Journal of Markets & Morality
Volume 25, Number 1: 99–114

The Pareto Distribution and the Matthew Effect

Definition and Moral Considerations

C. Layne Hancock
University of Notre Dame

This article coordinates recent scientific and economic research into the "rich-get-richer" phenomenon to define and explain the underlying causes. This has been labeled the "Pareto Distribution" in economic fields and the "Matthew Effect" in other social sciences. I then offer a moral sketch for the implications of these potential economic "natural laws" that rejects two extremes: primitivism and social constructivism.

Introduction

> Let [the mechanist and political economist] beware that their speculations, for want of correspondence with those first principles that belong to the imagination, do not tend, as they have in modern England to exasperate at once the extremes of luxury and want. They have exemplified the saying, "To him that hath, more shall be given; and from him that hath not, the little that he hath shall be taken away." The rich have become richer, and the poor have become poorer; the vessel of the state is driven between the Scylla and Charybdis of anarchy and despotism. Such are the effects which must ever flow from an unmitigated exercise of the calculating faculty.
>
> ~Percy Shelly, "A Defense of Poetry"[1]

In this quote, written two hundred years ago, Shelly summarized the chief dilemmas that economists face in the twenty-first century: the dominance of utility-thinking; wealth accumulation; and the perennial balance between egalitarian impulses and natural inequalities. Shelly's warning is also the likely origin for

the idiom, "The rich get richer, and the poor get poorer." It is here paired with the KJV translation of Matthew 25:29, which subsequently became known in various fields as the "Matthew Effect" (hereafter "ME").

The ME is a natural pattern whose moral valence has yet to be determined by ethicists and economists.[2] Economists and ethicists are indeed already discussing the moral consequences of wealth distribution, but they often do so under a neighboring concept known as the "Pareto Distribution" (hereafter "PD").[3] Our present knowledge of the dynamic realities of the ME/PD are necessary-yet-insufficient conditions for guiding public policy. That is, ME/PD realities ought not to be wielded as ultimate determinations for policy disputes, though they are profitable starting points for interdisciplinary conversation.

What follows is an introductory investigation into this economic phenomenon and its ethical considerations. This article has two steps: (1) drawing upon Vilfred Pareto, Xavier Gabaix, Robert K. Merton, George Kingsley Zipf, Mark Newman, and Charles I. Jones,[4] it outlines a definition of the scope of the ME/PD, and (2) drawing upon Jean Porter, Thomas Aquinas, and John Calvin,[5] it offers a sketch of moral considerations for future research. The promise and limits of ME/PD research are analogous to ongoing moral inquiries, including Christian reflection on natural law and the scriptural commentary tradition. On this basis, this article argues that the ME of wealth inequality ought to be considered neither as a primitivist natural law[6] nor merely as a socially constructed phenomenon,[7] but as an economic relationship that lies between these two extremes.

Fundamental Considerations

Names and Studies

The "ME" is a popular label for the rich-get-richer phenomenon, though "PD" is a more technical economic term—until it too was supplanted by another concept. It is necessary to give a brief list of relevant names and studies to establish a clear definition of the ME.

First, the "Pareto distribution" or "Pareto principle" was named after the political economist Vilfred Pareto, who in 1896 wrote his *Manual of Political Economy*, which showed that the allocation of wealth followed consistent patterns of inequality.[8] This was the first famous study that registered the dynamics of concentrated wealth.[9] Pareto showed that approximately 20 percent of Italian landowners possessed 80 percent of the land.[10] Here we are introduced to another name—the "80/20 rule"—which gained popular renown in the leadership and productivity self-help market.[11] The 80/20 rule and Pareto's *Political Economy*

have long been divorced, but the residual overlap lies in the general idea that 80 percent of the effects or benefits come from 20 percent of the causes (e.g., 20 percent of one's salesforce will produce 80 percent of total sales). What is most important about this discovery is Pareto's insistence that PD holds steady across diverse economies.[12] Further, he is reported to have shown that 20 percent of peapods in his garden produced 80 percent of total peas, but I have been unable to locate this in his *Manual*.[13] One of the abiding problems with the use of Pareto's work is the too-easy conjunction of economic and natural production; namely, the universality of PD across economies *and* the natural world is often taken to be a primitive and immutable natural law of wealth distribution.

