WITTGENSTEIN ON COUNTING IN POLITICAL ECONOMY

Section I: Setting the Stage for an Inquiry into the Normativity of Mathematics

> Philosophers are…interested in matters of normativity: What is it for person A to be obligated to do action B? What do we mean when we say that one ought to do something, like give to a charity? Mathematics and mathematical logic provide at least one important and, possibly simple, case. Logic is normative if anything is. In what sense are we required to follow the canons of correct reasoning when doing mathematics? (Stewart Shapiro, *Thinking About Mathematics*, 5)

I must state at the onset the obvious: I am not a philosopher of mathematics; nor am I a mathematician. Still, I have become increasingly captivated by various accounts of the purported necessity delineated by mathematical statements and proofs. Whereas many philosophers have abdicated the project of defending that empirical science can yield necessary truths or universal laws,[1] still it is typical that mathematical truths are conceived to be necessary. Therefore the philosopher W.V.O. Quine, although a thorough-going empiricist who attempted to defend mathematics on the grounds of sensory perception, still faced the burden of explaining "why mathematics was (and is) *thought to be* necessary, certain, and knowable a priori."[2] If we understand "normativity" to convey some sort of structural indispensability that may guide judgment and action, then mathematical knowledge represents perhaps the paradigmatic case of a codified, law-like system that embodies non-negotiable relations and claims, that may be intuited by the human intellect.

There is an arresting debate at the foundations of mathematics over whether mathematical objects, or numbers, have an objective existence independent from the mind. To simplify various positions on this question into two varieties, on the one hand are the "realists," who hold that the truth of mathematical statements is externally

[1] For example, W.V.O. Quine, for discussion see Shapiro, *Thinking About Mathematics*, 218,
[2] Shapiro, *Thinking About Mathematics*, 218.

determinate, even if its status is undecidable within a set theoretic or formal system: "We employ such a conception if we hold that the statement may be determinate in truth-value irrespective of whether we can recognize what its truth-value is."[3] In this school of thought, there is an assumption that there is a direct correlation between mathematicians' proofs and the non-empirically observable ontological bedrock of pure numbers. This direct correlation insures that true statements generated by theorems are actually "true" in an ideal sense. Of course, it remains the case that the hiatus between the work of the mathematician and the independent and objective realm of numbers cannot in principle be closed: we require an adamant faith in the ability of mathematicians to generate mathematical truths reflecting an actual state of mathematical affairs.[4]

A second school of mathematics, referred to as anti-realism or intuitionism, accepts that mathematical truths exist only in the mind of mathematicians: they are constructed. Such an acceptance of the imaginative work done by mathematicians would seem to be on par with Wittgenstein's emphasis of the social character of the normativities of counting, calculating, and proving. However, even given their similarities, an important difference stands between intuitionism and Wittgenstein's perspective on the source of the integrity of mathematics. For the anti-realist, there is no need to conceive of or be attached to mathematical "truth" separate from the procedures that validate it.[5] To know a mathematical fact is to have the epistemological means to test the fact through rule-following procedures that structure proofs. The intuitionist is

[3] Wright, *Wittgenstein*, 7; even philosophers of mathematics who hold a naturalistic position that ultimately mathematics should be verifiable through scientific (empirical) means, endorses numeric realism: "As a realist [P.] Maddy (1990: cha. 4, ss 5) agrees with Gödel that every unambiguous sentence of set theory has an objective truth-value even if the sentence is not decided by the accepted set theories" (Shapiro, 224).
[4] Wright, *Wittgenstein*, 9.
[5] Wright, *Wittgenstein*, 6-7.

committed to the rigorous necessity of these rule-following procedures such that their outcome is predetermined by the assumptions and principles of inference structuring the proof. Thus, intuitionists have air-tight procedures to arrive at mathematical truths which are objectively apparent to a community of practitioners.[6] Wittgenstein differs from this view in denying that proofs have lives of their own, independent from the concretely specific cases of individuals judging their conclusions: "Wittgenstein's general treatment of the topic of rule-following entails that the status of a proof, or calculation, is always in need of *ratification*."[7] By this account, human counting practices retain their shape, or consistent patterns, over time not because they are laid down by iron-clad procedural rules, but because we commit ourselves to interpreting and acting on the rules as consistently as our contingent intersubjective context makes possible.

