Special Issue on Jane Guyer's *Marginal Gains: Monetary Transactions in Atlantic Africa*

The Telling Challenge of Africa's Economies

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Abstract: This contribution to the special issue of *ASR* on Jane Guyer's *Marginal Gains* (2004) takes up two recent, and radically different, constructivist contributions to the field of economic sociology—those of Phillip Mirowski and Michel Callon. The article makes use of *Marginal Gains* to interrogate both these analytics, asking if they can meet the challenge posed by the diversity and multiplicity of African popular economic practice.

Introduction

Who are the experts in the economies of Africa? Many in Africa would claim that those in commerce, who in multiple ingenious ways achieve marginal gains, are the real experts. However, this claim might be strongly contested by those economists who work for national and international institutions like the World Bank and the International Monetary Fund, and who regularly advise African government officials and big business. Jane Guyer's book *Marginal Gains* (2004) unambiguously announces the arrival of another group who might claim expertise: anthropologists and sociologists who study economies, and for whom the activities of the former two groups are

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foci of interest. I see Jane Guyer and the anthropologist colleagues she characterizes as generating a cultural literature on value and markets as participating in a common enterprise with writers in economic sociology whose work I know from my institutional location in science studies.

A decade or so ago a few philosophers and sociologists of science began writing about economies and economics. This turn in the discipline caught many in science studies by surprise; previously, theorizing economies had been seen as the domain of economics, while theorizing economics was the domain of social theory. It seems the expanded scholarly gaze of science studies was sparked not only by the crisis in Marxian analysis and the ascent of the market to the commanding heights of what formerly had been the mixed economies in Europe and America. It was related also to the reemergence of the recognition of science as an economic good and the demise of the notion of science as purely a public good, a perception buttressed by a cozy Cold War agreement trading the political neutrality of the U.S. scientific establishment for Department of Defense dollars (Ross 1996).

The early 1990s saw the resurfacing of puzzles that have circled around science since its beginnings: the economic status of science and its products; how science is an economic activity; and the socioeconomics of scientific research. These questions have been pursued in theorizing the organization of markets in the context of the ascendancy of the neoliberal economic agenda, in particular focusing on the role of science and new technologies. The analytics that have emerged are designed to interrogate economies that take for granted the pervasive and underlying roles of science and technology, economies that most see as very different from the popular economies of Africa.

Prominent in this subfield today is the work of Phillip Mirowski (1989, 1990, 1991, 2004) and Michel Callon (1998a, 1998b, 2005). For many coming across their writing for the first time they might seem to have much in common. While Mirowski is interested in articulating a social theory of value, Callon is concerned with describing the workings of markets using the resources of a "retooled sociology of translation" (perhaps better known as "actor-network theory"). Both approaches can legitimately be labeled as constructivist. On this basis both seem to offer some useful resources in meeting the telling challenge of Africa's economies: according to Guyer, "a general constructivist theory fits Africa better than others, if only because it is far less likely than others to make Africa look like a pathological departure from a standard model based on Western experience and institutions" (2004:172).

By "the telling challenge of Africa's economies" I intend two different meanings. First, in their sheer diversity and multiplicity African economies are bewildering, as Guyer reminds us several times. They are a challenge to tell—to describe, or account for. They constitute a challenge in seeming to elude the categories of economic theory. Second, the very struggle to

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account for African economies is telling—revealing. Their continued existence constitutes a hardest-case challenge for established economic understandings. Of course, the two forms of challenge are intimately linked. The adequacy of general terms as descriptors is an expression of salience of the generalization they embed; the theory-laden-ness of observation is inescapable.

Jane Guyer's *Marginal Gains* (2004) presents itself as taking up both aspects of the challenge, progressing further with the first than with the second. Indeed an impressive articulating operation unfolds in parts 2 and 3 of the book. Yet despite the very considerable accomplishment of the book, Guyer intuits that this is only a first step in taking on the telling challenges of African economies, a "clearing the way for going further" (2004:23). I make use of *Marginal Gains* not so much as a lens through which I expect to see a cleared terrain, but as a tool for examining two analytic techniques that their originators claim are capable of producing guides to terrains that bear at least some resemblance to that of African economies. How might these analytic techniques be useful in this much more challenging terrain? And perhaps more important, where are their limits? How might they confound the project of elucidating the workings of African economies?

In this article I read the work of two theorists through the lens of *Marginal Gains.* My motivation for doing this grows out of concern that the ongoing perception of the exceptionalism of African economies can feed into a general pessimism about their prospects. As Guyer puts it, "tolerance of noncomprehension works on a threshold principle: so far, no further. By the 1990s, the state of scholarship and the state of the world showed that the popular economies of Africa had passed that threshold. General and specialist media alike started using apocalyptic terms: 'the hopeless continent' (cover of *The Economist,* Dec 9–16, 2000)."

