, while experimental laboratories often pull from a sample of highly-educated college students, video game players, at least those in America, often come from a wide variety of diverse backgrounds (Duggan 2015).¹ Due to the mass appeal of this new form of media, large sample sizes are naturally available which serve to make video games a sort of natural experiment. Finally, the social interactions that have developed in tandem with these games allow social scientists to directly observe, at a more informal level, real human interactions. In doing so, theories concerning human action become more well-informed, thereby contributing to the robustness of overall knowledge available for analysis. In comparison, computational economics lacks the uniquely social aspects of human behavior that are important for understanding spontaneous order.

Although there is a growing body of literature focusing on applying economics to video games and using video games to advance our understanding of economics,² there are few studies focusing on the economic concepts emphasized by the Austrian school of economics.³ This paper contributes to that literature by explicitly focusing on the Austrian concept of spontaneous order through video games. Specifically, I look to the formation of emergent order in the game world of *Destiny*. I hold that this order might be observed primarily through the ways in which players interact to overcome production problems, especially those related to the lack of predesigned social institutions within the game. Understanding how this order emerges should help us to understand the importance of such social institutions more broadly, particularly those related to online mediums.

The rest of this paper proceeds as follows. Section II reviews the relevant literature on spontaneous orders, issues concerning experimental vs. field research, and the similarities to agent-based computational modeling inherent in this line of research. Section III covers the theoretical structure of the paper and connects it to the larger body of work related to the theory of the firm. Section IV provides my case study of the two levels of emergent order evident within the world of *Destiny*. Section V concludes.

II. LITERATURE REVIEW

Compared to mainstream economists, Austrian economists have placed far more emphasis on understanding the role of spontaneous order (Boettke 1990; D'Amico 2015).⁴ This is due to both theoretical emphasis and methodology. Austrian economists seek to understand how self-interested individuals create complex social arrangements and the division of labor by placing the science of exchange at the core of their emphasis (Boettke, Fink, and Smith 2012). They thus tend to utilize empirical methodologies such as comparative institutional analysis (Boettke, Coyne, Leeson, and Sautet 2005), analytical narratives (Boettke 2000), laboratory experiments (V.L. Smith 1994), and agent-based computational modeling (Nell 2009; Seagren 2011; Wallick 2012). In comparison, mainstream economists tend to focus on institutionally sterile environments of choice (Boettke, Fink, and Smith 2012). They thus tend to focus on developing mathematical theory, in terms of agent optimization subject to constraints, and econometric empirical methods using conventional data sources.

The open models of Austrian economics enable the examination and understanding of the role of spontaneous order. While this limits the development of policies for engineering the economy (Wagner 2011), a downside of the Austrian approach to many mainstream economists, it does advance Hayek's (1988, 76) definition of what the primary task of economists is, "...to demonstrate to men how little they really know about what they imagine they can design." Interfering with complex social arrangements, according to Austrians, should not be taken lightly since individuals naturally develop cooperative institutions in order to solve various problems within society (Boettke and Candela 2015).

Modern research in Austrian economics has extended our understanding of the role of spontaneous order to pirate organizations (Leeson 2007), prison organizations (Skarbek 2012), and commercial law (Benson 1989). These studies and others provide evidence of the role of spontaneous order within society. The purpose of this paper is to extend such an analysis of spontaneous order to the world of video games.

As previously suggested, video games represent a fairly realistic laboratory for analyzing human behavior. While not controllable to the extent most laboratory experiments often are, they do tend to incorporate a higher degree of consequential realism. As Falk and Heckman (2009) argue, the laboratory methodology is widely criticized by social

scientists due to its lack of “realism” and “generalizability.” However, they contend, that despite its limitations, it provides a rich narrative upon which to base an argument. Laboratory experiments and field research are complements, not substitutes, and both should be valued for the potential they have to enrich our knowledge of the social sciences.

Notably, Normann, Requate, and Waichman (2014) find that short-term lab experiments actually predict the long-term behavior of field research pretty well under certain circumstances. Furthermore, V.L. Smith (1994) argues that experimental economics ultimately contributes to the robustness of our understanding of the social sciences by satisfying one or more of at least seven purposes.⁵ Given the aforementioned nature of video games, they serve as a natural compromise between the two methodologies of lab experiments and field research.