Second, in a 1968 article entitled "The Matthew Effect in Science," sociologist Robert K. Merton found that the cycle of citations and rewards within the Nobel laureate community had a self-amplifying effect. After Shelly, Merton is credited for pairing this social-amplification phenomenon with the gospel of Matthew but seems to be unaware of Pareto's research on wealth. For Merton, the scriptural pairing was almost entirely heuristic and not moral or theological. However, he did have two worries about self-amplification citations in science concerning (1) field efficiency and resource allocation and (2) merit and recognition.[14] Six years later Derek J. de Solla Price raised similar inegalitarian worries by putting mathematical precision to the amplification-citation problem: the square root of the number of people operating in a productive domain produce half the output.[15] This became known as "Price's Law" but tended to be overlooked by economists.

Third, George Kingsley Zipf discovered a similar self-amplifying phenomenon in his statistical studies of languages and word frequency. Zipf's investigating premise was the same as Mandeville's *Fable of the Bees*: Human activities should be studied as "purely natural phenomenon like everything else in the universe" with the promise of disclosing fundamental principles of social behavior.[16] It was, in other words, a preconventional, nature-as-reasoning project from the start. Today, reference to "Zipf's laws" is the regnant mode of referring to the rich-get-richer amplification process for economists.[17] For example, Xavier Gabaix spent his early career modeling out Zipfian laws for city growth that shows that initial inputs (i.e., city population size) do not ultimately alter the mathematical distribution of growth.[18] As cities grow, the largest cities grow exponentially and proportionally larger, and what results is the same kind of skewed distribution seen in the PD.

There are typically two reactions to instances of ME from readers: excitement or wariness. Entrepreneur Peter Thiel frames the matter quite bombastically: "the power law—so named because exponential equations describe severely unequal distributions—*is the law of the universe*. It defines our surroundings so completely

that we usually don't even see it."[19] Gabaix considers power laws to be a major breakthrough and important knowledge for all economists.[20]

However, a constructivist skeptic will be unimpressed with the sheer number of names and studies listed above. For whether we are considering citation practices (Merton-Price) or the distribution of wealth (Pareto) and words (Zipf), each domain runs on social practices. Social practices ebb and flow over time and are not immutable. *Ergo*, the ME/PD are not immutable, primitive laws of nature and thus are not binding upon us. The constructivist might be worried about Pareto's cross-economy certainty of the PD or Gabaix's bracketing of initial inputs from amplification phenomena, but these might not be insuperable.

While the constructivists' worry over primitivism is important, this *reductio ad* social practices move is unsound. Consider Zipf's findings about the mundane reality of language usage. It would be irrational to forge economic policy based on linguistic word distribution; however, Zipf's findings do tell us something very basic and preconventional about human nature. This thought experiment illustrates the tension: Imagine, on the constructivist view, that a society decided to correct the skewed and self-amplifying distribution of words exchanged between all citizens. What kind of world would this require? Note that this is *not* an argument against redistributive taxation, but merely an attempt to put into stark relief the oft unstated assumption that, if a practice is social, it is radically reformable. We thus need to press beyond the primitivist and constructivist poles in order to obtain a better picture of ME/PD.

In our final study, physicist and complex systems theorist Mark Newman has attempted to compile and analyze these "skewed distributions" across the social and empirical sciences. He writes,

> [These] distributions occur in an extraordinarily diverse range of phenomena. In addition to city populations, the sizes of earthquakes, moon craters, solar flares, computer files and wars, the frequency of use of words in any human language, the frequency of occurrence of personal names in most cultures, the numbers of papers scientists write, the number of citations received by papers, the number of hits on web pages, the sales of books, music recordings and almost every other branded commodity, the numbers of species in biological taxa, people's annual incomes and a host of other variables all follow *power-law distributions*.[21]

The burden of Newman's survey of the field is to attempt to answer the question: "Why?" Why do human and nonhuman phenomenon follow self-amplification or skewed distributions? While he does not answer this question, Newman does

provide us with candidates. These will be discussed in the next subsection. Here it is important to note Newman's caution:

> "Power-law [i.e., skewed] distributions are, as we have seen, impressively ubiquitous, but they are not the only form of broad distribution. Lest I give the impression that everything interesting follows a power law, let me emphasize that there are quite a number of quantities with highly right-skewed distributions that nonetheless do not obey power laws.… [T]he scientist confronted with a new set of data having a broad dynamic range and a highly skewed distribution should certainly bear in mind that a power-law model is only one of several possibilities for fitting it."[22]