This unfortunate attitude is reminiscent of an episode in the 1970s having to do with the concept of "African thought." Back then the perception of a continuing inability to satisfactorily explain, in Western terms, how "African thought" is different from that of the West led to a widespread assumption, even among well-meaning commentators, that "African thought" is primitive thought (see Verran 2001:11–14). Yet, as I show in *Science and an African Logic* (2001), the fault that obscures the West's view of "African thought" lies not in Africa but rather in the analytic framing by Western scholars. In a similar move, by mobilizing the alternative analytic framings of Mirowski and Callon, I hope to briefly sketch approaches that can begin to bring Africa's popular economies into focus for Western observers and thus begin to explicate their difference. Necessarily it involves challenging some established concepts of economics, and this does not make for easy reading.

I have a second motivation of a more theoretical kind in this paper. I am concerned with bringing into better focus a form of empiricism that is currently underrecognized in the academy. This is a form of empiricism that is crucial for identifying the continuities between Africa's popular economies and contemporary global economies, a form of empiricism common to both scholars and practitioners—in this case, economic anthropologists and economic agents like Nigerian "Market Madams." In the past this form of empiricism was systematically written out of academic products in an effort that Bruno Latour (1993) calls "purification." Currently the need for purification, and hence the need to show that scholarship conforms to classic empiricism, is being stripped away as, among other pressures, neoliberalism reforms the contemporary academy. But this "liberalization," which, importantly, enables us to connect, is a double-edged sword, dangerous for all concerned. As scholars we need to take care to recognize and theorize the form of working empiricism that in the past has been taken for granted and deleted from academic products.

I begin by outlining Mirowski's social theory of value, and move on to showing that while it can help explain some of the apparent peculiarities of a particular sector of African economic life, vast arenas of Africa's popular economies lie outside the grasp of this approach. Indeed African economies become even more inexplicable if we take Mirowski's analytic to its logical conclusion. I then elaborate briefly on Michel Callon's notions of markets as working through tensions of entanglement and disentanglement as products are adjusted, iterated, and transformed, metamorphosing across series of interfaces. Examining a particular episode described in Guyer's *Marginal Gains* through the framing articulated by Callon's project, we see that the radically alternative approach of Callon is capable of bringing the everyday life of West African markets into analytic view. We begin to see continuities between them and contemporary global economies, including the global economy of the academy. From this standpoint we are then in a position to make use of the insights that came from pushing Mirowski's project beyond its limits.

I see the theorizations of Mirowski and Callon as complementary although ultimately incommensurable. They stand in relation to each other as the first and third chapters of each of the parts in my *Science and an African Logic*: a foundationist relativist analytic (Mirowski's social theory of value) set against an analytic that takes worlds as emergent and relational (Callon's vision of the market as an economy of ongoing product modification). They express alternative metaphysical frames.

Mirowski's Social Theory of Value

In this section I briefly consider Mirowski's social theory of value. In the next section I use *Marginal Gains* as a lens for interrogating this analytic approach, asking if it might contribute to a possible next step in an anthropological or sociological study of Africa's economies.

An alternative value theory is the crux of Mirowski's constructivist critique of the orthodoxy of contemporary economics' neoclassical theory. Suggesting that we "live in an era when most orthodox economists make a mockery of most of what is signified by that protean term 'value'... and paradoxically are rewarded handsomely for it" (1990:687), Mirowski claims economic orthodoxy

> delights in debunking analytical statements about value. It instinctively disbelieves any expertise other than that embodied in the "market." The height of self congratulation for such an economist is to deploy science (which is automatically equated with a simple deterministic mathematical model) to contradict what common sense, canons of morality, or the wisdom of some elect might dictate.... It would seem the orthodox economist is that most celebrated of adolescent culture heroes, the rebel without a cause.
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> But no: here the orthodox economist must halt and venture no further because to question what species of value the market ratifies is to unravel the entire exercise.... [It would] contradict the mathematical structures that undergird neoclassical theory.

Playing this game of contradiction, the orthodox economist can "claim that value is idiosyncratic and unfettered; and simultaneously that value is determinate and scientific and tough-minded and irrefutable" (1990:688). Mirowski aims to "initiate an alternative to the neoclassical theory of value[,]... a reconceptualization beyond discussions of methodology to actually frame an alternative mathematical formularization of the notion of value" (1991:565).

As Mirowski sees it, the articulation of a theory of value that can take seriously the roles of history and culture, and avoid hiding the central contradiction in economics theory, involves attending to three elements. The first of these, "the institution of value" achieved through the workings of "conservation principles," is central, but it is only one of three issues that must be rendered as mathematical formalisms to be subsequently "consolidated by concatenation." The others are the "identity of the commodity" and the "conceptualization of trade" (1991:566). Yet since the second and third elements are not fully independent of the first, principles of conservation of value—and more important, their invariance—lie at the heart of Mirowski's social theory of value.

> One curious fact about conservation principles... is that although they are often cited as "laws" or "theories"... they do not seem to enjoy the same epistemological status as correlative theories. In practice they are nearly immune to empirical falsification.... Their status is further called into question by the realization that they are all false to a greater or lesser degree: nothing in human experience is perfectly invariant.... (1990:690)

Since "value in the economic sphere [is] the imposition of a set of invariance principles which are factually false but are eminently useful on both a pragmatic and a deeper conceptual level" (Mirowski 1990:691), a social and historical description of their origins is crucial to Mirowski's project. And this is where his endeavor intersects with Guyer's. Mirowski's exploration is predicated on the need to find what he calls "the pervasive thought structures of a market economy" (1990:706). These inform the singular, albeit conventional, "instituting principles of conservation of value" at work in an economy.