This lack of agreement about the foundation of mathematics, over whether the objects of its investigation actually exist or not, stands in parallel to debates over whether moral systems represent truths independent from the cultures in which they are expressed. There is a symmetry between the assertion of the existence of deontological moral truths, such as the Kantian categorical imperative, and the claim of independent validity of mathematical truths; either case, so far as we know, cannot in principle confirm its verification-transcendent authority. Even if this parallel is striking, it is further apparent that whereas deontology in morals is a position marginalized by mainstream scientific approaches to human behavior, realism in mathematics is the more widely accepted status quo in philosophies of science and math.[8] This realism essentially accepts that humans have "the capacity to grasp a verification-transcendent notion of

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[6] Wright, *Wittgenstein*, 6-7.
[7] Wright, *Wittgenstein*, 128.
[8] Shapiro, *Thinking about Mathematics*, "Numbers Exist," 201-225.

truth"[9] in matters of mathematics, but doubts the same in matters of morals or ethics. By this account, even though numbers and mathematical systems are ineffable and transcend sensory perception, nonetheless we are confident that our statements about mathematics reflect an ontological basis independent from either our means of knowing or content of our knowledge. However, when it comes to moral truths, philosophers who endorse mathematical and scientific realism doubt that these statements have any validity external to the human mind or to cultural contexts.[10] We routinely accept verification-transcendence in mathematics, but not in ethics.

Granted this general privileging of the normativity of mathematics as evincing necessary, a priori, yet verification independent, truths, a philosophy of mathematics is called upon to "account for the at least apparent necessity and priority of mathematic[al knowledge]."[11] Indeed, it seems that much of the present-day celebration of scientific naturalism, that casts doubt on the reality of moral and ethical judgment, strives to present a position on mathematics that navigates the notoriously unbridgeable chasm between a priori and a posteriori knowledge. Quine, Hilary Putnam and P. Maddy are leading philosophers who have attempted this line of argumentation, ultimately seeking to preserve the nonnegotiable quality of math while grounding it on knowledge derivable from empirical observation.[12] However, this line of inquiry consistently concedes both that empiricism is irrelevant for the actual practice of mathematics, and that mathematical

[9] Wright, *Wittgenstein*, 10.
[10] It is Jean Hampton's project in *The Authority of Reason*, to argue that the normativity usually taken to be unproblematic by scientific naturalism (which typically endorses mathematical realism) is characteristically equivalent to the normative authority of moral systems.
[11] Shapiro, *Thinking About Mathematics*, 23.
[12] See Shapiro, *Thinking About Mathematics*, "Numbers Exist," 201-225.

truth is independent from our procedures of knowing it.[13] Rather, it suggests that mathematics will finally be vindicated in scientific application.[14]

Leaving aside numeric realism for the moment, I turn my attention its rival position: mathematical practice and mathematical truths are solely mental constructions that only have a life inside the mind of mathematicians.[15] Even in redirecting my attention to this alternative school of philosophy of math, I frontally acknowledge that the realist position, which in its naturalized form is by far the scientific mainstream, deserves and will get much closer scrutiny.[16] I introduce anti-realism pertaining to numbers with a quotation of the intuitionist philosopher Arend Heyting:

> The intuitionist mathematician proposes to do mathematics as a natural function of his intellect, as a free, vital activity of thought. For him, mathematics is a production of the human mind…[W]e do not attribute an existence independent of our thought, i.e., a transcendental existence, to…mathematical objects…[M]athematical objects are by their very nature dependent on human thought. Their existence is guaranteed only insofar as they can be determined by thought. They are properties only insofar as these can be discerned in them by thought.[17]

In our "God is dead," post-modern era, a social constructivist view of math, which denies the meaningfulness of assuming verification-transcendent mathematical truth, would seem to be intuitively more palatable to our scientific insistence on non-naïve realism. In this vein Heyting admonishes, "Faith in transcendental…existence must be rejected as a means of mathematic proof."[18] To be clear that this foundational debate over the nature of mathematical truths is not a mere distraction from its very practice, at the heart of the

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[13] Shapiro, 220, 224.
[14] Shapiro, 220.
[15] For discussion see Wright, *Wittgenstein*, 3-20.
[16] The sections I envision here are: "Expected Utility Theory and Game Theory as 'Ultra-Physics,'" "Pettit's Naturalized Normativity Underlying both Rational Choice Theory and Social Rule-Following," and "The Prospective Equivalence of Ontological Realism in Mathematics, Evolutionary Biology, and in International Relations."
[17] Heyting quoted in Shapiro, *Thinking About Mathematics*, 187.
[18] Shapiro, 187.

dispute lies the acceptability of the law of the excluded middle which realists readily endorse.[19] As an example of the conflict over the law of the excluded middle, consider our rule for generating an n^{th} digit expansion for the irrational number representing π. If we consider the question, "does the three digit combination '550' exist in our *n*th digit expansion," even as *n* goes to infinity, the realist mathematician affirms that it must be the case that either "550" will be found in the expansion, or it will not be found.[20] The intuitionist agrees that in a finite expansion of π, the question of whether the string of numbers "550" is found or not is decidable, consistent with the law of the excluded middle.[21] However, in the infinite case, the intuitionist denies that the law of the excluded middle has any relevance, and therefore holds that in an infinite expansion, we are unable to claim that either "550" exists or it does not. Relinquishing the law of the excluded middle has practical implications for the mathematics that may be generated; thus realism and anti-realism in mathematics at least potentially lead to incommensurable numeric practices.[22] On this avenue of thought, the adoption of numeric anti-realism would be revisionst for mathematical practice.

