

INTERDISCIPLINARY APPROACHES TO SURVIVING THE **ZOMBIE APOCALYPSE**

<http://ojs.uwindsor.ca/ojs/leddy/index.php/iasza>

Interdisciplinary approaches to surviving the Zombie Apocalypse Conference

October 28-29, 2016, University of Windsor

PROPERTY RIGHTS AND CONTRACT ENFORCEMENT IN THE POST-ZOMBIE APOCALYPSE

Pages 74-87

By John P. Palmer

EclectEcon@gmail.com

PROPERTY RIGHTS AND CONTRACT ENFORCEMENT

IN THE POST-ZOMBIE APOCALYPSE

*By John P. Palmer**
EclectEcon@gmail.com

ABSTRACT

After the Zombie Apocalypse, the ROUNZ [Rest Of Us Non-Zombie] settlements will need to redevelop institutions to allocate scarce resources within their own communities, both for internal economic growth and for providing defense against the Zombie attackers.

The problem for the settlements will be how to allocate the scarce goods as well as how to allocate the risks. More likely than not, groups will initially develop systems of command and control. Some person or group will gain a monopoly over the use of force, using some combination of charisma and fear as a motivator.

The important long-term outcome will be that those settlements that create and enforce private property rights and enforceable contracts, albeit within a governing system relying on a monopoly over the use of force, will be likely to emerge more dominant over the long run. The evidence from the past two centuries [pre-Zombie apocalypse] shows that time and again, no matter who wins the wars, economies based on enforceable property rights, legal entitlements, and enforceable contracts tend to become dominant.

Keywords *Zombie, law, economics, monopoly, contract, property, efficiency*

1. INTRODUCTION

Nearly every apocalypse novel ever written predicts and describes a breakdown of law and order, including the loss of enforceable property rights and the lack of an enforcement mechanism for contracts, not to mention murder, rape, and cannibalism.¹

Some characters in the novels were prepared for lengthy periods of deprivation, either because they saw a disaster coming or because they were by nature more risk averse² or forward-looking³ and hence more inclined to save. They accumulated food,

* Professor Emeritus, Economics, The University of Western Ontario; Adjunct Professor, Economics, The University of Regina; former radio and television voice of the London Werewolves; and Past President of the Canadian Law and Economics Association. The author gratefully acknowledges advice and assistance from Lydia Miljan, Matthew Palmer, Paula Nicholls, Jason Childs, Jason Keenan, and John Henderson (who argues that the collective noun for zombies is “An Apocalypse of Zombies”).

¹ See for example, *The Long Loud Silence* (1952, biological warfare); *No Blade of Grass* (1958, crop and food disaster); *Lucifer’s Hammer* (1978, meteor strike). Also see, *World War Z* (2006, Zombie invasion) for lesser examples, as the apocalypse is less dramatic. *Pride and Prejudice and Zombies* (2009) does not fit this mold because there was no near-apocalypse in that novel. Alternatively, although there was a total apocalypse in *On the Beach* (1957, nuclear holocaust), there was no breakdown in law and order because government remained intact.

² On risk averse behaviour, see https://en.wikipedia.org/wiki/Risk_aversion

³ In economics jargon, they have a low time preference.

water, water filters, camping equipment, etc. Others, who were not prepared, found themselves desperate enough to try to take food and supplies from those who had the supplies. Understandably, those who had the supplies defended themselves.

Interestingly, many of the people who saved and were better situated to deal with a disaster were not well-prepared for dealing with the onslaught from those who were less well-prepared. In nearly every scenario, those who were prepared (either by luck or good planning) had to fight off marauding bands of those who were unprepared. The government was unable to protect them or enforce their private property rights because the government and all official forms of law and order had completely collapsed. Those who more fully anticipated the problem were prepared not just with food, water, and shelter, but also with weapons to protect their caches of supplies. Others, with no weapons and no support or protection from law enforcement agencies, lost their supplies and often their lives to those who had sufficient weaponry to take the supplies.