Among these non-skewed distributions are commonplace metrics like the distribution of a person's height, weight, and the speed at which they drive on a highway. The former metrics are naturally given, the latter is a kind of social practice. But neither Shaquille O'Neal nor the speed of miles per hour of cars on UK motorways records a self-amplifying or skewed accumulation of their height and speed that places them exponentially above your average Jane. The aim of Newman's survey is to *explain why* skewed distributions are "impressively ubiquitous" whereas the interest here is to unpack *what* that ubiquity across nature and social phenomena might mean. Read without Newman's caution, the readily observable and impressive ubiquity of the ME/PD tends to impress upon observers a kind of binding universalizability; namely, if ME/PD are ubiquitously present across human domains, economies, cultures, history, and any other form of randomness that could be summoned against the distribution, then we should make peace with the ME/PD rather than fight it. This was Pareto's followers' inference between peapods and economies.[23] What makes the universality of Zipf's law puzzling is its natural, spontaneous occurrence. No city planner aims to grow in mathematical proportions, and there was no NHL conspiracy to ensure that Wayne Gretzky scored 894 goals. Into this confusion steps the natural law primitivist with the claim that observability and universalizability bind us to a particular state of wealth inequality.

Definitions, Causes, and Limits

Each study is not reducible to the other, but they do have a common mathematical denominator that could help us more adequately define and explain wealth distribution. Newman, Gabaix, and Jones define the essence of the self-amplification phenomenon in terms of mathematics. Simply stated, the ME/PD were separately named disciplinary observations of the same natural phenomenon: power laws.[24] The former discovered in the sociology of science and the

latter in the field of political economy. Power laws are also known as "scaling laws" because a relative change in one variable results in a proportional (often exponentially large) change in outcome.[25] For the PD, the basic mechanism is simple: According to Charles I. Jones, "exponential growth that occurs for an exponentially distributed amount of time leads to a PD."[26] The aforementioned non-power law distributions of height and weight fall along the familiar "bell curve" distribution. Power laws are merely one of many different laws and distributions that exist in the world—up to ninety-five different kinds.[27]

If power laws are one of ninety-five distributions—or if they can be plotted in diverse ways—how do we know whether we are looking at phenomenon that exhibits power law relations rather than a skewed distribution? The short answer is through big data and careful statistical research.[28] On this element, ethicists will be forced to take the economists and mathematicians' deliverances on faith. Hypotheses about self-amplification phenomena (or the appearance thereof) need to be plotted and tested, which is already underway in economics *via* the fusion of big (historical) data and observations about wealth distribution in works such as Thomas Piketty's *Capital in the Twenty-First Century*.[29] What is needed now, *per* Newman's own warnings, are domain-specific and statistically tight analyses of economic phenomenon that move past the socialism-versus-capitalism disputes into a kind of responsible capitalism that distinguishes between merit and self-amplification effects.[30]

Since the causes and definitions of ME/PD are field-dependent, so too are the explanatory limits of these theories. In his 2004 article "Power Laws, Pareto Distributions, and Zipf's Law," Mark Newman cataloged seven "possible candidate mechanisms by which power-law distributions might arise in natural and man-made systems."[31] By his lights, the two most important mechanisms are: (1) The Yule process (yet another name for the "ME")[32] and (2) "self-organized criticality (SOC) in which a scale-factor of a system diverges, either because we have tuned the system to a special critical point in its parameter space or because the system automatically drives itself to that point by some dynamical process."[33] Again, these mechanisms purport to explain the universal element within a given power-law data set, but that same set will have particulars that contribute and modify ME, Yule, or SOC realities.

Despite these limitations on the *explanans* of ME/PD, over the past decade there has been much excitement over the potential for power laws in economics. Gabaix says, "I suggest that power laws help us explain many economic phenomena, including aggregate economic fluctuations."[34] Further, despite Thomas Piketty's dismissal of Vilfred Pareto, Jones argues that the ME/PD has potential to help explain and build on Piketty's work: "As just one example, the central

role that Piketty assigns to $r > g$ [net rate of return to capital (r) exceeds the economic growth rate (g)] has given rise to some confusion, in part because of its familiar presence in the neoclassical growth model, where it is not obviously related to inequality. The relationship between $r > g$ and inequality is much more easily appreciated in models that explicitly generate Pareto wealth inequality."[35] Contra Thiel, power laws are not the laws of the universe in the sense of a fundamental theory of nature but rather a consistent common denominator in many domains of production.

Moral Considerations

Two things are critical to note at this point, especially since they pull in opposite directions. On the one hand, for those who would prefer to see in the ME/PD of wealth a strictly social reality—that is, the social constructivist pole that insists we could simply negate these effects by altering conscious and even subconscious states—the existence of power law relations in the nonhuman world tends to mitigate against this idealistic picture.[36] There is no social constructivist remedy for solar flares and earthquake distributions. On the other hand, the limits of power laws noted above also mitigate against simply reifying power laws into absolute standards for a moral or economic discipline.[37] Both extremes—a simplistic "is equals ought" primitivist natural law theory and total constructivism—are untenable. Fortunately, there are resources in the Christian natural law and scriptural tradition that provide analogies for norming ME/PD.