Interestingly, video games might also be viewed as a classification of agent-based models (ABMs). Niazi and Hussain (2011, 2) provide one definition of an agent within these models as the following: “a representation of an interacting social component of a large system used to explore emergent global behavior in a simulation.” The importance of such an application to Austrian work can be found in Seagren (2011). Specifically, he argues that agent-based modeling can serve as the Austrian answer to the mainstream economists’ emphasis on mathematical models. Furthermore, he proposes that this type of modeling could serve as a more explanatory alternative to traditional neoclassical analysis, which unfortunately leads to the exclusion of so many relevant aspects of human activity.

Wolfram (2002), working from the perspective of physics and computer science, lays the foundation for such models in his exploration of how a surprising amount of complexity in computation tends to be generated even by what he refers to as relatively simple computational systems. In doing so, he provides several examples of this phenomenon related to a wide variety of systems including cellular automata, mobile automata, Turing machines, etc. To the extent this idea holds, he argues that a driving principle in science ought to consider experimentally investigating this type of complexity as a complement to traditional models of mathematical exploration and engineering principles. This idea might best be summarized in his concept of computational irreducibility in which it simply remains impossible to describe this behavior in some concrete way. Rather, empirical and experimental approaches best help to inform our understanding.

Interestingly, his work also suggests that these types of simple computational programs represent a minimalistic variety of emergence in that they provide for interesting behavior even in an environment of less explicit direction/randomness. In other words, this behavior in programmatic language occurs beyond just the confines of its basic design. Additionally, making the underlying framework more complex results in a relatively insignificant amount of extra behavioral complexity. As such, much of the interesting behavior should be observable within the simpler model.

Essentially, the current paper extends this line of thought by looking at video games as relatively simplistic programs (at least along certain margins) that lead to undesigned complex behavior. Though a “designed game” exists on some level, the focus in this paper lies primarily on the more complex social institutions that emerge within this framework. By serving as a type of hybrid methodology of all the above approaches (i.e. experimental, empirical, and computational), video games provide us a window into the social aspects of interest, and as such, the succeeding case study provides a more thoroughly realistic presentation of human behavior, specifically as it applies to spontaneous order within a programmed environment.

III. THEORETICAL FOUNDATION

This section of the paper functions to provide a theoretical foundation for the succeeding case study. The first subsection relates work on the theory of the firm to the question of emergent social institutions in video games. Following this, I provide an overview of the case study methodology as well as a general framework for Section IV.

3.1 Theory of the Firm and Social Emergence

As previously hinted, the social institutions in the world of *Destiny* remain distinctly organic, and therefore, they represent the most relevant factor in considering the phenomenon of emergence within this realm. Why do such institutions emerge though, and what are the advantages of this emergence as opposed to the architectural design of such institutions? The answer to the first question might be gleaned through the theoretical work on the firm while the answer to the second is addressed more in the work from Hayek (1945) and A. Smith ([1776] 2003).

Essentially, the theory of the firm tries to explain both the reason why firms emerge as well as the distinguishing characteristics between the form and functions of various firms. Coase (1937) provides one of the earliest neoclassical

models for the firm in which transaction costs represent the decisive factor in whether or not individuals will contract on the market or organize more formally. If the costs of using the price mechanism are sufficiently high, then a more optimal solution lies in creating some type of firm, the size of which depends on the marginal benefits and costs of each unit produced in the firm (i.e. via the entrepreneur-coordinator) relative to simple market exchange (i.e. via the price mechanism). Other work builds on this by looking at things such as team production (Alchian and Demsetz 1972), ownership structure (Jensen and Meckling 1976), asset specificity (Williamson 1983), and agency problems in organizational competition (Fama and Jensen 1983).

Granted, the social activity seen in *Destiny*, as well as video games more generally, differs significantly from a traditional firm, but it does occur for similar reasons. For example, the transaction costs of simply exchanging goods produced in game, assuming they can somehow be priced, tend to be sufficiently high to warrant coordinated production. Such costs include the fixed costs of setting up a marketplace and the variable costs of maintenance.

In addition, for the purpose of game balance, many games, including *Destiny*, actively prohibit the peer-to-peer exchange of loot (weapons, armor, items, etc.). Though this constitutes an artificial barrier, it helps to counteract in-game equity problems that ultimately lead to efficiency problems (i.e. it helps keep the game from becoming boring due to certain players being too rapidly “overpowered”). Notably, market exchange might still occur through the buying and selling of whole accounts, but this remains largely infeasible as goods would likely have to be bundled in relatively unmarketable ways. Ultimately, this barrier does drastically end up increasing transaction costs by making it nearly impossible to facilitate any sort of workable market transaction, at least in the traditional sense.