Conveniently, Ludwig Wittgenstein presents an anti-realist philosophy of math, consistent with intuitionism in many of its details and implications, but with the added benefit of not advocating any need to revise mathematical practice. For the rest of this section I will work to present the contours and implications of Wittgenstein's position. We can see how close the intuitionist Michael Dummett stands to Wittgenstein in

[19] For discussion see Shapiro, "Intuitionism," 172-197 and Wright, "The Law of the Excluded Middle," 142-166.
[20] Wright, 148.
[21] For discussion, see Wright, "The Law of the Excluded Middle," 142-166, and Shapiro, "Intuitionism," 172-197.
[22] "Only a repudiation of a platonist notion of logical consequence can now save us from the admission that one or the other alternative must obtain" in keeping with the law of the excluded middle," Wright, 164.

appreciating that for both math and logic are linguistic and public media. Both rely on the idea of rule-following, that "the rules for drawing inferences from a set of premises flow from the meaning of some of the terms in the premises, the so-called 'logical terminology.'"[23] Whereas Wittgenstein challenges the intuitionists' belief in the non-malleable quality of the links in a chain of inferential reasoning, they both essentially espouse the idea that math is embodied in a system of rules constructed by mathematicians. Although it is a little counterintuitive considering that the intuitionists uphold airtight processes of inference, both philosophers view proofs as inherently informal.[24] Finally, for each "[t]he meaning of a mathematical statement determines and is exhaustively determined by its use."[25] Hence, on this account, there is no objective, mind-independent property that numbers have; mathematics does not represent an autonomous realm of study. Furthermore, mathematics is not accessible as a private language, but rather as an intersubjective discourse.

In introducing the next section, "Plato vs. Wittgenstein on counting in political economy," I must first take the briefest through Plato's philosophy of the forms, of which mathematical objects were one kind. Wittgenstein in part introduces his concepts of normativity and his non-revisionist philosophy of math in response to Plato's lingering shadow over the practices of mathematics, especially in the mainstream schools of realism. Reminding ourselves of Plato's objectivist account of the forms, which include "the Good", is an apt starting place because we see the irony in that objectivist metaphysics has for the most part fallen out of favor, apart from respecting mathematical objects and the relations inhering between them. Plato's shadow makes it possible to

[23] Shapiro, 190.
[24] Shapiro, 190.
[25] Michael Dummett, quoted by Shapiro, 190.

label anti-realism in mathematical philosophy as "platonist," and it is this phantom that absorbs Wittgenstein's attention throughout his *Remarks on the Foundations of Mathematics*.

In becoming familiar with Wittgenstein's attitude toward math, an initial point is to try to understand his position that mathematics is instantiated as a language game, and embodies a normativity similar to other language games that may include grammar, social norms, parlour games, and sports. For Wittgenstein, mathematics has no privileged access to transcendent "necessities" any more than do other human activities. In fact, for Wittgenstein, our sense that mathematical truths are necessary actually expresses our deep need for mathematical laws which are no more than conventions.[26] If we think of Thomas Hobbes assertion that mathematics and astronomy are as liable to rampant debate and controversy especially among the learned, and his argument that a key role for the sovereign is to establish standards of conduct from the rule of law to weights, measures, and calendrics, we see that today a disembodied corpus of mathematical "law" serves to anchor numerous everyday practices in political economy.[27] In the next section I will attempt to provide an account for how a belief in a residual platonic basis as a justification that mathematical statements are objectively true or false, although perhaps arising out of a felt need, actually mistakes the source of normativity underlying counting and calculating to be absolute truth rather than human convention.

It may seem that Wittgenstein's philosophy is part and parcel of the movement toward scientific naturalism insofar as he extends the dethronement of human claims to

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[26] Wright, *Wittgenstein*, "'The Deep Need for the Convention,'" 94-113.
[27] Cite Hobbes; this is an overriding topic in Theodore Porter's *Trust in Numbers*.

authoritatively have knowledge of various provinces of the world to not only suggest our inability to establish necessities in social norms or physical law, but also that the necessities we chart out in mathematics are contingent artifacts of practical activities. However, in my view, rather than bring mathematics down from its lofty a priori plane to the level of a posteriori experience, thereby completing one more revolution in decentering humans and their knowledge from a pivotal fulcrum in the universe, Wittgenstein is best considered as giving us the basis for realizing that the species of normativity we already have in math, even though we mistakenly ascribe to objectivity, is more than sufficient to securely ground all manner of other human practices including language and social rules. For Wittgenstein, much human intercourse distills down to rule-following exercises that all share an immanent normativity. By implicating mathematics in this anti-realism, and relinquishing an undue faith in the necessity of mathematical truths to bootstrap humans up to the semblance of having secure scientific knowledge, Wittgenstein moves to place all the domains of rule-following on one basis that does not discriminate between scientific laws and mathematical truths on the one hand social laws and moral predilections on the other.