Slowly, but inevitably, the system of property rights and contract enforcement to which we have become accustomed in the western world deteriorated. And as the fighting for control of scarce resources occurred, there were two inevitable results:

1. Scarce, potentially productive resources were diverted from the production of goods and services to the production of theft activities; and some were diverted to provide protection from theft. Farmers had to arm themselves and spend time (as well as hire others) to protect their crops from marauders. Non-farmers had similar problems, protecting their caches of supplies from the marauders.
2. Strongmen analogous to crime lords emerged through the strength of their bodies and their personalities, as well as their willingness to use brute strength to acquire control of resources. In some instances, where law enforcement agencies still existed, they tended to become the decision-makers in the face of panic and scarcity; in others, the monopoly over the use of force devolved to whomever could form a coalition strong enough to retain that control.

The problem with most of these scenarios is that rarely do they address the continuing evolution of the struggle for power and the use of property rights and contract enforcement in the post-zombie apocalypse [PZA]. Unlike the other papers presented in this session, this paper deals specifically with the PZA and considers these important political, legal, and economic issues under various PZA outcomes.

To understand the nature of legal and economic institutions that might evolve or survive after the zombie apocalypse, one is forced to surmise how the apocalypse would occur and what type(s) of zombies would cause the zombie apocalypse.

2. SCENARIO ONE

In one scenario, the zombies attain complete control over the Rest Of Us Non-Zombies [ROUNZ]. Initially, the zombies would face a common-property resource problem⁴ and the Tragedy of the Commons (Hardin, 1968), as they eat the brains of the ROUNZ without regard for sustainability. Once the supply of brains from all the ROUNZ is fully depleted, either the zombies would die out from lack of sustenance or the zombies would begin attacking and eating other animals or each other.

This state seems to be about as far as many stories about the zombie apocalypse ever go (with few exceptions) primarily because in most versions of what happens during the zombie apocalypse, zombies have no frontal lobes, have no ability to organize, and have no thinking leaders. In some of these scenarios, the zombies eat all the human brains and then begin cannibalizing each other until all the zombies are gone.

In other versions, albeit rare ones, the initial chaos without a system of entitlements leads to the emergence of strongmen-zombies who control other zombies. For example, in *I am Legend* (Matheson, 2007), the zombies have actually become the dominant species while the human race is all but extinct, and there are some stronger zombies that act almost like herd leaders. Through the use of their own personal force, they acquire a monopoly over the use of force overall for enforcement of their rules. Warring zombie strongmen battle for the right to control territory and zombie underlings; they battle for control over the common property resource – ROUNZ brains. Much of the leadership for this type of control would undoubtedly come from the existing leadership within the Zombie hordes. From an evolutionary perspective (sometimes referred to as a spreading virus in various zombie depictions), those zombies that mutate and control other zombies to provide for sustainable supplies of ROUNZ brains will emerge as the dominant subspecies of zombies. Even in this simplified scenario, *it becomes clear that the emergence of a strong, dominant force to create and enforce property rights or entitlements is key to the continued sustainability of the group.*

In this scenario, zombies eventually adapt, as if they learn that they must conserve, and ultimately they develop a system of ownership rights, hunting rights, and

⁴ See this: https://en.wikipedia.org/wiki/Common-pool_resource

exchange rules. Some actually develop and acquire rights to hunting preserves, while others domesticate and cultivate the ROUNZ.

3. SCENARIO TWO

In the second scenario, zombies and ROUNZ develop a kind of unpeaceful, uneasy co-existence. The zombies raid the ROUNZ settlements either constantly or when they are hungry for more brains, but the Zombies never completely conquer the ROUNZ. During the early massive, surprise attacks, the zombies cause an apocalypse for the ROUNZ... their legal, social, cultural, business, and military infrastructures are destroyed.