Reading Mirowski's Social Theory of Value through the Lens of *Marginal Gains*

In *Marginal Gains*, Guyer finds Mirowski's work useful in crediting what she sees as a crucial insight in the challenge that Africa's economies pose for economic theory, an insight she attributes to Sara Berry: that in West Africa, "money payments do not give rise to precise or definitive transactions"(1995:308). In chapter 1 (2004:13), Guyer builds on this insight from Mirowski (1990):

> This seems to me to be the key insight to pursue with respect to Atlantic Africa's specific history, and one topic on which that history can speak to value theory more broadly. Mirowski arrives theoretically at the position that arises historically and empirically in an African context: "the insight that value is contingent, hermeneutic, negotiable and nonnatural."... But having arrived there theoretically he necessarily asks how to analyze economic life under such conditions: "one must drop anchor at some fixed point...after all the actual economic transactors are not paralyzed by nausea"; "a retrofitted social theory of value...should be tethered to the pervasive thought structures in a market economy... value is about conservation principles and invariants."

Guyer identifies Mirowski's relativist theory as useful because unlike "universalist European theory [with] its coherent models and calculative practices [that] orient it to its own frontiers of innovation, taking [its] institutional frameworks as given"(2004:172), his theory offered both a template and a boost to her confidence in claiming that "conditions of West African economic practice breech the assumptions of [orthodox] theoretical traditions" in economics (2004:172).

According to Guyer's formulation, this constructivist account "has cut loose from conventional assumptions of stability, trends, and constants" (2004:14), or at least it seems it could do that. She disagrees with Mirowski's assessment that invariance, albeit conventional (dropping anchor at some fixed point), is necessary in practice if an economy is to function. Picking up on Mirowski's metaphor, Guyer quite properly refuses his retreat to a convenient constant: "If people inhabit choppy waters, perhaps they do not "anchor at some fixed point" at all" (2004:13). Guyer's determination to take the popular economic life of Africa in its own terms is both admirable and significant, and ultimately it will ensure that Mirowski's analytic will be found wanting as an approach to explicating difference. The terms within which African economic life is carried on are incommensurable with Mirowski's terms, which derive directly from eighteenth-century European thought. Following the lead of her African colleagues, the practitioners of African economic life, Guyer refuses to treat the interface as invisible and to seamlessly engage in a conventional and invisible translation.

In a similar way, in setting out to articulate plural generalizing logics of numbering, I refused Quine's rejection of the possibilities of other logics that are opened up by his indeterminacy of translation (Verran 2001:215). I sided with the practitioners of Yoruba numbering, taking their terms seriously, refusing to opt for a conventional account of predicating that makes sense to "us" (in this case, speakers of Indo-European languages). As Guyer recognizes (2004:23) my endeavor with respect to numbering has a lot in common with the task she set for herself. Just as I wanted an account of number that actually can "do difference" rather than "doing away with difference," Guyer wants a social theory of value that can recognize difference.

Sensing that goal as beyond reach at present, Guyer adopts a more modest one and asks if it is possible to "at least make forays that would define the contours of the intellectual challenge" (2004:13). We can understand the book that follows as just that. Taking up a notion of value as complex and vague, we can read *Marginal Gains* as a set of forays foregrounding some of the varied and quite disparate ways of doing value that are instantiated in the rich case studies of African economic life that anthropologists and historians have been producing for many years now. In the chapters that follow this introduction, we glimpse a complex repertoire of performance of "doing value." In her stories of Africans calculating, scaling, ranking, and qualifying, and then transacting, institutionalizing, and balancing, we glimpse people simultaneously using the entire range of the repertoire she sketches.

But not satisfied with the baroque complexity of her accounts of doing value, Guyer asks for theory to do more: "The question becomes: what notions of value are compatible with "conservation principles" that make sense to both actor and analyst, once theory has cut loose from conventional assumptions of stability, trends, and constants? To address this question, and go one step further than "ambiguity," another level of abstraction from the case material is needed" (2004:13–14).

We can understand Mirowski's social theory of value as an analytic technique that claims to give useful general readings of the workings of market economies uniquely taking account of the variable roles of history and culture. It is a tool that has been devised and proven in the furnaces of contemporary globalizing economies driven by "the juggernauts of finance and information technology and regulation" of contemporary "knowing capitalism" (Thrift 2005:5). But is it a useful theory for coming up with general insights into the ways that Africans "do value"? Can it help analysts go "to another level of abstraction from the African case material" to develop a generalization around value? Well yes, but I argue this will not get us very far toward general understandings of African economies.

Interrogating Mirowski's social theory of value through the puzzlements assembled in *Marginal Gains*, we see that theory has not, and actually cannot, "cut loose" from assumptions of stability and the existence of constants around value. Such assumptions are embedded at the core of his theory. To be more precise, the problem lies with the particular principle of conservation Mirowski mobilizes in constituting his theory. When we look closely at Mirowski's argument, we realize that contrary to his assumption that "anchorage is necessary," it seems that a profound commitment to riding out the "choppy waters" lies at the core of the ways many in West Africa pursue their economic life.

