

The Political Economy of Price Measurement:
The NAS Report “At What Price” and Beyond¹

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I. Introduction

The NAS report “At What Price” (AWP) is an admirable piece of work in several regards. It provides a comprehensive overview of the Consumer Price Index (CPI) program, and lays out the basic issues and points of dispute. It also defines the contours of a future research agenda for the CPI program with a series of explicit recommendations. In so doing, it follows the tradition of two highly visible predecessors: the Stigler committee of 1961, and the Boskin commission of 1996. However, the NAS panel did not continue along the path laid out by these earlier commissions. Instead, it has retraced this path and taken the field of price measurement back to an intellectual cross-roads, where one of the sign-posts seems to point in a very different

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direction.

Which direction did the NAS choose? The accurate answer is “both” and “neither”: a critical reading of the report cannot fail to notice that the NAS panel was split over the fundamental issue of whether to base the CPI on the “true” cost of living approach of utility theory (termed “COLI” in the report), or on the more traditional objective of measuring the cost of purchasing the same market basket of goods over time (termed the “cost of goods index” or “COGI”). After assessing the relative merits and differences between the two approaches, the report goes on to say

“If asked to assess the relative merits of the two conceptual approaches as a guide for the construction of the CPI, various members of the panel would strike the balance differently (page 3)”

and

“Despite these differences, all panel members agree that the COGI and the conditional COLI that the panel recommends share many common aspects. We also concur that neither conceptual approach, viewed in its pure form, can provide the single guide to index construction but that each can make a contribution toward dealing with the various problems that arise in designing the CPI. Taking a pragmatic approach, the panel found that it could come, sometimes by different routes, to unanimous agreement on all the specific recommendations in this report. But in its inability to achieve unanimity behind a recommendation that the cost-of-living framework be the sole appropriate basis for the construction of the CPI, our panel differs from the Stigler committee and the Boskin Commission (page 3).”

There is an intellectually wholesome quality to this pragmatic approach that is hard to criticize. However, the passage does bring to mind the quip about the theorist who, when asked to comment on a particular solution to a problem, remarked: ‘It may work in practice, but it will never work in theory.’ Indeed, it may seem excessively Procrustean for the theorist to require that the CPI fit entirely into one conceptual framework or the other, but this is in fact the thrust of the famous warning by Tjalling Koopmans (1947) about the dangers of “measurement without theory”.²

The Koopmans injunction has been a guiding principle of economic measurement for more than five decades, and for a good reason: measurement without theory risks arbitrary and mutually inconsistent judgments about measurement practice. Measurement without theory is like a trip without a road map (or a hotel guide, to continue the Procrustean analogy). As applied to the CPI, the Koopmans injunction can be regarded as the guiding rationale behind the recommendations by the Stigler committee and the Boskin commission that the CPI be based on the COLI approach, which is rooted in the economic theory of utility. The development of the CPI program at the Bureau of Labor Statistics reflects a gradual evolution away from the original COGI conception of the CPI to the present COLI rationale. More broadly, the history of price measurement can be divided into two broad avenues, one based on the theory on the economic theory of index numbers, of which the exact-cost-of-living theory and the superlative index approach of Diewert (1976) are important examples, and the axiomatic approach to constructing

² Procrustes was the mythological Greek giant who forced unlucky travelers to fit into one of two beds of different sizes, either by stretching their bodies or shortening their limbs.

index numbers, as expressed by the theoretical work of Irving Fisher.³ The economic theory of index numbers has achieved intellectual dominance over its competitor during the last four decades.⁴

Or so it seemed until the appearance of the NAS report. The split in the NAS panel resulted in the *de facto* elevation of the COGI approach to intellectual parity with the COLI, though it is a weak parity indeed given the panel's skepticism about the adequacy of either approach alone. Nevertheless, the very fact that the panel found it necessary to discuss the main CPI issues of importance – price hedonics, new goods, the appropriate domain of the index, and so on – from the perspective of both views signals an unmistakable shift in the field of price measurement relative to the past direction along which it has evolved.