In exploring the character of mathematics as a language game that perhaps best represents our paradigmatic case of "rule-following," Wittgenstein suggests that the laws of mathematics stand as imperatives and commands, and not as objectively verifiable truth claims: "Mathematical discourse is not fact-stating; its role is rather to regulate forms of linguistic practice."[28] If we distance our understanding of the source of mathematical normativity as flowing from objective objects and relations that exist outside our minds and practices, then we may understand that mathematical statements

[28] Wright, *Wittgenstein*, 157.

have the character of declarations, imperatives, or commands in the form of rules that we assent to follow. The intuitionist Dummett, whose position Wittgenstein's resembles, refers to mathematical statements as quasi-assertions:

> Quasi-assertions are declarative sentences which are not associated with determinate conditions of truth and falsity but share with assertions properly so-called the feature that there is such a thing as *assenting* to them; where such assent is communally understood as a commitment to some definite type of linguistic of non-linguistic conduct, and receives explicit expression precisely by the making of the quasi-assertion.[29]

The subtle aspect of understanding the distinction between mathematical statements as in principle verifiable against an objective reality, versus having the character of being ratified by voluntarily acceptance, is that although we seek to preserve some sense of non-arbitrary structure, we must locate its apparent "necessity" in our discretionary compliance rather than in some facet of extra-mental reality. This necessity has the form of willingly binding ourselves to a normative correctness that is systemically grounded in our practice. Hence we have the sufficient leverage to not only ask "[o]f someone who is trained [in a specific type of rule-following] 'How *will* he interpret the rule in this case?'", but further to raise the question, "How *ought* he to interpret the rule for this case"?[30]

This view of mathematics has having a humanly devised command structure instead of a structure insured by objective reality alters our picture of the type of normative guidance underlying mathematical judgment. Instead of being guided in making mathematical statements by facts, we consider that "all mathematical propositions [are] expressed in the imperative, e.g., 'Let 10 x 10 be 100.'"[31] The

[29] Wright, *Wittgenstein*, 155.
[30] Wittgenstein, *Remarks on the Foundations of Mathematics*, V-9, p. 267.
[31] Wittgenstein, *RFM*, V-17, p. 276.

significance is that this depiction of mathematics makes the consistency of its structure dependent on voluntary commitment to uphold conceptual relations in specific ways:

> Such an account is exactly what we should intuitively propose for sentences expressing the making of a promise. No one would ordinarily suppose that the use of sentences of the form, 'I promise to…' is best understood as the making of a statement, true or false; though their being prefixed by 'it is true that…' is grammatical sense. Rather such sentences express explicit assent to an undertaking, and their occurrence as antecedent in a conditional is to be understood as the hypothesis of such explicit assent.[32]

The promissory quality, then, of mathematical normativity is that mathematical rules suggest what we "ought to conclude," and in participating in these rule-following exercises we accede to draw the conclusion implied by the rule. It is not that some feature of an objective world of numbers intercedes to form the basis of our judgment in a necessary fashion. Rather, in mathematical rule-following, we agree to abide by the rules as prefiguring or commanding our judgment. If we consider the role proofs play in mathematics, "it marks not a discovery of certain objective liaisons between concepts, but something more like a resolution on our part so to involve them in the future."[33]

If our understanding of the normativity structuring apparently necessary truths in mathematics rests on our commitment to follow the rules of mathematics, then it is possible to see that the rule-following nature of math is little different from other rule-following institutions throughout our society. This opens the possibility of considering that social-norms that stand as a system of rules have as much sanctity as do the rules of mathematics. Typically, social norms are regarded as subject to preference; either an individual prefers to follow a social norm or not; if she chooses to follow a social norm, this is because she prefers to do so. However, in the case of mathematical judgment,

[32] Wright, *Wittgenstein*, 157.
[33] Wright, *Wittgenstein*, 135.

preference is seldom invoked as a source of decision over the result of a calculation or proof.