The basis of my judgment that Mirowski's social theory of value is a generalizing tool incapable of engaging with African markets and economies relates to the centrality of "principles of conservation of value" in his theory. In my view, the principles of conservation that actually function in popular African economies do not actually begin with conserving value understood as a universal constant. Instead, African economies are built around a concern to conserve multiple local orders.

What is the basis of my claim for this African difference, a claim that challenges the universality of value as the core of economy? I draw on a contrast between conservation principles based on qualitative reasoning and those that employ modal reasoning. Noting the systematic elaboration of conservation principles of value as an accomplishment of nineteenth-century philosophy, Mirowski defines these principles as follows:

> We here use the terminology of "conservation principles" in much the same way as it is used in physics: namely as invariants or symmetries imposed on a problem in order to simplify its solution. For instance, the "conservation of energy" is a condition imposed upon many physical problems, positing that the amount of energy in a closed system is a constant under a class of transformations. In Piaget's famous experiments with children the "conservation of [the property or quality of] volume" referred to whether the water poured from a tall pitcher into a number of squat tumbles was the "same amount" of water in a child's eyes.... The key to understanding conservation principles in any area of human discourse is that they express the conviction of identity and reversibility of a specified action or process in the presence of specified changes of state or disposition. (1990:688)

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To make my argument about the principle of conservation that actually operates in African economies, I first need to give a little background about different forms of reasoning. Most readers of this article will be familiar with modal reasoning; probably the most common example uses ordinal number—although this does *not* use conservation principles. For example, during a petrol shortage in Nigeria, many people will assemble at a petrol station that is known to have a supply, and the owner of the station will determine who is to be served first, second, and third. The concepts first, second, third, and so on, mobilizing time and space, do not draw on any qualitative notions. "Order" is involved here; neither "conservation" nor "value" has been invoked. The concepts first, second, third, and so on do not invoke any properties of the matter involved. The concepts report order, reflecting what actually happened in the here-and-now, the contingent making of a local order.

When we use a cardinal number, however, we do engage principles of conservation, and to invoke value we attend to properties of the matter involved. "You can purchase fifty liters": Here the station-owner is using a principle of conservation of value based on reasoning through a property or quality. A certain amount of petrol, substance to a certain value, can be definitively specified using a quality said to be possessed by petrol—volume. A liter of petrol is an abstraction: singular, invariable, and constant. It exemplifies conservation of value. Shared understanding of the principles of the conservation of the quality of volume ensures that everyone knows how large a keg can be filled.

So, going back to the modal reasoning we see in using an ordinal number, is it possible to use conservation principles based on modal reasoning and still effect value, albeit through first accomplishing local order? Are conservation principles that abstain from drawing on notions of properties or qualities of matter a feasible basis for coming up with value? Surprising as it might seem for many readers, it is feasible, though necessarily in a secondary sense (Verran 2001:123–42). Using modal reasoning, conservation principles *conserve order, not value.* Conservation principles here, focusing as they do on ordering, provide the possibility for value to be negotiated and agreed in a subsequent step.

It seems that modal reasoning is very common among West Africans. A large number of Piaget-inspired studies conducted in the 1960s and 1970s on the thinking of West African children and adults with little or no schooling provided evidence for the absence of qualitative-based conservation principles across a wide variety of African ethnic groups (Verran 2001:123–24). In the interpretation of those studies, clear evidence of extraordinary numerical capacity was discounted as "primitive thought." My claim is that instead of discounting it—as a universalist must—it should be counted in a relativist frame as evidence for modal, rather qualitative, reasoning. To use Mirowski's terms: the pervasive thought structures in the market economies of Africa are concerned with order, not with value.

As we saw in my brief introduction of modal reasoning above, modal reasoning is a form in which concepts convey the contingencies and actualities of the here-and-now while allowing (just) enough stability; modal reasoning perpetuates openness. If this is the case, and modal reasoning does predominate in Africa's popular economies, would it be possible to institute principles of conservation based on modal thinking? There is no a priori reason why principles of conservation deriving from modal reasoning could not be instituted. But when it comes to instituting principles of conservation, those based on modal reasoning behave very differently from those based on qualitative reasoning. The latter become instituted as defined and standardized practice. In contrast, the institution of principles of conservation using modal reasoning embeds contingency and possibilities for negotiable variability in practices. Here, rather than being shifted down into the defined technique and equipment that make up practices, elaborated protocol and negotiation must do the work of establishing local principles of conservation of order according to which value can be agreed on.

Even in recognizing possibilities for principles of conservation based either on modal reasoning or on qualitative reasoning, we still have value established through conservation principles. But significantly, we need to let go of the assumption that this involves given invariants and constants. On the contrary, when we are dealing with modal conservation principles, the effect of applying those principles can be about ensuring possibilities for particular noninvariants to work.