The result is the emergence of two distinct societies: zombies and ROUNZ, each facing different challenges. The zombies would not be able to treat the ROUNZ as cattle, as they would in one of the variants of Scenario One. Instead the Zombies would need to develop strategies, as well as reward and incentive systems to make their hunting/raiding expeditions more effective. Successful strategies would lead to the growth of some bands of zombies, and unsuccessful strategies will lead to the demise of other bands of zombies.

If the zombies do not evolve some sort of structure, they will eventually be defeated, as appears to be the likely outcome in *World War Z*. If the zombies do, however, develop some sort of structure, then the result could well be something analogous to the Eloi and the Morlocks in H.G. Wells' *The Time Machine* (1895).

4. THIS STUDY – DEALING WITH THE NEAR APOCALYPSE

This study focuses primarily on the effects of a partial or near apocalypse in which the zombies are held at bay and/or completely conquered after nearly destroying the ROUNZ.

4.1. ORGANIZING DEFENCE

One of the initial requirements (and clamoured-for services) for the ROUNZ is defence. The ROUNZ require defence against the seemingly never-ending onslaught of zombies initially and against marauding bands of other ROUNZ later, as the search for food and shelter continues. But defence requires scarce resources: armaments, people, and organizational skills in addition to the basic food, clothing, and shelter requirements.

Many communities and households will have some armaments in place for dealing with the zombies. Hammers, rifles, pistols, slingshots, etc., as well as flame equipment seem to work well. But eventually the ammunition and fuel for the weapons begins to run out. More ammunition and additional or alternative weapons, must be either produced or otherwise procured via theft/marauding. Organizing the production and/or acquisition of the armaments requires that individuals interact with each other via some reliable mechanism to assure that promises are kept and commitments are honoured.

Similarly, when people move beyond simple self-sufficiency, on their own or within a family or very small community, they make agreements about how to share out the work. In the case of armaments, people will organize to produce the ammunition, repair weapons, produce new weapons, form raiding parties, and provide defence for their own groups. As people have had to learn time and again, through the ages, when people come together to provide for anything, including defence, they must determine who does what, and who receives what compensation for providing the goods and services. The initial allocations are often based on sharing and equal division. But as people living in communes inevitably discover, problems of shirking and favouritism emerge (Palmer, 2007). Eventually, the successful communities and groups realize that people shirk less and produce more when they receive rewards according to the value of their services.

At first, there are caches of armaments. These armouries are sometimes treated as common property, for all to use according to their self-perceived needs. Over time, the weapons fall into disrepair; if something is broken, it is often easy just to discard it and replace it with something else from the common pool. Only if some vague form of entitlements and responsibilities is created and enforced do people have an incentive to care for the weapons. Culture and tradition can play a large role in creating these entitlements and responsibilities, but somehow they emerge.

Organization of the defence effort can be complex. People must emerge as trusted, respected leaders one way or another. Sometimes the roles are filled by people with leadership-type charismatic personalities; other times bullies emerge following battles against the zombies. These leaders have certain (usually limited) authority and power to make decisions. They create and enforce rights and responsibilities within their realm of authority.

To the extent that the leaders create rights and entitlements based on productiveness, their realm will more likely be successful in defending itself against zombies and marauders. To the extent that the leaders use favouritism or other criteria for creating these rights, their realms will be less likely to be successful.

If the leaders reward productivity, people will strive to become more productive. If, however, the leaders mete out rewards according favouritism, people will strive to become favourites of the leaders. And if the leaders reward according their own standards of attractiveness, people will strive to meet those standards of attractiveness. As the standard economics phrase goes, “People respond to incentives.”

4.2 ORGANIZING COMMUNICATIONS

As the zombie apocalypse threatens humans, isolated pockets of people will want to communicate with others about successful and unsuccessful defence techniques, as well as about unified defence strategies. They will also want to organize mechanisms for trade and exchange.