This recasting of the foundation, as it were, of mathematics from fact and objective truth to socially constructed and ratified laws suggests the possibility for drawing a parallel between legal systems of rule-following and mathematical systems. In his essay, "The Groundless Normativity of Instrumental Rationality," Donald Hubin argues that neo-Humean instrumentalists "must engage in the same 'lowering of expectations' [of the source of normativity of instrumental rationality to the same level] that the legal positivist must."[34] For Hubin, practical rationality, of which instrumentality is part, is not an objective matter. In making his point, he draws on legal positivism's retreat from natural law theory, and quotes H.L.A. Hart to expand on this view:

> We would need the world 'validity', and commonly only use it, to answer questions which arise *within* a system of rules where the status of a rule as a member of the system depends on its satisfying certain criteria provided by the rule of recognition. No such question can arise as to the validity of the very rule of recognition which provides the criteria; it can neither be valid nor invalid but is simply accepted as appropriate for use in this way. To express this simple fact by saying that we assume, but can never demonstrate, that the standard metre bar in Paris which is the ultimate test of the correctness of all measurement in metres, is itself correct.[35]

Hubin is making the point that even though a legal system provides a normative basis for action, it cannot ground its ultimate principles. Likewise, he suggests, that although instrumental rationality can suggest actions, given ultimate ends, that this is a normativity internal to the principles of connecting means and ends as subjectively understood by the agent. I am reworking Hubin's parallel between positive law and instrumental reason to contrast a realist account of math with an alternative declarative understanding. In an

[34] Hubin, 466.
[35] Hubin, 463.

anti-realist mathematics, the binding quality of rules only holds insofar as we assent to them.

For the reason that natural law theory and other expressions of transcendent normativity have long been suspect, it seems intuitively plausible to grant this change in perspective to our mathematical enterprises. In this case we are invited to explore the implications of this view for directly comparing political rule following and social norms with mathematical proof and calculation. In putting forward what I perceive the implications may be, I present an encompassing hypothetical position to put on the table the possible stakes; subsequently I will work to delineate the details pinning down the plausibility of this account.

It has traditionally been the case the social and political normativity has been viewed as of a lesser pedigree than instrumental and mathematical normativity insofar as the former is conditional, and the latter is non-negotiable. For example, Phillip Pettit provides an explanation for how social norms may be derived from instrumental agency as the former is conditional on individual rational self interest. John Rawls was widely criticized from within rational choice theory for placing action according the "the reasonable," which included the political theoretic concept of fair play, on par with agency conforming to the dictates of expected utility theory.[36] It was not automatically obvious from within rational choice theory that agents had a duty to uphold the rules of government if they did not further an agent's ends in each and every circumstance of action. Therefore, without some sanctioning device that alters payoffs, the rule of law does not in and of itself provide a reason for action that trumps agents' preferences over

[36] John Rawls, "Justice as Fairness: Political not Metaphysical," *Philosophy and Public Affairs*, 14:3 (summer, 1985), 223-51.

end states. Rawls concludes of his approach to justice as fairness, "There is no thought of trying to derive the content of justice within a framework that uses an idea of the rational as the sole normative idea."[37]

I am suggesting that mathematics, in any form, but even more specifically as it is harnessed to anchor all manners of institutions in political economy that depend on "accurate counting" for their functioning, embodies the normativity of Rawls' "reasonable" as opposed to the rational.[38] By Rawls' description, "if the participants in a practice accept its rules as fair, and so have no complaint to ledge against it, there arises a prima facie duty…of the parties to each other to act in accordance with the practice when it falls upon them to comply."[39] Most of us accept the normativity of mathematical rule-following automatically out of habit or a sense of duty. We do not at first perceive that this virtually innate compliance cuts across the grain of the competing normativity of instrumental agency which recommends counting in one's favor when one can get away with it. In fact, considerations of expected utility do interrupt counting practices in cases of embezzlement, fraud, corruption, and ballot box stuffing. The normativity of counting and calculating represents the logic of appropriateness and not the logic of consequences. Adherence to mathematical rules confines judgment; judgment is not a function of preferences over outcomes.

Counting practices throughout political economy resemble the rule of law insofar as they do not an independent object or autonomous truth-value separate from the rules constituting them. Although most of us do not actually determine, or even consent to, the

[37] Rawls, "Justice as Fairness," 237.
[38] For a discussion of the distinction between the rational and the reasonable in Rawls, see Rawls' "political not metaphysical" essay, and Amadae, *Rationalizing Capitalist Democracy*, 271-3.
[39] Rawls, "Justice as Fairness," 60.

rules governing these procedures in banking, insurance, taxation, inheritance, or elections, still there is an evident presumption that one accounts in accordance to the rules free from considerations of our obvious interest in the outcomes. Much like Rawls' formulation of "the Reasonable," most of us have been conditioned to accept, or even to reflexively consent to, an inherent necessity of counting accurately.