To sum up: I am suggesting that the lability of African popular economies lies at the very heart of the constitution of value and is not a reflection of the limited extent of institutionalization that pertains in those economies. Rather, to the extent that there is institutionalization of principles of conservation, what is instituted is an openness that ensures ongoing possibilities for contingency and multiplicity, rather than working toward single, closed standards and norms.

Deriving its metaphors from physics' pervasive, qualitatively based principles of conservation, economics assumes the universality of qualitatively based principles of conservation of value. Not surprisingly—to get back to Mirowski's social theory of value—Mirowski saw no reason to question this, and like the theories of value of his universalist colleagues, the assumption is embedded as central in his theory of value. His analytic can recognize variation in the ways principles of conservation are instituted, in the places and ways that are found to "drop anchor." But it assumes that principles of conservation necessarily conserve quality and produce stability. Invariants and constants lie at the core of his theory of value.

Mirowski's analytic enables empirical study of the working of value taken as conserved quality—a defined, solid, single object that becomes instituted in a plurality of ways. One might use this theory to study many variously instituted forms of the one thing: conserved, qualitative value. General insights can be achieved from drawing these many instances together. What they have in common can be articulated as a definable, further singularity—an abstraction, a generalization. But this form of empirical study cannot attend to the unitary object of value itself, and that is exactly what we need to ask about if we are to develop general understandings of the workings of African economies.

Nevertheless to the extent that African economies "do" qualitative value, Mirowski's theory is useful in helping economists understand how to "do value differently," albeit that its usefulness is confined to those areas in which the workings of markets do proceed through concepts of value. For example, we see in the stories in Guyer's chapter 6 that the government-mandated price for petrol—the value of a liter—is systematically flouted in a shortage. But the fact of its existence constitutes a core of stability around which a complex economy of modal add-ons is worked and ethical considerations can be pegged. It may be that this core of stability can be managed in better and worse ways in recognizing the exigencies of various social and historical settings. This is what Mirowski's analytic is designed for: investigating the various forms whereby value is instituted, the ways commodities (regulated economic goods) are constituted, and how the trade of such economic goods is conceived. Perhaps relatively insignificant in the larger scheme of things, investigating how social factors influence the constitution of institutionally sanctioned qualitative value is still relevant.

However, in terms of my more general aim of rendering Africa's popular economies more comprehensible to the "mind of contemporary globalism," the usefulness of Mirowski's theory of social value is at best ambiguous. On the one hand, we see why African popular economies escape the categories of life in global economics, but on the other, they are rendered completely opaque. An unbridgeable gulf of incommensurability separates the "othered" African economies from the global domain of economics, which is not about to abandon its commitment to an ontology centered on value understood as universal and found. Taking Mirowski's relativist project to its logical conclusion in remaining true to the terms that are salient to participants in Africa's popular economies, we find ourselves as scholars in a position that is both politically and morally untenable. Similarly, my relativist study of Yoruba numbers left me in just this uncomfortable position (Verran 2001:30–33).

Callon's Sociology of Translation Retooled for Economics

I move on now to consider the very different analytic of Michel Callon. I introduce what I see as its main features, and then subject it also to a reading through the material assembled in *Marginal Gains*. In concluding this article I come back to the issue of alternative empiricisms, and the qualitative and modal reasoning on which they are based.

Unlike Mirowski's analytic, Callon's work does not feature directly in

Marginal Gains. It does, however, enter through the back door through Guyer's use of my notion of numbers and money as "performative clots": "Numbering as embedded in any transaction is a "punctuation point," a temporary "clot" generated by and dissolving back into "a set of routine and repetitious practices" that are never erased" (2004:95), which we can think of as a version of Callon's "entanglements/disentanglements" (Barry, Slater, & Callon 2002:287; Callon, Méadel, & Rabeharisoa 2002:201–7).

There is also a wider although vague sense in which Callon's and Guyer's work make common cause, which we see in the sentence that follows the one quoted above: "Multiplicity and contingency are pervasive. The routine marginal gains of life are produced on these disjunctures between scales, through performative skill at successfully bringing them together" (Guyer 2004:95). Their shared recognition of the performative, the ways socio-material enactments in the here-and-now both link and separate in economic practice, inclines me to the view that Callon's alternative version of constructivist empiricism, one that assumes knowledge as participation in worlds that are relational and emergent, might at this point be of considerable use in taking up the telling challenge of Africa's economies. Conversely, the rich and bewildering material on the workings of African markets could be the basis for usefully elaborating and extending Callon's approach to studying market organization.

Along with John Law and Bruno Latour, Michel Callon is recognized as an originator of an approach from the early 1980s that is variously labeled as "sociology of translation" (Akrich, Callon, & Latour 2006), "actor-network theory" (Latour 2005), and "material semiotics" (Law 2007). Drawing on the work of Deleuze and Michel Serres, Callon, Latour, and Law formalized an analytic vocabulary for articulating the collective action of "doing science" as various modes of explicit translation.