In the era of cellular telephones and the internet, this process seems straightforward. However, local service provision will be necessary, as will the maintenance of communications and communication protocols. Also, the provision of electrical energy to power the local services and the individual communication devices will be crucial. Undoubtedly on smaller scales, solar and wind power, along with gas generators will be in heavy demand, assuming the major sources of electrical power cannot withstand the zombie onslaught. Yet even these sources of power require scarce resources for their construction and maintenance; those already in place will not last forever and will surely be the targets for marauding tribes. Production will at some point be necessary, a fact rarely dealt with in many apocalyptic novels.

4.3 PRODUCTION OF GOODS AND SERVICES

Among the surviving ROUNZ, food and energy supplies eventually will be depleted. Some people will have hoarded more than others, just in general out of a strong sense of insurance against the unknown or out of a strong religious belief. But eventually their sources of food and other products will be depleted. Acquisition of new goods and services must eventually occur to stave off a complete apocalypse, whether the acquisition is by production or by marauding and taking the goods from other communities or legal entities (possibly including slaves). How this acquisition will be organized may vary. In some communities, the organization could well be communal, but we have learned time and again that communal organization of production is unsuccessful. One outstanding example is provided by Bradford's account of what happened in the Plymouth colony in The United States from 1620-1622 (Palmer, 2007):

One of the traditions the Pilgrims had brought with them from England was a practice known as "farming in common." Everything they produced was put into a common pool; the harvest was rationed among them according to need. ...

They had thought "that the taking away of property, and bringing in community into a common wealth, would make them happy and flourishing," Bradford recounts.

They were wrong. "For this community (so far as it was) was found to breed much confusion and discontent, and retard much employment that would have been to their benefite and comfort," Bradford writes.

Young, able-bodied men resented working for others without compensation. They thought it an "injustice" to receive the same allotment of food and clothing as those who didn't pull their weight. What they lacked were proper incentives.

After the Pilgrims had endured near-starvation for three winters, Bradford decided to experiment when it came time to plant in the spring of 1623. He set aside a plot of land for each family, that "they should set corne every man for his owne perticuler, and in that regard trust to themselves."

The results were nothing short of miraculous.

Bradford writes: "This had very good success; for it made all hands very industrious, so as much more corne was planted than other wise would have bene by any means the Govr or any other could use, and saved him a great deall of trouble, and gave far better content."

The women now went willingly into the field, carrying their young children on their backs. Those who previously claimed they were too old or ill to work embraced the idea of private property and enjoyed the fruits of their labor, eventually producing enough to trade their excess corn for furs and other desired commodities.

More recent examples include *inter alia* the myriad stories of inefficient and misdirected production under the communist systems of the USSR and China. Others would include pre-Thatcher nationalization of industries in the UK; and the most recent examples are the tragedies of government non-market directed production, all purportedly for the common good in Zimbabwe and Venezuela. All these examples follow the pattern set out by George Orwell so effectively in *Animal Farm* (1946). Venezuela is an especially timely example of the reduction in production that occurs when property rights are not clear and when the flux of legal entitlements create such uncertainty that people turn inward, producing and trading less and less as the uncertainty grows.

4.4 THE IMPORTANCE OF SPECIALIZATION AND TRADE

The provision of even basic goods and services for survival is nearly impossible within a single family. As families begin to realize this, they regroup into communities where they can specialize in the production of some things and trade for others. This trade happens quite naturally and develops fairly quickly. And, to the extent there is no fraud or duress, trade makes all parties better off. They become more productive as they develop their comparative advantages.⁵

So long as the trading partners are within a fairly small community, there is little need for formal declaration of property rights and legal enforcement. Reputation effects go a long way to providing the type of enforcement of contractual agreements that is usually necessary. When someone knows “his word is as good as his bond”, that knowledge (or expectation) creates a quasi-legal environment in which people can trade fairly smoothly and efficiently. But when the trading community is larger, defections from common arrangements are more likely to occur; strangers are, on average, viewed as less trustworthy.