ME/PD and Natural Law

Much of the confusion regarding the moral valence of ME/PD comes through a thin usage of the word *nature*—and the sparse resources economists have for distinguishing conceptually among humans-in-nature, social-nature, merely natural phenomena, laws of nature or regularities, and human norms. *Nature* is indeed a general term and can be legitimately deployed in each of these realms, but it must be adequately defined and distinguished. In this subsection, I employ the work of Jean Porter in order to model a better version of nature's laws.

In *Nature as Reason*, Porter develops a "*theological* account of the natural law, which takes its starting point and orientation from the concept of natural law developed by scholastic jurists and theologians in the twelfth and thirteenth centuries," using primarily Aquinas, among others, to construct a moral theory for contemporary perspectives and concerns.[38] In her second chapter, Porter aims to unpack Albert the Great's pithy remark—"The natural law is nothing other

than the law of reason or obligation, insofar as nature is reason"—by explaining *how* nature is both nature *and* reason.[39]

"Nature as nature" means that our world is intelligible in its operations, is open to moral reflection, and that this intelligibility and moral valance are available to us. "Nature as reason" overflows from this first commitment, because if nature or natural laws are observable, then their parameters, substance, and conceptualization can be debated and rationalized. Porter's subscription to moral realism and a chastened epistemological realism lays an uncontroversial foundation for the possibility of interpreting nature.[40] Aquinas and Porter avoid the naturalistic fallacy (i.e., an act is moral simply in virtue of whether or not it appears natural to us) by reminding us both that reason itself is a natural capacity and that there is a dynamic interplay between our prerational nature (Aquinas's "sensitive appetites") and reason. Consider the case of polygamy: One might argue that the prevalence and strength of a male sex drive demands polygamy. Neither Porter nor Aquinas argue this because polygamy has various deleterious social consequences.[41]

While Porter and Aquinas's natural law determinations are not identical, they share a common asset needed in order to chart a middle course between primitivism and constructivism. According to Porter, "Because [natural law] focuses on the complex relation between social conventions and the natural principles from which those conventions stem, a Thomistic theory of the natural law is well suited to provide a starting point for developing" a more nuanced account of the relationship between beliefs and practices.[42] Porter and the scholastics distinguish between "the naturalness of these acts, in virtue of which they are good in a sense, and their conformity to the rational standards appropriate to human nature."[43] Ethicists and economists will have to chart the same path that affirms the reality of ME/PD dynamics alongside the moral standards of human reason.

ME/PD and Scripture

In both of her books on natural law, Porter stresses the scriptural warrant for her retrieval of nature as reason. In short, Christians have long held a unity between natural law and the moral law of Scripture, and given the name and nature of the "ME"—it would be unwise to ignore scriptural applications of the natural law in the field of economics. In my survey of select patristic, medieval, and early modern commentators on the family of verses related to Matthew 25:29, they are found entirely at cross purposes with its popular economic usage today.

The "Matthew Effect" might be more accurately called a "Synoptic Principle" since the proverb appears not only in the parable of the talents (Matt. 25:29; Luke 19:26) but also in the parable of a lamp under a bushel (Mark 4:25; Luke 8:18)

and in Christ's discourse on his usage of parables (Matt. 13:11–12). Based on a survey of the commentary tradition, the following cautions are in order.

First, there is a tendency to prioritize a spiritual reading of the parable (appropriately so) that tends to elide over our questions of economic justice.[44] During the patristic, medieval, and early modern eras, commentators overwhelmingly interpreted each of these parables as teachings concerning grace and the kingdom of Christ. For example, Origen interprets the Matthew Effect in entirely the opposite direction as Merton's citation: "We appear to offer sacrifice to the Lord, but the things we offer are given back to us. God does not need anything, but he wants us to be rich. He desires our progress through each, individual thing."[45] For contemporary interpreters, the "cryptic" nature of the parable and its harsh language fit Christ's pattern of eschatological priority.[46] In short, the stakes are too high (and incoherent) for the origin verses of the ME to be utilized as proof texts for positive thinking or high return on investments. The tradition has long held that the theme is instead on Christian faithfulness and the greater demands made upon those with greater revelation.[47]

Second, if we do follow the tradition of spiritual interpretation, we will find a new problem with "inequity." While Augustine, Aquinas, and Calvin all consistently insist that our striving, working, and investing is a divine gift of grace not obtained by natural power and abilities, they nonetheless recognize that the distribution of that grace does not aim at indiscriminate equity.[48] This could be called a revelatory and experiential inductive argument. Scripture and the life of the two cities attests that there are those with saving grace and those without.[49] Calvin in particular interprets these parables as ways of stressing the gratuity of grace, which is an intuition likely to grate against modern egalitarian and equity preferences.[50]

These two cautions balance one another. On the one hand, the parable's spiritual meaning points beyond its rather facile connection with the ME. Christian ethics will need to resource not only the Synoptic passages but the whole witness of Scripture and tradition to counteract anachronistic and immoral deployments of the ME in economics. On the other hand, it will be difficult to render these passages in such a way as to make "grace" coextensive with today's concepts of "equity" or "merit." Spiritualizing the ME thus makes its relationship to PD and other power law relations in the world both loose and difficult.