Section 2: Plato vs. Wittgenstein on Counting in Political Economy

1) There is a residual Platonism that informs the everyday, mundane, practice of counting relying on the rules of inference. This Platonism may be characterized by Wittgenstein's depiction of "ultra-physics": "Logic is a kind of ultra-physics, the description of the 'logical structure' of the world, which we perceive through a kind of ultra-experience." (*Remarks on the Foundations of Mathematics,* I-8). Putting together Plato's view of mathematics as pure theoretical knowledge characterized by "what holds of necessity," with contemporary faith in the supernatural order of logic and mathematics as an embodiment of absolute necessity, it may be surmised that Wittgenstein challenges the role that this residual Platonism plays in ordinary life.[40]

2) Accepting that Wittgenstein is not a revisionist philosopher, and yet warns of our routinely misplaced faith in a perception of the extra-ordinary necessity of mathematics and logic, it is worth asking what he deems to be specifically "pernicious" about this wrongful understanding. Quoting Crispin Wright, "For Wittgenstein…it is a dangerous error to think of pure mathematics as descriptive of some objective domain. It is an error which he thinks affects our entire way of thinking about mathematics and which leads us to give to its results a skew and erroneous form of expression."[41] My goal in this paper is to identify the "dangerous" implications of false assuredness in the transparent and autonomous truth of "pure mathematics" and "pure logic." I pursue this inquiry by setting forth two archetypes for a political economic order: one based on a residual Platonic faith in logical inference and counting procedures; the other based on Wittgenstein's *Remarks on the Foundations of Mathematics*.

[40] Relying on Allan Silverman's reading of Plato in his current manuscript, "Divine Mind", p. 11.
[41] Wright, *Wittgenstein*, 5.

3) Whether or not it is true that pure math and logic reflect the actual structure of the universe, we can be sure that counting practices and calculation procedures structure political economy. This is clear in banking, insurance, credit and interest, accounting, stock markets, dividends, actuarial tables, taxation, welfare programs, elections, weights and measures, and property rights. We may consider counting in political economy as a form of applied math that is inherently contestable and contested. This contestation may occur both in the application of specific rules and in the selection of rules. One view of applied math, consistent with a residual Platonist faith in the mathematical order of the universe, is that applied mathematics differs from its pure progenitor in pertaining to the impure realm of becoming and change, and by being embodied in social contexts that are informed by interests. Therefore applied math is a twice fallen version of pure math. First, because abstract math can be fitted only loosely onto the empirical world of experience. Second, because parties applying math may have vested interests in the outcomes of their counting procedures. As economists assume: it is axiomatic that individuals prefer more to less; there is a continuous incentive for individuals to "count in their favor" if they can get away with it.

4) Many of the counting procedures structuring political economy have no independent measure of truth apart from in the accurate application of the rules set up to govern these practices. There is no "Platonic victor" of an election; there is only a victor specified by counting rules that are legally mandated by an institution. Referring to the current U.S. presidential primary race between Senators Clinton and Obama, BBC World News quotes a political scientist as observing: "The long and short of the debate over the popular vote is this - no-one is likely to agree on exactly what it is, or how it should be

counted." [42] Similarly in banking, stock markets, and accounting, there is no Platonic standard that dictates the true result of these counting practices underlying common social forms. We only have the rules we created to determine how to count accurately in these various situations. Property rights as adjudicated by states are fraught with contingencies of taxation, changing natural boundaries, rules of inheritance, and rules of eminent domain. Similarly, with commodities, given that they must be certified both by grade and quantity, all manners of artifice are required to maintain standard weights and measures, and tests of quality.[43]

5) In order to compare a political economy relying on a residual Platonism to guide its practices of counting, and one wholly relying on Wittgenstein's *Remarks on the Foundation of Mathematics*, I first point to a difference the two world views have in drawing boundaries between ethical and non-ethical normativity; the two world views propose a different boundary between so-called non-problematic, self-evident normativity, and debatable ethical normativity.[44] In a Platonic world, pure math and logic have a privileged status of self-evidentness that evades social practices. Even recognizing that applied math is only an imperfect version of pure math, and that it is sullied by competing interests that may add bias, still in their application counting practices rely on an underlying pure mathematical structure which supplies an ideal

[42] Larry J. Sabato, "View Point: The Dubious Popular Vote," *BBC World News*, April 28, 2008.
[43] (Theodore Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life*, Princeton UP, 1995).
[44] Whereas Jean Hampton (*The Authority of Reason*, Cambridge University Press, 1998) draws attention to the usually assumed divide between instrumental reason as non-problematically normative, and other forms of practical reason having contested sources of normativity, Stewart Shapiro clearly identifies that the normativity of math and logic is only a special case of all sorts of normativity, including that underlying political obligation (*Thinking About Mathematics*, Oxford University Press, 2000, p. 5).

benchmark for practical approximation.[45] Across the divide from pure mathematics and logic are the socially normative exercises such as contracting, promising keeping, and political obligation. These two realms are forever separated by the association of mathematical fact, or "is," with the former category, and social "ought" with the second category. It is in part this tacit or explicit assumption of access to authentic mathematical facts that Wittgenstein questions throughout *Remarks on the Foundations of Mathematics*.