For trade and exchange to occur efficiently and effectively, two conditions must be satisfied:

1. Transaction and negotiation costs must be low, i.e. the cost of making a deal or exchange must be low. If the parties have to wrangle at length, or if the parties must bring armed guards with them to protect their goods, then fewer deals will be made that would have been good deals for both parties in the absence of high transaction costs.
2. Property rights, or more generally legal entitlements, must be well-established and easily enforced. If I make an agreement with you, we both must have ways of

⁵ In Economics, the term “comparative advantage” has a very precise meaning; roughly it means producing those things you’re comparatively best at even if others are better in some absolute sense. See https://en.wikipedia.org/wiki/Comparative_advantage

knowing that both trading partners have the right to exchange whatever it is we are exchanging, and we must be fairly confident that both parties will honour the agreement. The evolution of property law and contract law has occurred for this very reason: to make a deal, people want to know the deal will go through as expected. To the extent that they have serious doubts about whether the deal will go through as expected, they will make fewer exchanges, leading to lower values of production for the community as a whole.⁶

After the apocalypse, somehow legal entitlements are created. Some traditions and cultural values are carried forward into the post-apocalypse societies, but people quickly learn that “It’s different now.”⁷ The old societal and legal norms break down. Laws become unenforceable and unenforced. The resulting chaos leads to a dramatic reduction in productive activity as people shift their efforts and resources away from production and toward theft, marauding, and defence. What is astounding about so many of the apocalypse stories, such as *The Walking Dead*, is that the old norms seem to be in place much longer than one would reasonably expect. In the instance cited with the phrase, “I don’t think those rules apply anymore, do you?” a woman is considering shoplifting an item from a store. Yet with the breakdown of law and order, it would be very surprising if such stores existed for long without armed guards and/or without the protection of some godfather or other force.

In general, without a formal system in place to define and enforce property rights and other legal entitlements, other mechanisms will evolve to take their place. Typically in novels and movies about the apocalypse, bullies and strongmen begin to take over, assuming control. Not unlike the mafia, individuals seek the assistance of these bullies or strongmen to help settle disputes and to create a new form of legal entitlements. If two people cannot agree on who has the right to use a certain resource, they seek adjudication of the dispute by their leader. If they cannot agree on what the terms of a contract were and whether it was honoured, they seek resolution by appealing to their leader. In exchange for providing these services, the leaders receive (or take!) compensation from their followers in some form, such as tributes, taxes, fees, share-cropping, sexual favours, etc.

⁶ Many readers will recognize these two points as a restatement of what has come to be known as “The Coase Theorem” although it was not set forth quite so succinctly by Coase (1960) in his famous article on social costs. To set the record straight, the Coase Theorem is *not*, as I incorrectly asserted in an earlier presentation of this paper, named after the famous economist who devised it, Professor Theorem.

⁷ “It’s different now,” is a short-form summary of the title, “I don’t think those rules apply anymore, do you? Rebuilding civilization after the Zombie Apocalypse,” the keynote address of the conference, delivered by David Bright.

Another example of this emergence of strongmen and bullies is seen in the development of prison gangs and enforcers in the absence of enforcement of strong rules by prison officials:

“First, when officials do not govern effectively, informal prisoner institutions play a more important role. Prisoners fill the gap in governance left by delinquent officials. When officials do their jobs well, such as in Norway, prisoners have little need to self-organize. Second, prison gangs do a good job of regulating the underground economy, but they are not always the most efficient source of governance. As earlier studies showed, ostracism is effective in small, tight-knit communities, but these decentralized punishments are ineffective in large populations of strangers. As a result, in large prison systems, prisoners turn to gangs to create rules, threaten more severe punishments, and to facilitate order In small prison systems, prisoners do not need gangs to do so. They can easily do it on their own....” (Emily Skarbek, 2016, who concludes with the following quotation from David Skarbek, 2016):

‘Prison populations are comprised of a biased agent type, forced to interact with each other, with no exit options, and sometimes living in desperate poverty. Nevertheless, this article shows that inmates can develop effective (albeit far from ideal) solutions to the problem of order, and these solutions take diverse forms depending on official's choices and the demographics of the community. Extralegal governance is not only possible, but is often robust to significant difficulties.’