Conclusion

There are very few primitive "givens" that we now take at face value, and ME/PD should not be one of them. To those on the economic left, it is true that very strong forces—power laws—forbid us from shoveling enough wealth down (consistently and efficiently) to create a Marxist utopia. Nature puts a hard boundary on what is possible for human society, and total equity would require the dubious process of working against nature without any model or precedent for success. To those on the economic right, the power laws of ME/PD forbid us from mistaking self-amplification processes for individual merit. They also demand that we take the long view of distribution patterns and their sustainability. For example, if we found that *ceteris paribus*, free economies always exemplified an 80/20 wealth distribution, then what would this entail if we found that America's current wealth distribution was even more extreme—for example, approaching a 90/10 distribution?[51] For the primitivist who is arguing that ME/PD legitimates an 80/20 distribution as an acceptable barometer, we would expect that *worse* deviations from that norm would motivate primitivists to endorse some kind of effective redistributionist policy.[52] Contrary to the ME/PD's *prima facie* conservative gloss, are we now in a scenario in which appeals could be made to ME/PD for heavy redistribution? Is that even possible?

In light of what has been argued here, there are several promising directions awaiting Christian economists and ethicists over the ME/PD. First, the ME/PD provides a nexus point—that is, natural reoccurring phenomenon—in which theology and economics can meet and exchange intellectual insights rather than policing their own borders. Both disciplines make claims about nature that can and should be checked-and-balanced by one another.[53] Second, the ME/PD provides a readily understandable metric by which theologians and economists can have a common point of departure for income inequality debates. This does *not* mean both sides have to accept my *via media* approach to the ME/PD, but at least the ME/PD represents a more determinate point upon which to argue about policy than, for example, the more abstract and dated framing of "socialism" versus "capitalism." Finally, there will be the thorny question of bridging ME/PD from theory to policy. Perhaps ME/PD is a measurable metric, but still an under-determinative one that will need to be paired with other considerations before truly ameliorating polices could be enacted.

Notes

1. Percy Shelly, "A Defense of Poetry" [1821], in *Essays, Letters from Abroad, Translation and Fragments* (London: Edward Moxon, 1840), 42–43.

2. Note that I distinguish between classic natural law theories and a "primitivist" position that is used colloquially to mean something like "scientific laws" or "laws of inescapable regularity."

3. See Makoto Nirei, "Pareto Distributions in Economic Growth Models," IIR Working Paper 9-05, Institute of Innovation Research, Hitotsubashi University, July 2009, https://econpapers.repec.org/paper/hitiirwps/09-05.htm; Xavier Gabaix, "Power Laws in Economics and Finance," *Annual Review of Economics* 1, no. 1 (2009): 255–94. Charles I. Jones, "Simple Models of Pareto Income and Wealth Inequality," 2014, http:// www.stanford.edu/~chadj/SimpleParetoJEP; idem, "Pareto and Piketty: The Macroeconomics of Top Income and Wealth Inequality," *The Journal of Economic Perspectives* 29, no. 1 (Winter 2015): 29–46.

4. See Vilfredo Pareto, *Manual of Political Economy*, ed. Aldo Montesano et al. (Oxford: Oxford University Press, 2014); Xavier Gabaix, "Power Laws," in *The New Palgrave Dictionary of Economics* (London: Palgrave Macmillan, 2008); Robert K. Merton, "The Matthew Effect in Science," *Science* 159 (January 5, 1968); George Kingsley Zipf, *Human Behavior and the Principle of Least Effort: An Introduction to Human Ecology* (Boston: Addison-Wesley Press, 1949); Mark E. J. Newman, "Power Laws, Pareto Distributions and Zipf's Law," *Contemporary Physics* 46, no. 5 (2004); Jones, "Pareto and Piketty."

