by the *price* of this commodity, and y_t and P_t replaced by any variables that affect supply but not demand.

In the 1970s econometricians began to recognize that how the supply or demand equation is normalized affects the estimator of the supply or demand elasticity ($\bar{\alpha}_M$ or $\bar{\beta}_R$) when the two-stage least squares (2SLS) approach is employed. The quality of this estimator is sensitive to the strength of instruments used in the 2SLS estimation, which in turn depends on whether the price variable or the quantity variable is normalized to be on the left-hand side of the supply or demand equation, as in (3) or (4). There are other methods that one can use to estimate the supply and demand equations. One dominating alternative is the full-information maximum likelihood (ML) approach. This approach used to be computationally infeasible for many practical problems. As computing technology improves over time, the ML approach has become more feasible to implement. One advantage of the ML approach over the 2SLS approach is that the economic meaning of the ML estimates will *not* be affected by normalization.

Not until the 1990s, however, did it become known that normalization matters to small-sample statistical inference about the ML estimates. Likelihood-based small-sample inferences are affected because normalization governs the *likelihood shape* around the ML estimates. A poor normalization can lead to multimodal distribution, disjoint confidence intervals, and very misleading characterizations of the true statistical uncertainty.

Related to this discovery, in the Bayesian econometric literature there have been theoretical results showing that normalization can lead to ill-behaved posterior distributions when a flat or symmetric prior is used. The empirical and policy significance of these results has been largely unexplored until very recently. Daniel Waggoner and Tao Zha (2003) and James Hamilton, Waggoner, and Zha (2007) show that normalization can alter economic interpretations of dynamic responses of the variables M_t and R_t to a supply or demand shock ϵ_t^S or ϵ_t^D in the above example. They use this and other examples to demonstrate that inadequate normalization may confound statistical and economic interpretations.

There are a variety of economic applications in which normalization plays an important role in likelihood-based statistical inferences. Unfortunately, there is no mechanical way to implement the best normalization across different models. As a practical guide, therefore, it is essential to report the small-sample distributions of parameters of interest rather than the mean and standard deviation only. Bimodal and wide-spread distributions are the first clue that the chosen normalization may be inadequate. Carefully chosen normalization should follow the principle of preserving the likelihood shape around the ML esti-mate. A successful implementation of this principle for normalization is likely to maintain coherent economic interpretations when statistical uncertainty is summarized.

SEE ALSO *Bayesian Econometrics; Demand; Econometrics; Matrix Algebra; Maximum Likelihood Regression; Regression Analysis; Simultaneous Equation Bias*

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Tao Zha

NORMATIVE SOCIAL SCIENCE

Early in the educational process, the novice social science student is typically introduced to two kinds of research: positive and normative. Positive social science is allegedly about what is—the unbiased, objective facts of the world, untainted by value judgments of an ethical, political, or aesthetic sort. By contrast, normative social science is about what ought to be. Apparently unlike positive science, normative social science admits to bias, subjectivity, the moral taint. Much confusion has arisen from the alleged positive/normative distinction, a distinction that is known in philosophy circles as the fact/value dichotomy.

Advanced students of social science, excluding some students of sociology and most students of anthropology, are not encouraged any more than are beginners to clarify the nature of the confusion. Most philosophers, but to repeat, only a few social scientists, reply that this is because the distinction between positive and normative, facts and values, what is and what ought to be, cannot be clarified; they are inextricably entangled.

The word *normative* descends from the Latin *norma*, meaning a carpenter's T-square, a rule, or a prescription. In ordinary English, a norm is what is expected, what is customary, what is habitual. In mathematics, the norm is a standard unit. In economic discourse, ever since John Neville Keynes (1852–1949) published his influential *On the Scope and Method of Political Economy* (1891), *normative* conflates the Latin *norma* and the ordinary English *norm*, yielding something like, as Keynes put it, a "regulative science … a body of systematized knowledge discussing criteria of what ought to be." Like his muse, David Hume (1711–1776), Keynes (father of the great

economist John Maynard Keynes [1883–1946]) believed that "confusion between [positive and normative] has been the source of many mischievous errors" and urged "a distinct positive science of political economy" (Keynes 1891, quoted in Friedman 1953, p. 3).

NORMATIVE SOCIAL SCIENCE AND NOVELTY IN ECONOMICS

While contemporary social scientists take a liking to Keynes's prescription and the allure of the distinctly positive, historians and philosophers have settled on something like the exact opposite: they argue that the failure to acknowledge the normative element in the allegedly positive social sciences has been the source of mischievous errors.

The distinguished economist and philosopher Amartya Sen provides an example of such an error. For much of his career Sen (the 1998 Nobel laureate in economics) has been preoccupied with four areas of research: social choice, preference theory, capabilities, and the economics of poverty and famine. For example, in *Inequality Reexamined* (1992), he brings attention to a contradiction in "positive" preference theory, an error with ethical and political ramifications. Sen observes that economists and an increasingly large number of sociologists and political scientists accept "individual choice" and "revealed preference" to be foundational concepts in their positive science. Therefore, they argue, statistical measurements of income and consumption, and even the data from social surveys, are capable of extracting the parameters of "desire" or, to use the utilitarian term, of "happiness" achieved at various levels. Utility functions themselves cannot be observed. But the choice set of a rational economic actor is, by the logic of choice, relative price, and revealed preference, de facto observable, and so (indirectly) is a person's desire. But, Sen observes, impoverishment and deprivation can so reduce a person's desire and self-worth that what they say and do about their own desire is far below—and different from—what they would actually do (let alone what they "should" do) were they in fact flourishing at normal levels. According to Sen:

> The problem is particularly acute in the context of entrenched inequalities and deprivations. A thoroughly deprived person, leading a very reduced life, might not appear to be badly off in terms of the metric of desire and its fulfillment, if the hardship is accepted with non-grumbling resignation. In situations of long-standing deprivation, the victims do not go on grieving and lamenting all the time, and very often make great efforts to take pleasure in small mercies and to cut down personal desires to modest—"realistic"—proportions.… The extent of a person's deprivation may not at all show up in the metric of desire-fulfill-

ment, even though he or she may be quite unable to be adequately nourished, decently clothed, minimally educated, and properly sheltered. (Sen 1992, quoted in Putnam 2002, p. 59)

As the philosopher Hilary Putnam puts it, " 'Capabilities,' in Sen's sense, are not simply value functionings"; that is, they are not continuous utility functions derived from a preexisting and exogenously given preference ordering. They are "freedoms to enjoy valuable functionings"; that is, they are social and economic preconditions for performing a job well, keeping a clean house, casting a democratic vote, or reading a book by Adam Smith (Putnam 2002, p. 59). Social scientists disagree about what counts as a value functioning, and, importantly, on how one would go about measuring them in a capabilities approach. For example, will an annual income of $20,000 (in constant 2008 dollars) suffice, by Sen's standards, for a family of four living in the United States? Or is income level alone a lame metric of deprivation? What, if anything, should society do to help expose and heal any wounds of deprivation? The point of the example is not to answer a policy question; it is to suggest that normative judgments reside deep in the heart of the neoclassical preference-theoretic approach.

Thomas Schelling, Albert O. Hirschman, and other economists have found it easy to identify other mischievous errors in economics caused by an unexamined faith in positive analysis. For example, in "Against Parsimony: Three Easy Ways of Complicating Some Categories of Economic Discourse" (1984), Hirschman, working in a vein similar to his Princeton colleague, the philosopher Harry Frankfurt, shows that metapreferences—preferences over preferences—are a proper object of economic analysis, more realistic, more humane, but also capable of some prediction.

Metapreferences are about the kind of self one would like to be in the future, not the self one is today, at current prices and budget constraints. Metapreferences require reflection, the ability to step back and evaluate the spiritual and material constitution and direction of one's life. Bigots, for example, may find on reflection that they prefer human equality and the Golden Rule; party animals may decide on reflection that they are better off sober (or at least drinking less and at home with family and friends rather than in expensive nightclubs with strangers). If the metapreferences differ from the actual, Hirschman notes, then eventually, of course, one could expect to observe a preference change. How to observe a preference change is a matter of usual scientific debate and invention (Hirschman 1982 [2002]; Kuran 1995). But the main point here is that reflection about one's future self is itself a value judgment, even if one does not change one's preferences. So if an economist assumes in an economic model,

following the positive approach of Milton Friedman (1912–2006) and Gary S. Becker, that people have, for instance, a "taste for discrimination" (Becker [1957] 1971) or excessive partying or nationalism, then at minimum economists are obliged to state that they are examining the wanton, and not the reflective, side of human life. But that move, Hirschman and Sen would probably agree, reveals a normative judgment in positive economics. It makes transparent the assertion of human wantonness.

Normative and positive continue to figure prominently in social science discourse and education. But the distinction rests on the so-called fact/value dichotomy, long collapsed.

SEE ALSO *Ethics; Methodology; Positive Social Science; Social Welfare Functions*

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NORMS

Social scientists invoke the concept of norms to explain a broad range of human behaviors. No universally agreed-upon definition of *norms* exists, but many definitions share three components (Horne 2001, pp. 3–5). First, norms are rules that prescribe or proscribe a behavior or set of behaviors. Second, norms are enforced by external sanctions (rewards and punishments furnished by a source other than their target). These sanctions can be material (e.g., financial bonuses or fines) or symbolic (e.g., expressions of approval or disapproval). Third, norms are consensual, group-level phenomena. Group members recognize the existence of norms and feel entitled to enforce them. Some debate remains over whether norms, once established, are unconditional, clear, and generally followed (as in many rational choice theories), or conditional, unclear, and constantly negotiated (as in many symbolic interactionist theories) (Hechter and Opp 2001, pp. 394–396).

This definition distinguishes between norms and similar concepts, such as *values* and *attitudes*. Norms differ from values in that they are enforced by external sanctions, whereas values are enforced only by internal sanctions, such as feelings of pride or shame (Hechter and Horne 2003). Norms differ from attitudes in that norms are consensually held and legitimated by the group, whereas attitudes are a property of individuals. Norms also differ from *laws* in that a central authority (such as the state) formally creates and enforces laws, while people informally create and enforce norms. Some scholars distinguish between norms and *conventions*, the primary difference being that the direction of conventions is arbitrary (Coleman 1990). For example, it does not matter whether people drive on the left or the right side of the road, so long as everyone follows the convention of driving on the same side.

Norms shape social behavior by constraining action, and may be beneficial or harmful. Beneficial norms make society possible by protecting people from exploitation. Humans existed for thousands of years without the protections of a formal legal system (de Quervain et al. 2004), and the actual exercise of law remains limited due to resource constraints (Ellickson 1991). In the absence of law, norms regulate behavior and prevent people from routinely using force and fraud for private gain (Ellis 1971). Such norms include those that ensure that people look after their neighbors' children or livestock, punish laziness at work, respect cease-fire and arms-control agreements, reciprocate favors, help strangers, and otherwise contribute to a stable society.

Harmful norms may constrain individual achievements. Such norms include *leveling norms* that prevent advancement by members of disadvantaged ethnic groups (Portes 1998, pp. 15–18), or norms mandating that women confine their activities to domestic pursuits and forego the labor market. Norms can also sustain harmful practices that a majority of the group opposes, including