In some other communities, a more republican or democratic type of control might emerge quickly, with a group of leaders who use their authority to create institutions that have authority to define and enforce legal entitlements and to adjudicate disputes.

Either way, however, or no matter how else the system might evolve, only to the extent that *some* system is created can the conditions necessary for economic growth be met. And it is those communities with more rapid economic growth that will be more likely to thrive, more likely to be able to defend themselves, and more likely to ward off threats from other, marauding communities. Only if people develop a trust that their property can be developed and worked with little threat, only if people believe that their agreements will be enforced if necessary, only then will people begin to redeploy their scarce resources away from theft, confiscation, and marauding and toward more productive activities.

5. REGIME UNCERTAINTY

In order that trust in property rights and contract enforcement be maintained, the successful communities will be those that minimize the degree of uncertainty about that enforcement. If property rights are enforced but cannot be counted on to be strong and stable, people will divert some of their time, energy, and resources to trying to make them more stable. To be more specific, if people think their leaders can be swayed by political, financial, or other entreaties to abrogate past property-rights decisions, then not only will their property rights be perceived as less stable, but (and more importantly for this argument) people will respond to those perceived incentives by using more of their scarce resources to attempt to influence the political decisions, thus leaving fewer resources available for production of goods and services. Put bluntly, lobbyists could otherwise be growing food or planting flowers if there weren't high expected pay-offs to the lobbying activity. Recasting this argument in the PZA setting, people will have an incentive to seek favours from their leaders if they believe the leaders can be influenced by their behaviour.⁸ And by doing so, they will be detracting from the productive output of food, defence, or any other good for the community.

It is this realization that regime uncertainty can, and usually does, lead to economic inefficiency that helps us understand why the PZA communities with tyrants or demagogues as leaders may survive effectively in the short-run but will be more likely to struggle in the longer run. Communities ruled by tyrants or demagogues generally face considerably more long-run regime uncertainty than do those with elected leaders or with leaders who eschew random favouritism for the sake of longer-term goals for their communities.

Unfortunately, in most apocalyptic settings, strongmen emerge as the leaders. They tend to be the most ruthless in seeking power, and they use brutal alliances to maintain their power. The pockets of humans who survive and fight off the zombie attacks closely resemble the fiefdoms of the dark and middle ages, with a concentration of power in the leaders of the local communities. The resemblance continues with these pockets or communities or fiefdoms battling each other for power and for the control of resources.

When there is chaos and uncertainty and when the normal channels for community decision-making are disrupted, the conditions are ripe for strongmen tyrants and demagogues to emerge. They will "get things done", and some will be successful,

⁸ The social and economic benefits of the perceived stability of property rights, contract enforcement rules, and other legal entitlements helps explain the comparative successes of those entities which place a higher emphasis on *stare decisis* in the rule of law.

making decisions that help fend off the zombies and other fiefdoms. Even in societies or communities with a long history of non-exploitative power, things change rapidly in the face of looming disasters. In these instances, which will be common during the zombie attacks and during the PZA, those who can create some semblance of stability will also tend to create some degree of certainty about property rights and contract enforcement. Fighting the zombies and marauding neighbours will, of course, be time- and resource-consuming, and so the leaders will need simple rules to adjudicate property and contract disputes. One common set of rules that emerges in many apocalyptic settings is twofold:

1. Might makes right. Whoever has the power wins the dispute. The godfather, the king, the lord of the manor is too busy with the wars to adjudicate disputes. Lower levels of lords, lieutenants, or senior executives will adjudicate the disputes and be open to influence from the disputing parties.
2. The top leaders of the communities will tend to be careful to select deputies they can trust to make effective short-run decisions to win wars and maintain power with little concern for long-run economic efficiencies.
3. Property rights and contract enforcement will often be left to the parties themselves to settle, either using force (duels, in a more formal setting; also tit-for-tat or other strategies), or using reputation effects.