5. See Jean Porter, *Nature as Reason: A Thomistic Theory of the Natural Law* (Grand Rapids: Eerdmans, 2004); Thomas Aquinas, *Commentary on the Gospel of Matthew 1–12*, Latin-English Opera Omnia (Steubenville, OH: Emmaus Academic, 2018); John Calvin, *Calvin's Commentaries*, vol. 16: *Harmony of Matthew, Mark, and Luke*, trans. William Pringle (Grand Rapids: Baker Books, 2009).

6. For an example of someone arguing on behalf of Pareto against any policy changes, see Werner Stark, "In Search of the True Pareto," *British Journal* 14 (June 1963): 103–12.

7. Here any number of noneconomic disciplinary critiques of "neo-liberalism" could be cited, but I have in mind Kathryn Tanner's concluding pages on noncompetitive economics in idem, *Christianity and the New Spirit of Capitalism* (New Haven: Yale University Press 2019), 203–19. Tanner's aim is to show "the coherence of a whole new world to be entertained as an imaginative counter to the whole world of capitalism as it presently exists and pretends to be all-encompassing, to have no limits, nothing outside itself." This article is indebted to Tanner and is an attempt to interact with those limits by pressing the boundaries rather than simply reimagining.

8. Vilfredo Pareto is famous for a variety of different economic rules, and PD is not the most prominent among them. The foremost association that most economists have with a Pareto principle is "Pareto efficiency" or "Pareto optimality." This refers to an economic state in which it is impossible to make one party better off without making someone worse off; that is, when resources are ideally maximized among all parties without detriment to a particular party. A Pareto inefficient state is a situation in which productivity outputs are not maximizing efficiency and returns. Note that Pareto inefficiency might appear to be associated with equality, but this is *not* the case. Pareto optimality is concerned with the efficient allocation of resources in a free market, but this comes with a framing problem. Inevitably economists will have to evaluate nonmonetary goods while aiming for Pareto optimality and market balance. Although Pareto optimality clearly has implications for Pareto distributions of wealth, the two should be kept distinct for the sake of clarity between the moral theologian and the economist.

9. See Xavier Gabaix, "Power Laws in Economics: An Introduction," *Journal of Economic Perspectives* 30, no. 1 (2016): 191.

10. See Vilfredo Pareto, *Manual of Political Economy*, ed. Aldo Montesano et al. (Oxford: Oxford University Press, 2014), chap. 7, §§ 11–31.

11. See Richard Koch, *The 80/20 Principle* (New York: Doubleday, 1998); Gareth Kane, *Accelerating Sustainability Using the 80/20 Rule* (New York: Greenleaf Publishing, 2014); Cal Newport, *Deep Work: Rules for Focused Success in a Distracted World* (New York: Grand Central Publishing, 2016); Peter Thiel, *Zero to One: Notes on Startups, or How to Build the Future* (New York: Crown Publishing Group, 2014).

12. See Gabaix, "Power Laws," in *The New Palgrave Dictionary of Economics*.

13. In separate studies, Piketty and Rigney denied that Vilfredo Pareto could identify his distribution as a kind of law of nature. See Thomas Piketty, *Capital in the Twenty-First Century*, trans. Arthur Goldhammer (Boston: Belknap Press, 2014), 368; Daniel Rigney, *The Matthew Effect: How Advantage Begets Further Advantage* (New York: Columbia University Press, 2010), 87–90. For a reference to Pareto's "pea pods," see Fred J. Rispoli et al., "Even Birds Follow Pareto's 80-20 Rule," *Significance* 11, no. 1 (February 2014): 37–38.

14. See Robert K. Merton, "The Matthew Effect in Science," *Science* 159 (January 5, 1968): 56–63.

15. See Derek J. De Solla Price, *Little Science, Big Science* (New York: Columbia University Press, 1963). Price himself connects his law to the work of Vilfred Pareto (49–51, 55, 61) and Zipf (51, 57–58).

16. See Zipf, *Human Behavior*, v.

17. If history is any pattern for the future, it is highly likely that "Zipf's laws" will, like its predecessors, be supplanted and/or forgotten without any clear indication of what new advance the incoming concept proffers.

18. See Xavier Gabaix, "Zipf's Law for Cities," *Quarterly Journal of Economics* 114, no. 3 (1999): 739–67. Harvard's Gabaix later made a turn in 2008 toward justifying CEO compensation *qua* market efficiency.

19. Peter Thiel, *Zero to One: Notes on Startups, or How to Build the Future* (New York: Crown Publishing Group, 2014), 82–83 (emphasis mine).