Another way in which the theory of the firm relates to the emergence of social institutions in gaming centers around the idea of increased output from team production (Alchian and Demsetz 1972). While this does rely on appropriate mechanisms for problems of metering and moral hazard, games tend to have such mechanisms readily built into them. In regards to the former, rewards generally come from a non-rivalrous source since such gains are typically digital in nature (i.e. they are infinitely reproducible, at least in any practical sense). Hence, the marginal cost of creating the reward is effectively zero and the only real cost comes in the time it takes to acquire them. Unfortunately, this means that in regards to the latter, a player may simply shirk his

responsibility in terms of allowing others to generate his rewards, and as such, an incentive exists to underproduce the desired good. However, in practice, as we shall see, this tends to not be that much of a problem due to strong social mechanisms of exclusion and reputation.

Considering all of this, it becomes apparent that low transaction costs and increased potential gains incentivize the emergence of social institutions in gaming. The question now becomes, does this lead to better outcomes compared to the ex ante creation of such institutions? Well, the answer may not be straight-forward. Certainly, players are prone to mistakes and will make them frequently. So, for a particular case under strict assumptions, perhaps it is possible for a better outcome to result from a centrally made institution (in this case, a social platform made by the game developer). However, such decisions tend to be very case-specific, and situations can and often do arise that rarely conform to that particular case. Again, the time and place knowledge that arises in a given instance is crucial for effectively making any such decision (Hayek 1945). The question then becomes: Can institutions be architecturally designed to facilitate spontaneous order in gameplay (Beaulier, Smith, and Sutter 2012)?

The value of spontaneous order, as opposed to the constructed order, is that it allows for outcomes through the “invisible hand” that remain hard to properly design through central direction. Adam Smith ([1776]2003, 572) encapsulates the basic idea of spontaneous order in the following:

As every individual, therefore, endeavours as much as he can both to employ his capital in the support of domestic industry, and so to direct that industry that its produce may be of the greatest value; every individual necessarily labours to render the annual revenue of the society as great as he can. He generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting it. By preferring the support of domestic to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it.

I have never known much good done by those who affected to trade for the public good. It is an affectation, indeed, not very common among merchants, and very few words need be employed in dissuading them from it.

As this quote relates to video games such as *Destiny*, improving societal gains comes through increasing the value of the game for everyone through individual self-interested actions. Each individual only cares about enjoying the game for him or herself, but in coordinating with others to achieve such satisfaction, each individual ultimately enhances enjoyment of the game for others as well. While such coordination or decisions may not always be optimal (and realistically speaking, they rarely are), the market (or in this case, the collective decisions of the players) constantly adjusts to approach such optimality. Allowing the relevant institutions (in the case of *Destiny*, those related to social platforms) to emerge organically, as opposed to attempts at predictively defining them, promotes experimental competition and market discovery. As such, I argue that this tends to encourage more well-being in the long run.

3.2 Overview of Case Study Methodology

In order to effectively get at the question of how emergent order improves social outcomes for gamers, I am employing a case study of a few different mechanics within the *Destiny* universe. By using the more expansive term universe, I intend to imply the inclusion of factors within *Destiny* that lie outside of gameplay itself such as dedicated forums, matchmaking websites, and other user-generated materials. In addition, numerous articles have been written concerning various aspects of *Destiny's* game world. All of these resources serve to highlight the effect and value of spontaneous order within the overall scope of the game.

In regards to specific instances of emergent social institutions within the game, I argue that *Destiny* promotes order on two levels, namely the functional and applied levels. The first deals primarily with a foundational level of order which the second then develops into well-established norms. As previously mentioned, these examples are by no means meant to be considered all-encompassing representations of how *Destiny* embraces such concepts, nor do they implicitly preclude negative outcomes from such institutions. Such an analysis is outside the scope of this paper. However, they do provide a solid starting point for considering how such institutions might enhance overall gamer welfare.