A good introduction to Callon's work on the organization of markets is the text of an interview conducted by Andrew Barry and Don Slater (Barry et al. 2002). Callon begins by recognizing his interest in economic sociology as an extension to the social sciences of the work he did on the natural sciences. He links the question of the organization of markets under contemporary neoliberalism to moral questions concerning the commodification of life, noting that the ways in which economists ask questions around these issues and imagine answers to them have changed significantly in recent times: "The metaphors of infrastructure and superstructure and the metaphor of embeddedness are not helpful if we want to find answers to these questions" (Barry et al. 2002:291). Or to put this claim in the more specific terms I have been using: a concern with constants of value and the historical and cultural contexts of institutionalization is not up to the task of attending to questions that Callon sees as needing attention, which are of course rather different from the questions we are concerned with here: "What I tried to do in *The Laws of the Markets* [1988a]," he says, "was to replace these old metaphors by a new way of describing transactions or relations that involves a double process of entanglement and dis-entanglement. This... leads to very different accounts of markets" (Barry et al. 2002:291).

The metaphor of entanglement comes in part from anthropology (e.g., Thomas's *Entangled Objects* [1991]), but when inserted into the more explicit metaphysics of sociology of translation/actor-network theory/material semiotics, the metaphor, re-presented as a tension of entanglement and disentanglement, does much more dynamic work. The metaphysics of Callon's framing takes it as problematic to imagine society as a context "out there" within which one imagines the market as some sort of strange beast. The problem in taking the social as a given domain, a foundational reality, is that one must then try to imagine respective positions; thus one must embroider the givenness of society and posit the notion of a superstructure and infrastructure. The argument then becomes ever more imbricated and baroque.

> In... developing an argument in the sociology of translation approach, you must not imagine society as a context for different types of activities including economic activities; you have to image the process through which collective relations are constructed, including relations that can be called economic relations.... The metaphors of entanglement and disentanglement are more productive because they allow you to describe the omnipresence of commercial transactions and other types of relations and, in the same movement, the process of boundary shifting. (Callon et al. 2002:292)

Thinking through these metaphors of entanglement and disentanglement, Callon develops a contrast between economic goods and products.

> The concept of an economic good implies a degree of stabilization of the characteristics that are associated with it, explaining why it is in demand, and why, being wanted as such it is traded. A product, on the other hand, is an economic good seen from the point of view of its production, circulation and consumption. The concept (*producere*: to bring forward) shows that it consists of a sequence of actions, a series of operations that transform it, move it and cause it to change hands, to cross a series of metamorphoses that end up putting it into a form judged useful by an economic agent who pays for it. During these transformations its characteristics change. The product is thus a process, whereas the good corresponds to a state... [which is actually] a moment in that never-ending process. (Callon et al. 2002:197)

Identifying that series of metamorphoses, that never-ending process as "an economy of qualities," Callon suggests that seeing

> the qualification of goods as one of the central issues in the dynamic orga-

> nization of markets, makes the situations in which this qualification–requalification constitutes an explicit challenge for all agents involved particularly interesting.... We suggest using the term "economy of qualities" for this (dynamic) economy of the product (as opposed to the more static economy of the good) in which modalities of the establishment of supply and demand, and forms of competition, are all shaped by organized strategies deployed by the different actors to qualify goods. (Callon et al. 2002:202)

In closing my brief introduction to the sociology of translation and the version retooled for economies and economics, I wish to make two points. First, Callon's description of contemporary global markets which embed the workings of science and technology could just as easily be taken as describing West African markets.

> Forms of organization of economic markets and their modes of functioning are ... an explicit issue for multiple actors and especially for economic actors themselves.... Markets evolve and, like species[,] become differentiated and diversified. But this evolution is grounded in no pre-established logic. Nor is it simply the consequence of a natural tendency to adapt. Economic markets are caught in a reflexive activity: the actors concerned explicitly question their organization and, based on an analysis of their functioning, try to conceive and establish new rules for the game. (Callon et al. 2002:194)

I note, first, the resonances between Callon's economy of qualities, which sees market organization as emergent, "an open field of reflection and experimentation" (Barry et al. 2002:299), and Guyer's terms. We could say that it is in the "economy of qualities" that marginal gains are generated, and in this we see the way Callon's work speaks directly to Guyer's understanding that "a transaction is a moment when correspondences are agreed upon. It emanates from valuational ranking and established potentials for tropic linkage, but it does not erase the asymmetries from which it originates and which motivates it in the first place" (2004:172).

Second, I note that Callon's talk of an "economy of qualities," in which qualities are wrought as outcomes of "modalities" of one sort or another, alerts us to the form of reasoning this sociology of translation employs: modal reasoning. It is concerned with ordering and the roles of all sorts of mediators, both human and nonhuman, in those multiple orderings.

Marginal Gains and the Working of Callon's Economy of Qualities

My interrogation of Callon's analytic through the lens of *Marginal Gains* takes the form of retelling, utilizing some of Callon's terms, a story of the ways a particular Yoruba woman worked an "economy of qualities" of petrol during a time of extreme petrol shortage in Nigeria in 1997. "Madame A" is the name I ascribe to a central figure in chapter 6 of *Marginal Gains*, a woman who in June 1997 owned a petrol station far out in the countryside, about twenty-five miles north of a rural town in Western Nigeria, where Jane Guyer was staying with friends (2004:107–13).