20. See Gabaix, "Power Laws in Economics," 201:

> All economists should become familiar with power laws and the basic mechanisms that generate them because power laws are everywhere. One place to teach power laws is in the macro sequence when discussing models with heterogeneous agents and sectors. The future of power laws as a subject of research looks very healthy: when datasets contain enough variation in some "size"-like factor, such as income or number of employees, power laws seem to appear almost invariably. In addition, power laws can guide the researcher to the essence of a phenomenon.… Many open questions remain about the prevalence and explanation of power laws, and in many of these areas, new data have recently become available. Along with the earlier examples of the distribution of income, wealth, firm size, and city size, here is a sampling of some other questions.

21. Mark E. J. Newman, "Power Laws, Pareto Distributions and Zipf's Law," *Contemporary Physics* 46, no. 5 (2004): 325 (emphasis mine).

22. Newman, "Power Laws," 330.

23. There is a longstanding debate regarding Pareto's research and its relationship to Italian fascism. For criticism of Pareto's data, see Piketty, *Capital*, 364–68.

24. For a basic and brief introduction, see Mark E. J. Newman, "Power-Law Distribution," *Significance* (August 2017).

25. For a more precise definition, see Gabaix, "Power Laws in Economics," 186. Gabaix defines a power law as follows: "A power law, also called a scaling law, is a relation of the type $Y = aX^{\beta}$, where Y and X are variables of interest, β is called the power law exponent, and a is typically an unremarkable constant. For instance, if X is multiplied by a factor of 10, then Y is multiplied by 10^{β}—one says that Y 'scales' as X to the power β." See also idem, "Power Laws," in *The New Palgrave Dictionary of Economics*, 912–14: "A power law (PL), also known as a scaling law, is the form taken by a remarkable number of regularities or 'laws' in economics, and is a relation of the type Y 1⁄4 kXa, where Y and X are variables of interest, a is called the power law exponent, and k is a typically unremarkable constant."

26. Jones, "Pareto and Piketty," 32–33.

27. See Newman, "Power-Law Distribution," for an example and explanation. Note that the "long tail" diagram that is listed above for Zipf's distribution of word frequency is not the only way of graphing power law relations either, there is a logarithmic plotting.

28. Again, consider Newman, "Power-Law Distribution," for an example of a social practice that by intuition might indicate a power law—email contacts—but in reality, does not.

> When should power-law distributions not be used?… Because use of the power-law distribution is most often motivated by observation, one can rarely be entirely certain of its correctness. The best one can say is that it is not ruled out by the data. There are, moreover, several alternative distributions, such as the log-normal or the stretched exponential, that can easily be confused with a power law. It is unfortunately quite common in the published literature for authors to rely solely on qualitative inspection of a log-log plot to detect power-law behaviour, and this is a not a reliable approach. (11)

For difficulties attending this procedure, see Mark E. J. Newman, Aaron Clauset, and Cosma R. Shalizi, "Power-Law Distributions in Empirical Data," *SIAM Review* 51, no. 4 (December 2009): 661–703.

29. See Piketty, *Capital*, 573–74:

> As I made clear in the introduction, I see economics as a subdiscipline of the social sciences, alongside history, sociology, anthropology, and political science.… I dislike the expression "economic science," which strikes me as terribly arrogant because it suggests that economics has attained a higher scientific status than the other social sciences. I much prefer the expression "political economy," which may seem rather old-fashioned but to my mind conveys the only thing that sets economics apart from the other social sciences: its political, normative, and moral purpose.

30. See, e.g., Frank Cowell, *Measuring Inequality* (Oxford: Oxford University Press, 2011); Anthony B. Atkinson, Thomas Piketty, and Emmanuel Saez, "Top Incomes in the Long Run of History," *Journal of Economic Literature* 49, no. 1 (March 2011): 3–71.

31. Newman, "Power Laws, Pareto Distributions and Zipf's Law," 12, see also sections A–G, 13–24.

32. See Newman, "Power Laws, Pareto Distributions and Zipf's Law," 16:

> Yule process [first reported in 1922], whose invention was, coincidentally, also inspired by observations of the statistics of biological taxa… In addition to having a (possibly) power-law distribution of lifetimes, biological taxa also have a very convincing power-law distribution of sizes. That is, the distribution of the number of species in a genus, family or other taxonomic group appears to follow a power law quite closely.

33. Newman, "Power Laws, Pareto Distributions and Zipf's Law," 24.

34. Gabaix, "Power Laws in Economics," 185. In this article, Gabaix argues that power laws could be the answer for an economic law theory that is both nontrivial and true. This is a standing objection since it was posed to economist Paul Samuelson since 1969.

35. Jones, "Pareto and Piketty," 39. Jones goes even further to state that Pareto and Piketty could be mutually enlightening: "[I]n a way that is easy to overlook because of our general lack of familiarity with Pareto inequality, Piketty is right to highlight the link between $r - g$ and top wealth inequality. That connection has a firm basis in economic theory."