IV. A CASE STUDY OF *DESTINY*

Now consisting of two games, *Destiny 1* and *Destiny 2*, as well as a number of expansions (all of these combine to form an ongoing continuation of the same game), the *Destiny* universe represents a dynamic and evolving world, especially in regards to its social institutions. Given its unique place in the repertoire as a hybrid MMORPG (massive-multiplayer online role-playing game) and first-person shooter, this game relies on robust social networks to not only survive, but to thrive. Despite this, very little infrastructure exists within the game itself to coordinate such social activity. While a formal automated matchmaking system does exist, it remains relatively limited in function compared to games similar in type.⁶ Nevertheless, players still end up coordinating, outside of any central direction, and as a result, some interesting norms within the game tend to form.

4.1 The Functional Level of Order

This level of order deals primarily with the matchmaking and loot systems within *Destiny*, and it describes a foundation upon which player norms tend to develop. In regards to the former, a number of different options exist for matchmaking within *Destiny's* gameplay. From a core perspective, the game offers a matchmaking service that differs from other multiplayer games by utilizing what has been termed mesh networking. This allows the entire game world to be populated at all times so that no one ever feels alone. This operates in stark contrast to many other games that have limited servers in which players may end up in an area completely by themselves.⁷

In effect, an automated matchmaking service adds players to your fire team based on a number of different criteria whenever you enter a specific game mode. However, there are still some areas of gameplay that do not facilitate matchmaking through this automated system. In such cases, it becomes the player's responsibility to find other people to join his or her fire team in order to participate in the given activity. For example, gameplay features such as the popular raids, nightfalls, Trials of Osiris, and Trials of the Nine require manually pre-made teams in order to participate. This has resulted in some controversy as some players prefer such a system while others think that automated matchmaking should be extended across all game modes.⁸

To overcome the problem of finding players for such activities, numerous LFG services such as *DestinyLFG* have emerged which allow players either looking for a team or

looking for more team members to coordinate on manual matchmaking. Essentially, players list themselves as either LFG (Looking for Group) or LFM (Looking for More), respectively, along with details around proposed game modes, platforms, and levels. Each group then can view listings in the other group to find individuals with whom to play and also send messages to connect. This process overcomes commitment and relationship issues associated with automated matchmaking while at the same time providing an avenue for those who do not have pre-formed teams to find individuals with whom to play. Other options for manual matchmaking exist as well such as the Bungie Forums and fan-created tracking sites. Furthermore, players are also free to create fire teams from their friend lists on PSN, XBOX Live, etc.

Through such varied approaches to matchmaking, Bungie has established a framework in which players have a large number of options for creating their fire teams. As a result, players are able to coordinate effectively with one another in order to find good players with whom to tackle the variety of tasks in *Destiny's* game world. This order comes about not from centralized decision-making in which fire teams are determined directly by Bungie, but rather from a multitude of self-interested actions that lead to a wide number of beneficial outcomes for most players. Granted, as previously stated, there is a push to pressure *Destiny* to extend automated matchmaking to all game modes. However, given the recent spike in *Destiny's* registered player base to 25 million users as well as the fact that average engagement is 3 hours per day, it is unlikely that this is a major widespread concern.⁹

Ultimately, this structure comes about due to the lack of a more "complete" matchmaking service created by the game's developer, Bungie. To that end, it plausibly represents a second-best alternative compared to centralized design. I argue, however, that it presents a more beneficial institution primarily since it allows for the formation of teams and the exchanging of information relevant to individual needs. Moreover, this system creates stronger incentives and accountability mechanisms to see activities through once begun as anonymity is at least partially removed. Regardless though, it still constitutes a defined social institution in which players can connect, share information, discuss strategies related to certain activities, and most importantly, socially engage in the game itself. As we shall see, this leads to some interesting norms for activities related to end-game activities and the Crucible, *Destiny's* version of competitive multiplayer.

Another area in which *Destiny* demonstrates functional emergence lies in character customization and the procurement of loot. From the wealth of options available to create a distinctive character at the start of the game to a database of approximately 5,000+ items,¹⁰ many of which are gear pieces the player can equip, opportunities for creating a truly unique character abound. As such, this robust mechanism represents the other part of the foundation upon which social order emerges within the *Destiny* universe.

In fact, given the highly repetitive nature of this game, creating such a character and collecting this item database is likely the primary motivation behind most players' sustained commitment to *Destiny*. In a video entitled "Destiny: The Hardcore Gamer's Slot Machine" on his show *The Point*,¹¹ Danny O'Dwyer explores what he considers to be ethical concerns around the perceived lottery structure of Bungie's game. In essence, he argues that, given the monetary DLC component attached to the loot grind in *Destiny*, the game can be likened to gambling. Therefore, he suggests that it carries with it concerns around exploitation. Although such a moral question is outside the scope of this paper, the illustration he provides comparing *Destiny* to a slot machine remains highly apt as a description of the incentive structure in place.