In a thoroughly Wittgensteinian political economy, without a hard and sharp division between "pure math" underwriting applied counting practices on the one hand, and a social universe of voluntary rule-following on the other, all practices or games share a similar rule-following structure. For Wittgenstein, there is no privileged, direct access to esoteric math and logic, or to pure counting informing applied mathematics.[46] All rule-following performances share a common normative base, no manifestation of which has a super-natural, verification-transcendent, connection to a directly intuited ultra-physical structure of the world. Thus, for Wittgenstein, the pernicious quality of residual Platonism displaces the normative rule-following work of keeping political economy (our social practices) intact through participatory conformity to intersubjective practices that have lee-way for alternative judgments and interpretations, to a false belief in inexorable and objective mathematical necessity.

6) At this juncture it may be argued that to throw doubt onto mathematical rule-following serves little more purpose than to mire applied mathematics into a post-Modern

[45] For an analogous argument about our everyday manner of assuming an objective reality underneath measuring procedures, see Crispin Wright, *Wittgenstein on the Foundations of Mathematics* (Cambridge: Harvard University Press, 1980, 76-77).

[46] Neither, against the intuitionist school of mathematics, are there indubitably secure rules of inference that predetermine their use…but this is a separate strand of argument.

skeptical paralysis. After all, if counting in political economy, despite its applied and contested nature, works reasonably well as it is, then why attempt to impugn it with what may be regarded as a skepticism that its rules can be readily applied within a stable consensus. Applied mathematics has worked and is working. Why the need to direct a skeptic's glare upon it, other than to spread the blight of moral relativism to the sphere of mathematical precision? It seems to be this very worry that has, thus far, left mathematics safely out of the scrutiny of post-Modern scholarship. Both Martin Hollis and Jürgen Habermas are content to let mathematical truths retain their Platonic luster as a safer bet to anchor their own projects of shoring up other forms of social knowledge.[47]

7) From various angles of analysis, Wittgenstein consistently insists that math and logic are rule-following practices no different from any others that organize "games," or life-forms throughout human society. For Wittgenstein, there is no rarified realm of pure numbers underlying all specific instances of counting. He asks, "what does the peculiar inexorability of mathematics consist in?" He replies, "For what we call 'counting' is an important part of our life's activities. Counting and calculating are not…simply a pastime. Counting (and that means: counting like *this*) is a technique that is employed daily in the most various operations of our lives."[48] Both Wittgenstein and the residual Platonist agree that applied counting is not ideal, pure counting. However, they differ in that Wittgenstein cuts the umbilical cord between practical math and Platonic pure math suggesting that instead of the practical being a mere shadow of the pure, the practical in its full glory is both all we have, and is sufficiently praiseworthy and assured in its own right.

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[47] (Jürgen Habermas, *Theory of Communicative Action*, Vol. 1, Beacon Press, 1984,273-337; Martin Hollis, *Philosophy of Social Science: An Introduction*, Cambridge University Press, 1994).
[48] Wittgenstein, *Remarks on the Foundations of Mathematics*, I-4.

Wittgenstein and the Platonist approach the practical value of counting from different directions. Wittgenstein calls our attention to the endless drills we were subjected to as children to learn to count in a precise way: "And this is why we learn to count as we do: with endless practice, with merciless exactitude; that is why it is inexorably insisted that we shall all say 'two' after 'one', 'three' after 'two' and so on." Whereas the Platonist has faith in having a direct access to the ultra-physical structure of the universe that bequeaths pragmatic success to those who master it, Wittgenstein inverts the hierarchy suggesting that we count because it pays, not that counting is true and, as a ancillary attribute, affords worldy success. Wittgenstein queries, "But is this counting only a *use*, then; isn't there also some truth corresponding to this sequence?" He answers, "The *truth* is that counting has proved to pay." He again asks, does this imply that "'being true' means: being usable (or useful).'" He clarifies, "No, not that; but that it can't be said of the series of natural numbers—any more than of our language—that it is true, but: that it is usable, and above all, *it is used*."[49]

For the Platonist, our direct intuition of the ultra-physical logical and mathematical structure of the world grants us practical success: truth is secured by super-ordinary intuition; and it is useful. However, according to Wittgenstein, we have no faculty that can directly intuit the transcendent or immanent structure of the universe; all we have is everyday, open-ended practices based on rule-following. Each step of a rule-following exercise is contingent on attentive participation and interpretation. As much as we are not guided by "rail-road tracks to infinity" in our application of rules, still this openness and lack of strict guidance does not signify arbitrary chaos. Each of our counting practices must have practical value to us, or we would not engage in it. Instead

[49] Wittgenstein, *Remarks on the Foundations of Mathematics*, I-4.

of stipulating independent and useful “truth,” Wittgenstein focuses our attention on contextualized practices with no externally accessible standards of validity.[50] Although it may seem that he is suggesting either a consensual basis for mathematical truth, or a pragmatic basis in useful application, he rather is leaving our trust in mathematics intact, but he subtracts the added leap of faith that it embodies unconditional necessity. This is why he repeatedly challenges us to see that the Platonic residue, or this hankering after “an *absolutely* trustworthy calculus” (*RFM* VII-13) represents an article of dependence that serves no more purpose than the training wheels on a bicycle.