So long as time, energy, and resources are devoted to fighting attackers, the attention paid to civil disputes will be abbreviated. Some pockets, some communities will evolve systems that rely heavily on the character and personality of their leaders. These will tend to be the communities led by tyrants and demagogues. These communities will appear to be successful in the sense of “Mussolini made the trains run on time”; they will have certainty and they will likely be effective, at least initially, in warfare. But because they have extreme vesting of power in the executive, they will also be less efficient in the longer run production of goods and services: residents (subjects) will be producing fewer goods and services and devoting more scarce resources to currying favour with the executive.

In the longer run, those communities that evolve away from extreme centralized control will be more likely to be successful.⁹ They will be more productive in the longer run, and this increased productivity will tend to have numerous longer-term payoffs for their communities:

1. They will have more and better food, clothing and shelter.

⁹ Careful readers will notice the exorbitant use of hedge words and phrases, such as “likely”, “might”, and “tend to”. The use of these words and phrases indicates the probabilistic nature of the views set forth here.

2. They will have a greater productive capacity to produce more armaments for waging war.
3. They will have more decentralized decision-making, leading to less favouritism and more meritocratic decision-making.

Of course there could, and likely will be, exceptions. Brutal, centralized dynasties have persisted at times for centuries. But regardless of the form of government, typically those societies that have survived and even thrived are those in which the legal entitlements are clear and stable and in which contract enforcement is carried out with generally known rules and outcomes.

REFERENCES

- Austen, Jane and Grahame-Smith, Seth (2009) *Pride and Prejudice and Zombies: The Classic Regency Romance*, Quirk Books, Philadelphia
- Bright, David (2016) “I don’t think those rules apply anymore, do you? Rebuilding civilization after the Zombie Apocalypse.” Conference Keynote Address, *Interdisciplinary Approaches to Solving the Zombie Apocalypse*, Windsor, Ontario, October
- Brooks, Max (2006) *World War Z: An Oral History of the Zombie War*, Crown, New York
- Christopher, John (1958) *No Blade of Grass*, Penguin, London
- Coase, Ronald (1960) “The Problem of Social Cost”, *The Journal of Law and Economics*, 3:1-44
- Hardin, Garrett (1968), “The Tragedy of the Commons”, *Science*. 162 (3859): 1243–1248. doi:10.1126/science.162.3859.1243.PMID 5699198.
- Matheson, Richard (2007) *I Am Legend*, Tor-Macmillan, New York
- Niven, Larry and Pournelle, Jerry (1985) *Lucifer’s Hammer*, Del Ray, Los Angeles
- Orwell, George (1946) *Animal Farm*, Harcourt Brace, New York
- Palmer, John (2007) “Property Rights: The Salvation of Pilgrims”, *Electecon*: November 20, 2007, <http://www.electecon.net/2007/11/property-rights.html>
- Shute, Nevil (1957) *On the Beach*, Vintage, New York
- Skarbek, David (2016) “Covenants without the Sword? Comparing Prison Governance Globally”, *American Political Science Review*, 110:4, 845-862
- Skarbek, Emily (2016) “Covenants without the Sword?” *Econlog*: December 31, 2016, <https://mail.google.com/mail/u/0/#inbox/1595a126096472e3>
- Tucker, Wilson (1952) *The Long Loud Silence*, Dell, New York
- Wells, H.G. (Originally published in 1895; herein, 1995) *The Time Machine*, Dover Thrift Edition, New York
- Wikipedia (as of Oct 25, 2016), “Common-pool Resource”, https://en.wikipedia.org/wiki/Common-pool_resource

Wikipedia (as of Oct 25, 2016) “Comparative Advantage”,
https://en.wikipedia.org/wiki/Comparative_advantage

Wikipedia (as of Oct 25, 2016), “Risk Aversion”, https://en.wikipedia.org/wiki/Risk_aversion