Simply speaking, each activity in *Destiny* has a loot table, which continuously changes. From this loot table, there are set probabilities for the given activity to drop a particular item. Additionally, with various updates, there are also a few different methods of affecting these probabilities and ensuring at least some value out of every drop. Furthermore, a number of smaller, less valuable, items are guaranteed depending on the activity in which the player is participating.¹² Notably, there are also a few items that can be acquired via micro-transactions, but these are generally limited to cosmetic items. However, some updates have included the sale of practical items as well.¹³ Regardless, the game rewards effort (via playtime) and dedication (via playtime and money allocation) through creating a system in which players constantly can work to improve upon their individual character designs and signal certain aptitudes/advantages.

As this all relates to spontaneous order, players are constantly pursuing self-interested motives in order to improve as well as diversify each of their characters, and often, these goals are in conflict with one another. After all, the piece of gear or improvement that one player is pursuing may not be the same one that another player is pursuing. However, given different character builds, complementary abilities,

and varying levels of progression, it becomes advantageous for such players to team up and work towards different loot goals together. Thankfully, the game provides plenty of opportunities for this and, most notably, not through design. Instead, it occurs in a truly spontaneous fashion coordinated through emergent social institutions. This leads to certain established norms which I explore in the next subsection.

Notably, this also facilitates greater team well-being as each player is satisfying his or her comparative advantage (based on character design, goals, and availability) through the division of labor in helping to achieve each group member's goals. Logically, it would be highly unrealistic for a central planner to know not only which particular item a given player wishes to pursue, but also which combination of players will best help him or her acquire it. Within this game, we instead see players voluntarily forming mutually beneficial arrangements through emergent social apparatuses to accomplish various objectives without any sort of direction.

4.2 The Applied Level of Order

Building on this foundation, an applied level of order forms in which some interesting norms emerge within the *Destiny* universe. For instance, challenges such as the various raids provide opportunities for securing unique pieces of gear that cannot be found anywhere else. Why then might we see veteran players who have already acquired this gear continue to participate? Outside of simply enjoying the game or securing additional materials, a strong incentive exists for these individuals to help less developed players to learn and complete the raid, namely the reputational benefits and favor economy that emerge from this interaction.

Since the automated matchmaking system does not extend to the raids, players often must resort to LFG sites and forums to put together their fireteam and the most sought after players from these sites (especially for newer players) tend to be those who have already reached the level cap and completed the raid multiple times (this results from transaction costs related to the development of relevant knowledge). Such veteran players, in return, receive a reputation boost within the social community for their assistance and new connections upon which they can call to help complete other in-game tasks. Furthermore, even if the players one recruits are not veterans, the connections formed in this medium serve to develop new regular raiding groups and sub-communities with which players often continue to participate. Ultimately, these norms help build and estab-

lish lasting connections within the community that assist individual players within the game itself, and they extend to other end-game content and Crucible activities as well. Interestingly, much like other games, these connections also often go beyond the *Destiny* universe and develop into real friendships.¹⁴

Another more concrete area in which emergent social institutions have established order can be found in the game's customization system. This extends across both the cooperative and competitive multiplayer modes, and the sharing of information within the community leads to a set of standard norms for ability and gear selection. Examples for cooperative play include commonly understood practices such as using the weapon Gjallarhorn to quickly and efficiently take down the raid boss Crota, taking advantage of the Hunter's invisibility ability to easily revive dead teammates, using the Titan's bubble shield to easily generate more super energy, etc. Importantly, these norms are established both through word of mouth and the same forums/LFG sites that players use to construct fireteams.

Regarding competitive multiplayer, the Crucible can also be a fantastic demonstration of this norm. Given the strategic nature of competing against "real" players, choices surrounding weapon and armor selection can be crucial. The trick for each individual player is to decide on an equipment set that will deliver the strongest advantage in actual gameplay. This can vary depending on such factors as the type of match being played, the map that is randomly selected, and even the other players within the match itself. Regardless, certain consistent choices prove to be most advantageous in this mode, and much like its cooperative mode counterpart, these come about through the emergent social institutions at play. Examples of such norms here include the coordinated collection of both heavy ammo refills (to keep it away from the other team), use of standard sniping locations on each map, the formation of specific strategies in Control, the domination of certain weapons during particular versions of the game, etc.