36. See Rigney, *The Matthew Effect*, 89–90.

37. See Rigney's sections on "social fact" arguments and worries about assortative mating constituting a kind of "sociological law." Rigney, *The Matthew Effect*, 87–89.

38. Jean Porter, *Nature as Reason: A Thomistic Theory of the Natural Law* (Grand Rapids: Eerdmans, 2004), 5 (emphasis mine).

39. Porter, *Nature as Reason*, 53.

40. See Porter, *Nature as Reason*, 57–68.

41. See Porter, *Nature as Reason*, 74–78. Aquinas and the scholastics took into account social norms insofar as they chastened pre-rational inclinations and enabled intelligible, responsible living.

42. Porter, *Nature as Reason*, 51.

43. Jean Porter, *Natural and Divine Law: Reclaiming the Tradition for Christian Ethics* (Grand Rapids: Eerdmans, 1999), 85.

44. According to Rigney, the original idiom is much older:

> [Merton 1988] credits theologian Marinus de Jonge for tracing the idea even further into the past. De Jonge notes that "it is highly likely that [Jesus] took over a general saying, current in the Jewish (and/or Hellenistic) Wisdom circles—see, e.g., Proverbs 9:9, Daniel 2:21, or Martialis, Epigr. V 81: 'Semper pauper eris, si pauper es, Aemiliane. Dantur opes nullis [nunc] nisi divitbus' ['You will always be poor if you are poor, Aemilianus. Wealth is given nowadays to none but the rich.']"

Rigney, *The Matthew Effect*, 124n3. See also Kyle R. Snodgrass, *Stories with Intent: A Comprehensive Guide to the Parables of Jesus* (Grand Rapids: Eerdmans, 2008), 520–21.

45. Origen of Alexandria, *Homilies on Genesis*, 8, in Thomas C. Oden and Arthur Just, Jr., ed., *New Testament III: Luke*, Ancient Christian Commentary (Downers Grove: IVP Academic, 2003), 295.

46. See Snodgrass, *Stories with Intent*, 533–34: "The parable is about stewardship, but is the issue stewardship in general or specifically stewardship *in relation to the kingdom?*… [I]t is difficult to deny the eschatological intent of the parable."

47. See Snodgrass, *Stories with Intent*, 542.

48. See Thomas C. Oden and Manilo Simonetti, ed., *New Testament Ia: Matthew 1-13*, Ancient Christian Commentary (Downers Grove: IVP Academic, 2001); Thomas Aquinas, *Commentary on the Gospel of Matthew 1–12*, Latin-English Opera Omnia (Steubenville, OH: Emmaus Academic, 2018), 3–17; John Calvin, *Calvin's Commentaries*, vol. 16: *Harmony of Matthew, Mark, and Luke*, trans. William Pringle (Grand Rapids: Baker Books, 2009), 102–11.

49. Augustine, *The City of God*, The Works of Saint Augustine (New York: New City Press, 2012), bks. 11–14.

50. See, e.g., Calvin on vv. 12–13. Idem, *Calvin's Commentaries*, vol. 16.

51. The COVID-19 crisis has only exacerbated the situation. See Richard McGahey, "Covid-19 Accelerating Economic Trends, Including Inequality," *Forbes*, April 30, 2021, https://www.forbes.com/sites/richardmcgahey/2021/04/30/covid-19-accelerating-economic-trends-including-inequality/?sh=6403fb4a2b7c. See also Rigney, *The Matthew Effect*, 107–15. For data indicating the United States is pushing beyond the 80/20 distribution, see Juliana Menasce Horowitz, Ruth Igielnik, and Rakesh Kochhar, "Most Americans Say There Is Too Much Economic Inequality in the U.S., but Fewer Than Half Call It a Top Priority," Pew Research Center, January 2020, https://www.pewresearch.org/social-trends/2020/01/09/most-americans-say-there-is-too-much-economic-inequality-in-the-u-s-but-fewer-than-half-call-it-a-top-priority/.

52. An 80/20 principle is not an exact numeration of political stability or economic equilibrium, but it is at least one benchmark by which different policy partisans of income inequality can discuss a common metric. For example, the degree to which the present economy deviates from 80/20 (above or below) will correlate with the weight of argumentation from each side as to *why* redistribution should or should not take place. My thanks to Dylan Pahman for his comments on this point.

53. For an excellent template of how to proceed in this endeavor, see Neil Arner, "Apprehending 'The Human': Theological Anthropology and the Crisis of Credibility in the Social Sciences," *Journal of the Society of Christian Ethics* 41, no. 2 (Fall/Winter 2021): 367–85.