Guyer uses the petrol shortage as the occasion for assembling a series of revealing stories and anecdotes around the ways Nigerians worked the petrol economy of qualities at that time (and no doubt still do) in performances that are as routine as they are extraordinary. She shows the ways in which

> linked registers... provided a repertoire for combination and permutation under crisis conditions... [and how] small shifts and recombinations of elements from different registers preserved a sense that a particular sale fell within a certain normality. This skill of improvisation in a volatile situation was based on particular logics already in place and shared at the cognitive level: logics and skills that create the often-mentioned West African qualities of flexibility and resilience. (2004:113–14)

The narrative in the section "Waiting for Petrol" gives a vivid picture of a capable woman, my "Madame A," who "had bought one tanker of petrol in Lagos by working through old patronage networks" (2004:108) and by dint of considerable skill and perseverance brought her project to fruition. No doubt she was working simultaneously through multiple networks, getting her business and her petrol more and more entangled with more and more people and their enterprises in negotiating the sheer social and material complexity of getting the truck safely to her service station.

Once the tanker was in place the owner, "who stood right next to the pump with her large bag of money" (2004:112), oversaw the distribution of the petrol by negotiating a whole new series of entanglements and disentanglements with customers who were massaged into "three great categories." Using Callon's terms, we can see that the three categories were worked in a "dynamic economy of the product... in which modalities of the establishment of supply and demand, and forms of competition are all shaped by different actors to qualify goods" (Callon et al. 2002:202).

The first group, which paid the nominal price, (predictably) comprised those with the highest rank in the local hierarchy. The people in the third group, lowest in rank and served last, were those who waited longest in line—well into the night—and who paid a premium in suffering. Those in the middle group, each of whom, like Guyers's party, "paid a premium of one sort or another not to the station owner herself but to surrounding employees, and facilitators, including soldiers," eventually found particular ways of inserting themselves into this very local network of shifting alliances. "In the end all three categories were served, and not because there was enough petrol for everyone but because the owner played across the possibilities of categories so skillfully" (Guyer 2004:112–13).

After this marvelous collective performance the owner had no doubt achieved considerable gain in multiple currencies. She remained enmeshed in multiple networks that might help her in further enterprises (including the most unusual outcome of figuring in an academic project, which may or may not prove useful as social capital). But she had successfully disentangled herself from one crucial and very unpredictable partner—an unreliable tanker truck filled with petrol.

> The owner had effectively rationed the sale of this tanker of petrol in a way that allowed the play of the market, and of status differences, and at the same time had maintained an image of a stable and fair price, offered to everyone. Deviations were qualitative add-ons and exemptions: clientelistic exemption from waiting and anxiety; shortening of waiting or access to a greater amount through payment of a premium to a set of gatekeepers; and the spending of time in line. All were recognized; all were successful; and all preserved the sense that the owner herself had sold at a standard price and therefore had not profited in devious ways from the deal. (Guyer 2004:113)

"Madame A" works indefatigably in efficiently running a very local market that has evolved around petrol. It is a deliberate and planned creation designed by a skillful economic agent. Her work, as reported by Guyer, deserves to stand alongside that of another economic agent whose story is much rehearsed in recent economic sociology literature—a case study of buying and selling strawberries in a French rural area (Garcia 1986). According to Law and Urry (2004:394) in their re-presentation of a case study elaborated in actor-network terms by Callon (1998a) (who in turn was re-presenting a case study reported by Garcia in 1986), "an ambitious young civil servant who had learned his neo-classical economics" well had designed a computerized market that "elaborated a series of rules about the character of permitted bidding, the number of lots, the size of steps... in the auction and extra market sales (forbidden). He also organised a set of material arrangements that included electronic display of prices, and an architectural arrangement of lines of sight that secured mutual invisibility between buyers and sellers." An English translation of Garcia's 1986 paper (Garcia-Parpet 2007) published very recently in an edited collection is introduced by the editor as "paradigmatic in its suggestion that economic sociology and anthropology should focus on how markets are constructed and maintained (and on the role of economic theory, material devices, procedures, physical architectures, linguistic codes, and so on in the construction and functioning of markets)" (Mackenzie et al. 2007:8).

The point of introducing Garcia-Parpet's study here is to point to the obvious commonalities between designing a "perfect neoclassical market"

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in France and a "perfectly functioning popular market" in contemporary Nigeria. They might be different species of markets, but clearly they belong to one genus. In both cases markets are designed to arrange various socio-material elements with the goal of conserving local order according to a locally recognizable set of acceptable criteria. But we can go even further than recognizing this continuity between markets.

I am quite taken with "Madame A's" participation in that local petrol market, for it puts me in mind of Jane Guyer's participation in the collective around the academic endeavor to study the workings of African economies. I have a sense that these two women engage a similar form of empiricism in achieving marginal gains—a form that I call relational empiricism and that I regard Callon's analytic as expressing. The forms of their marginal gains differ in some aspects, but both are interested in the particulars of the many ways petrol can be qualified as an economic good in becoming many diverse products, and the characteristics of the mediators (human and nonhuman) that participate in those translations. For both of them those particulars contribute to a general picture—the multiple and specific orders by which a vague whole, the economy of qualities of petrol during a shortage in Nigeria—is composed. And of course it is not only "Madame A" and Jane Guyer who can be seen as engaging in similar processes; the ambitious young French civil servant, Marie-France Garcia-Parpet, Michel Callon, John Law, Donald MacKenzie, and last in line, myself (in writing this article and re-presenting their work) are all engaged in projects that are similar in form.