These examples by no means constitute an exhaustive list of the norms that have developed within the *Destiny* universe. They do, however, provide a starting point for considering how order is spontaneously established within this game and the key role that emergent social institutions play in interacting with the given programmed environment. Furthermore, it provides a foundation for exploring other emergent phenomena within video games, and it helps us to understand how online communities naturally form and develop in a broader context.

V. CONCLUSION

In conclusion, video games serve an effective role in mirroring the economic outcomes of various institutions within society. As they essentially act as a natural experiment for examining economic inquiries with minimal consequences, they provide a solid avenue through which to explore various theories and ideas. Unfortunately, analyses concerning uniquely Austrian concepts within this medium have been woefully under-pursued. To that end, my contribution to the existing literature helps to fill this gap by exploring how emergent social institutions work to establish spontaneous order within the video game *Destiny*.

By examining two theoretical levels of order and considering previous research on the emergence of the firm, I provide several examples in which the formation of online communities helps to establish certain norms within the game's universe. While this analysis is by no means exhaustive, it does provide an initial look into how these institutions operate. Sometimes, this takes the form of players solving various problems through innovative solutions and passing along the information through relevant networks. In other instances, it simply amounts to a naturally forming and mutually enforcing arrangement of decisions among several different players. In each respect, this order does not result from any centrally directed action by the game's developer, but rather through multiple agents pursuing different goals in the service of self-interest.

Since many video games mimic reality (at least to some degree) through similar environments, the presence of human interaction, and robust economic systems, they likely have much to tell us about our own world, at least in regards to our online personalities. Given the naturally social element within *Destiny* as well as the fact that it is fundamentally a game driven by human players (as opposed to artificially intelligent agents), its universe is essentially an extension of our own. What applies to human interactions within this game world should also intuitively apply to reality (or again, at least the digital version of it). More research, both of the econometric and analytical varieties, should be done to demonstrate this claim. Examples might include the analysis of social relationships formed while playing these games as well as the transference of these principles to other "real-world" interactions. However, this paper provides initial support for such an argument.

In addition, there are a number of other lines of research that could be pursued from such a perspective. One notable

extension of the current paper involves measuring the frequency, breadth, and regularity of matchmaking queries on *Destiny* forums and LFG sites. A few examples related to other topics include case studies of the same idea with different game genres, the interaction between spontaneous order and creative destruction in video game worlds, and the effects of entrepreneurship on the emergence of order. Other Austrian concepts could also be explored in relation to video games such as the application of the structure of production to video game worlds, the effects of government regulation on the industry, and the knowledge problem as it relates to the various decisions of players. In any case, regardless of how this stream of research evolves, video games can provide us much insight into the economic questions of both today and tomorrow.