8) Given that the training wheels on a bicycle seem relatively innocuous, we again must try to understand how they could be insidious: what is wrong with a residual Platonic faith in mathematical truth if it gives our counting practices their stability of uprightness? To follow this metaphor, anyone who has actually ridden a bike with training wheels can testify that they do, indeed, guarantee stability and they do prevent tipping over. However, if relied on, they also hamper the attainment of actual bicycling which requires balancing on two wheels and sufficient forward velocity to stabilize the cycle. A person who requires training wheels to remain upright on a cycle is most likely either stationary, or making very little forward progress: he is not actually cycling. This is the predicament with our attachment to residual Platonism in political economy. It is not the training wheels of belief in an absolute mathematical certainty that keeps our counting practices in political economy in working order. In fact, the more reliant we are on this faith in pure math, the more hindered we are in grasping that all sources of normativity throughout political economy have the same status of being humanly

[50] By Crispin Wright’s reading (*Wittgenstein on the Foundations of Mathematics*), the implication of this is far-reaching, Part I, Chapter 6, “The Deep Need for the Convention,” 94-113).

secured. Holding on to mathematical certainty as other-worldly, and incorruptible by material interests, blinds us to the shared normativity of all social practices from contracting and recognizing property rights to counting.[51]

9) Relieved of the Platonic package-deal, that combines self-evident ultra-physical truths with their direct usefulness in human afairs, we may reappraise our former bifurcation of the world into one domain of certainly knowable objects, and another domain of socially relative routines or customs. Once we gather that all counting practices are tethered by a commitment to applying the rules that govern them, then we appreciate that all manner of counting in political economy, from weights and measures, to accounting, and electoral votes, are gain their transparency from the participatory action of members of the community. The correctness of counting is not secured by a direct correspondence to transcendent mathematical truth, but rather by the conscientious judgment of practitioners.

10) We are frustrated in our misplaced belief in a Platonic ultra-physics account of math and logic because we fail to give due recognition to the mundane sacredness of rule-following practices that structure our institutions. Instead of mistaking the sacrosanct to be found in the direct apprehension of pure mathematics, we realize that the establishment of rule-following communities that give rise to all types of counting practices and logical inference, not to mention contracting, contracting, and property rights, is the expression of a transcendental ability of people to intersubjectively create joint meaning systems that coordinate actions. The normative guidance of regular judgment is not interjected from an external source of validity. Rather, it flows from

[51] David Bloor makes this comparison explicit in *Wittgenstein, Rules and Institutions*, Routledge, 1997, Chapter 9.

performative virtuosity in the company of others. Counting ballots, although not stipulated or predictable in advance by a Godly command or omniscience, can only be performed by commitment to law governed procedures of how to count.

11) Political economy marred by residual Platonism leaves the door open for the idea that even though mathematical truth may be directly intuited, and is directly useful, that it can be subject to manipulation through deception. In Habermas' formulation, strategic action is parasitic on truth. In other words, any misuse of the truth through manufactured deception must be parasitic on there being a truth in the first place. Thus, even though we can be sure that cheating on tax forms, and in card games, may be prevalent throughout political economy, the enduring faith in an ultra-physics account of math holds that cheating exists on top of a bedrock standard of true counting. The abuse can only exist alongside, and as a function of, there being a true fact of the matter. A person cannot "cheat" on her taxes, on her accounts, or in a card game, unless there were a clear standard of what the true or fair practice should be; otherwise fair play could not be distinguished from foul play.

In Wittgenstein's formulation, cheating cannot be predatory on pure counting, as the latter does not exist. "Counting in one's favor," though it may be tempting, is not an abuse of exacting standards. Instead it signals the breakdown of the rule-following practices that constitute social order. As long as I believe my miss-counting ballots in an election simply skews the representation of individuals' votes, I may be tempted to engage in misconduct. As long as I remain confident that "counting strategically" is merely a matter of manipulating an in principle well-defined system, I hold that my actions may alter a specific outcome, but that they cannot tamper with the fundamental integrity of society. I argue that in Wittgenstein's world of action, deviation from standard counting procedures in order to press one's will onto the world underscores the estimable quality of joint actions expressed in basic grammar and math: they are not prized because they assert transcendent truths. Rather we learn to count together because this activity is the minimal requirement to engage in the joint activities that bind society. Rather than have elite elders or statesman who are able to count for everyone, it is crucial that everyone learns to count for himself among and with others. Wittgenstein frequently remarks on the routine drills students are subjected to in learning rule-following practices. This training enables us to participate in social practices, and ultimately to alter the very rules giving form to the practices.

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