Conclusion: (Purified) Foundational Empiricism and (Working) Relational Empiricism

> It was largely the quiet and methodological work of the station owner, who supervised the entire distribution, that kept the situation orderly. In the end there was no serious fighting, due at least in part to the skill with which she worked the repertoires for differential access throughout the whole day and night that it took, over several openings and closings, to sell the entire tanker load to the assembled clientele. That day the government mandated price of petrol stood at N11 per liter, as it had throughout the shortage. By now no petrol was actually sold by the liter, so the parallel measurement scale of larger units could "mask" and legitimize the higher price. The unit of sale was the twenty- or fifty-liter keg, the latter selling for N1,700, or approximately three times the mandated price by the liter. The petrol was sold at this price in the presence of the police and the army, who could certainly have cited the sale as contravention of the law. They did not, and were just as certainly rewarded for their forbearance. Actually, this was a comparatively low price for this phase of the shortage, as everyone knew. (Guyer 2004:110)

This is an account of just some of the multiple modes by which petrol that has been safely brought to a distant petrol station is qualified as a good in the complex economy of its distribution. It is important not to miss the crucial stable core of "the government mandated price of petrol [of] N11 per liter"; a core of certainty where value is conserved by principles that use qualitative reasoning. As Jane Guyer recounts the episode, we see a mutually constitutive tension between the constitution of value and the constitution of order, and the existence of that certain core is crucial. I see the tension as also one between disparate styles of reasoning, which I gloss as foundational empiricism and relational empiricism.

I begin my conclusion with this summing up of Guyer's "waiting for petrol" story because it shows well that Nigerians need to use both forms of reasoning in accomplishing a distribution of petrol in a shortage. My claim is that we scholars also need to use both forms if we are to come up with general understandings that might support efficacious and beneficial forms of intervention in African economies—which I take to be the overall hope here. The problem as I see it is that the form of empiricism that Callon's approach exemplifies is systematically underrecognized and undervalued in the academy, and Jane Guyer's sense of casting around for a recognizable method to do the sorts of generalizing she intuits as necessary is a symptom of this.

It is, of course, important to elaborate the epistemological and ontological characteristics of the different types of knowledge generated by these alternative forms of reasoning, but I am not going to do that here. In concluding, I focus on the sorts of generalizing enabled by each form of empiricism in the expectation that some insight into the mechanics of these alternative forms might be useful for those who study economies—local African economies as much as contemporary global economies.

Generalization allows for simplified insights detached from the bewildering actualities of everyday experience. In a formal sense, it is working the relation unity–plurality (Verran 2001:99–101, 234–37) and can be done in ways I have glossed here as qualitative reasoning involving a form of "classic" or foundational empiricism, and modal reasoning involving what I call relational empiricism. Part of the trouble in differentiating between what I see as two distinct forms of empiricism is that we are so accustomed to the two quite different senses in which the term *generalization* is used. A generalization is singular and definitive—an abstraction. A liter, a qualitative (volumetric) unit of extent or value, is a generalization about petrol (or any flowing substance). As a generalization employing qualitative reasoning, it effects singularity, and certainty through foundational empiricism. Let me say this more formally in the form of a definition of foundational empiricism: a qualitative analysis through single units of value or extent using a one–many form of generalizing. Mirowski's analytic enables empirical study of the working of value taken as conserved quality: a defined, solid, single object that becomes instituted in a plurality of ways.

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One might use this foundationalist theory to study many variously instituted forms of the one thing: conserved, qualitative value. General insights can be achieved from drawing these many instances together. What they have in common can be articulated as a definable further singularity—an abstraction, a generalization.

Alternatively, we might find ourselves saying: "Generally, the price of petrol goes up in a shortage." The adverbial way we use *general* here can alert us that we are engaging modal reasoning. This form of generalization evokes a vague whole that we might call the "petrol economy." The specific ordering of some parts and the general order they constitute *are* articulable. Relational empiricism studies the "lives" of these vague wholes, specifying the ways its parts come to life and perhaps die off, identifying the mediations that are important in the "doing" of this vague whole. Again, let me resort to a definitional register. Relational empiricism is a modal analysis of relations between participants, with distinction made between human and nonhuman actors: a parts–whole form of generalizing in which the whole is only vaguely delineated

The whole of "the economy of qualities of petrol during a shortage in Nigeria" remains vague, but the specificity of its parts does not. In relational empiricism one generalizes—works the relation unity–plurality as a whole–parts relation, a vague general whole that allows articulation of specifiable parts. What matters, what is conserved, is the relational orders of the vaguely delineated whole. Through the functioning of a series of mediators, modalities of supply and demand and competition are established and maintained. Empirically, the natures, the forms, and the roles of the mediators are of interest, as is the accounting of the relationalities they order.

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