NOTES

- 1 For more on the demographics of gamers and other data on the industry, see the Entertainment Software Association's (ESA) "2017 Sales, Demographic, and Usage Data" report at http://www.theesa.com/wp-content/uploads/2017/09/EF2017_Design_FinalDigital.pdf as well as Krista Lofgren's "2017 Video Game Trends and Statistics—Who's Playing What and Why?" at <https://www.bigfishgames.com/blog/2017-video-game-trends-and-statistics-whos-playing-what-and-why/>.
- 2 Lehdonvirta (2005), for example, explains how the economic systems within video games, especially massive multiplayer online (MMO) games, mimic real life systems. There is also a growing body of literature in economics analyzing various aspects of video game worlds. Most of the research focuses on providing examples of, and support for, basic economic concepts (Bilir 2009; Castronova 2003, 2006; Hunter 2003; Lastowka and Hunter 2004, 2005). Salter and Stein (2016), however, provide a notable exception to this literature, using Austrian economics to understand how monetary institutions in *Diablo II* emerged to facilitate exchange.
- 3 Notably, however, a recent methodological work does explore the role of emergent order within virtual worlds more generally. Mildenberger (2015) explores economics as it relates to the anarchical world of virtual pirates. Although such individuals tend to be inherently conflict-loving, rules emerge to mitigate their otherwise destructive behaviors.
- 4 For a criticism of the Austrian concept of spontaneous orders, see Sandefur (2009).
- 5 Although V.L. Smith (1994, 113-115) contends there are likely more, the seven reasons he lists for economists to do experiments are to: 1) test a theory, or discriminate between theories; 2) explore the causes of a theory's failure; 3) establish empirical regularities as a basis for new theory; 4) compare environments; 5) compare institutions; 6) evaluate policy proposals; and 7) test institutional design (V. L. Smith 1994). As it relates to the current paper, video games most fittingly serve purposes 1, 3, 4, and 5, though they could conceivably fit purpose 7 as well.
- 6 Notably, *Destiny 2* attempts to address some deficiencies (as perceived by some of its player base) within the matchmaking system through the introduction of a formal clan system and the Guided Games mechanic. For more on this, see Eddie Makuch's 2017 article "Destiny 2 Guided Games: Here's What You Need to Know Ahead of Launch" at <https://www.gamespot.com/articles/destiny-2-guided-games-heres-what-you-need-to-know/1100-6453521/>. While time will tell how these new ideas will influence the development of the franchise, they matter very little for the analysis of emergent social institutions within this paper. They do, however, present an interesting feedback development which begs the question, "Do game developers respond effectively to broad consumer interest or are such changes merely to appease a vocal minority within the fan base?"
- 7 See Anthony Taormina's 2014 article "Bungie Details 'Destiny's Seamless Matchmaking for Multiplayer'" at <http://gamerant.com/bungie-destiny-matchmaking-multiplayer-detail/>.
- 8 See Paul Tassi's 2015 article "Everything in 'Destiny' Needs Matchmaking, Yes, Everything" at <https://www.forbes.com/sites/insertcoin/2015/05/07/everything-in-destiny-needs-matchmaking-yes-everything/#602dd0e87943>.
- 9 See Matt Martin's 2015 article "Destiny Players Grow to 25 Million, Putting in 3 Hours per Day" at <https://www.vg247.com/2015/11/03/destiny-20m-users-3-hours-per-day/>.
- 10 A complete listing of all current loot can be found at Planet Destiny's website, <http://db.planetdestiny.com/>.
- 11 See The Point episode "Destiny: The Hardcore Gamer's Slot Machine" at <http://www.gamespot.com/videos/the-point-destiny-the-hardcore-gamers-slot-machine/2300-6425852/>.
- 12 See the Destiny sub-reddit, https://www.reddit.com/r/DestinyTheGame/comments/2ry8bj/can_someone_here_explain_how_the_loot_drop_system/, and Anthony Taormina's 2015 article "Destiny's New Loot System is a Huge Improvement that Rewards Player Effort" at <http://gamerant.com/destiny-review-loot-system-151/>.
- 13 See James Plafke's 2015 article "Destiny's Microtransactions are Getting Out of Control" at <http://www.geek.com/games/destinys-microtransaction-pricing-is-getting-out-of-control-1642198/>.
- 14 See Brenna Hillier's article "Destiny: How to Get a Raid Group Together Using LFG Sites" at <https://www.vg247.com/2015/02/10/destiny-how-to-get-a-raid-group-together-using-lfg-sites/>.

REFERENCES:

- Alchian, A. A., and Demsetz, H. 1972. Production, Information Costs, and Economic Organization. *The American Economic Review*, 62(5): 777–795.
- Beaulier, S. A., Smith, D. J., and Sutter, D. 2012. Technology and the Architecture of Emergent Orders. *Studies in Emergent Order*, 5: 157–176.
- Benson, B. L. 1989. The Spontaneous Evolution of Commercial Law. *Southern Economic Journal*, 55(3): 644–661.
- Bilir, T. E. 2009. *Real Economics in Virtual Worlds: A Massively Multiplayer Online Game Case Study: Runescape*. Georgia Institute of Technology, Atlanta, GA.
- Boettke, P. J. 1990. The Theory of Spontaneous Order and Cultural Evolution in the Social Theory of F.A. Hayek. *Cultural Dynamics*, 3(1): 61–83.
- 2000. Reviews: Analytical Narratives. *Constitutional Political Economy*, 11: 377–379.
- Boettke, P. J., and Candela, R. A. 2015. What Is Old Should Be New Again: Methodological Individualism, Institutional Analysis and Spontaneous Order. *Sociologia*, 2: 5–14.
- Boettke, P. J., Coyne, C. J., Leeson, P. T., and Sautet, F. 2005. The New Comparative Political Economy. *Review of Austrian Economics*, 18(3–4): 281–304.
- Boettke, P. J., Fink, A., and Smith, D. J. 2012. The Impact of Nobel Prize Winners in Economics: Mainline vs. Mainstream. *American Journal of Economics and Sociology*, 71(5): 1219–1249.
- Castronova, E. 2003. On Virtual Economies. *The International Journal of Computer Game Research*, 3(2).
- 2006. On the Research Value of Large Games: Natural Experiments in Norrath and Camelot. *Games and Culture*, 1(2): 163–186.
- Coase, R. H. 1937. The Nature of the Firm. *Economica*, 4(16): 386–405.
- D’Amico, D. J. 2015. Spontaneous Order. In: *The Oxford Handbook of Austrian Economics* (Peter J. Boettke & Christopher Coyne, pp. 115–142).
- Duggan, M. 2015. *Gaming and Gamers*. Washington, D.C.: Pew Research Center.
- Falk, A., and Heckman, J. J. 2009. Lab Experiments are a Major Source of Knowledge in the Social Sciences. *Science*, 326(5952): 535–538.
- Fama, E. F., and Jensen, M. C. 1983. Agency Problems and Residual Claims. *The Journal of Law & Economics*, 26(2): 327–349.
- Hayek, F. A. 1945. The Use of Knowledge in Society. *The American Economic Review*, 35(4): 519–530.
- 1988. *The Fatal Conceit: The Errors of Socialism*. Chicago, IL: University of Chicago Press.
- Hunter, D. 2003. Cyberspace as Place, and the Tragedy of the Digital Anticommons. *California Law Review*, 91(2): 439–520.
- Jensen, M. C., and Meckling, W. H. 1976. Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure. *Journal of Financial Economics*, 3(4): 305–360.
- Lastowka, G., and Hunter, D. 2004. The Laws of the Virtual Worlds. *California Law Review*, 92(1): 1–74.
- 2005. Virtual Crimes. *New York Law School Law Review*, 49(1).
- Leeson, P. T. 2007. An-arrgh-chy: The Law and Economics of Pirate Organization. *Journal of Political Economy*, 115(6): 1049–1094.
- Lehdonvirta, V. 2005. Virtual Economics: Applying Economics to the Study of Game Worlds. In: *Proceedings of the 2005 Conference on Future Play*. Lansing, MI.
- Mildenberger, C. D. 2015. Virtual World Order: The Economics and Organizations of Virtual Pirates. *Public Choice*, 164(3–4): 401–421.
- Nell, G. L. 2009. Competition as Market Progress: An Austrian Rationale for Agent-Based Modeling. *The Review of Austrian Economics*, 23(2): 127–145.
- Niazi, M., and Hussain, A. 2011. Agent-Based Computing from Multi-Agent Systems to Agent-Based Models: A Visual Survey. *Scientometrics*, 89(2): 479–499.
- Normann, H.-T., Requate, T., and Waichman, I. 2014. Do Short-Term Laboratory Experiments Provide Valid Descriptions of Long-Term Economic Interactions? A Study of Cournot Markets. *Experimental Economics*, 17(3): 371–390.
- Salter, A. W., and Stein, S. M. 2016. Endogenous Currency Formation in an Online Environment: The Case of Diablo II. *Review of Austrian Economics*, 29(1): 53–66.
- Sandefur, T. 2009. Some Problems with Spontaneous Order. *The Independent Review*, 14(1): 5–25.
- Seagren, C. W. 2011. Examining Social Processes with Agent-Based Models. *The Review of Austrian Economics*, 24(1): 1–17.
- Skarbek, D. 2012. Prison Gangs, Norms, and Organizations. *Journal of Economic Behavior and Organization*, 82(1): 96–109.
- Smith, A. [1776] 2003. *An Inquiry into the Nature and Causes of the Wealth of Nations* (Bantam Classic Edition). New York, NY: Bantam Dell.
- Smith, V. L. 1994. Economics in the Laboratory. *Journal of Economic Perspectives*, 8(1): 113–131.
- Wagner, R. E. 2011. Spontaneous Order, Liberty, and Austrian Economics. *Studies in Emergent Order*, 4: 209–223.
- Wallick, R. 2012. Agent-Based Modeling, Public Choice, and the Legacy of Gordon Tullock. *Public Choice*, 152(1–2): 223–244.
- Williamson, O. E. 1983. *Markets and Hierarchies: Analysis and Antitrust Implications*. New York, NY: Free Press.
- Wolfram, S. 2002. *A New Kind of Science* (1st ed.). Champaign, IL: Wolfram Media.