If the demotion of economic theory as a guide to price measurement were the panel's main legacy, it would not be a rich bequest. Indeed, the panel itself states that “having a clear conceptual basis for the index is important (page 2).” However, an alternative reading of the report suggests that the gloss of pragmatism conceals a valuable contribution to the theory of price measurement: the appeal to political economy considerations as a method of evaluation. The report alludes to the relative transparency and simplicity of the COGI approach as being

³ A review of the relevant history is provided by Diewert (1987, 1993).

⁴ This dominance, however, is far from absolute. In his defense of the COLI, Triplett (2001) reviews the literature that opposes this approach and notes that the statistical agencies of many countries have rejected this view. Deaton (1998) presents a spirited attack on the COLI position.

beneficial attributes (page 58). It also mentions the need for “perceived credibility” in the chapter discussing the use of price hedonic techniques. These ideas are not developed in the report, but are instead taken as the implicit “givens” of policy analysis, where they already have much currency. However, this shift in focus may well prove to be the most valuable legacy of the NAS report.

The goal of this paper is to make a start on formalizing what might usefully be called “the political economy of price measurement.” It is an extension and generalization of previous work on the political economy of price hedonics (Hulten (2003)) to the CPI as a whole. It is also an attempt to shift the debate from the question of whether the CPI is best derived from economic theory to the question of how theory (economic and political) can best serve the dual public policy goals of the CPI program: to provide a useful a measure of price inflation and also serve as a cost-of-living adjustment (COLA). From the standpoint of political economy, the most useful version of economic theory for this purpose is the old conception of theory as an “informing paradigm,” or parable, rather than as a description economic behavior. When appropriately applied, the parable of the “representative consumer” provides a useful guide for designing a CPI that has the requisite flexibility to deal with a constantly changing, dynamic world. The fixed-basket COGI approach, on the other hand, has no endogenous way of transforming itself to deal with such a world. Moreover, the theory-as-parable approach is more attractive from the political economy standpoint than the COGI model in a dynamic world, because it offers a rules-based approach to handling change that minimizes the associated political and economic transaction costs. This last advantage is particularly damaging to the case for the COGI, since political economy considerations are generally regarded as its strong point.

This argument is set out in the following sections, starting with a brief history of the CPI, followed by a description of the political economy principles that affect price measurement, and then by the application of these principles to economic theory. The final part of the paper examines some of the specific CPI issues raised in the report in light of this theory.

II. The Political Economy of Price Measurement: Brief History

The U.S. Federal government spends millions of dollars every year on its major statistical programs. It does so because macroeconomic statistics have a large impact on social welfare by informing government monetary and fiscal policy, as well as the decisions of private businesses and consumers, and by indexing private contracts and public programs for inflation. Any government program, statistical or otherwise, which affects the welfare of society to such an extent, can expect to be evaluated politically in light of its impact. It should therefore come as no great surprise that the history of the CPI is steeped in political economy considerations.

The CPI was developed on the eve of World War I, and its immediate application was to automatically adjust workers' wages for wartime inflation in order avoid the labor unrest and political action that might have incurred if adjustments had to be renegotiated every year. The CPI adjustment was intended as "rough justice" in the face of price inflation, not as precise

compensation to each individual for the real income lost due to rising prices. What was wanted was a procedure that was easily understood and intuitively plausible, and above all, politically acceptable to those affected even if it did not reflect exactly the inflation experience of any one worker. This led the BLS to adopt the COGI approach of pricing a more or less fixed basket of goods in successive periods, and to the fixed-weight Laspeyres index number formula in which the weights associated with individual prices are held constant at initial levels.

This political economy rationale carried over to World War II. However, the rapid growth, structural change, and innovation that followed the War were a challenge to the fixed-basket philosophy of the CPI, which rested on the assumption of little or no change in the relative importance of the items in the basket. Of equal importance to the evolution of the CPI was the wave of innovation that hit the field of economics starting in the late 1930s: the Arrow-Debreu and Hicks-Samuelson revolutions brought mathematical methods into widespread use and recast economic theory in a form that made quantitative analysis possible (Hulten (2003)). The economic theory of utility functions was quantified and elaborated, along with the associated concepts of compensating and equivalent variations, the true cost-of-living index, and substitution bias. A parallel development occurred in the field of econometrics with the elaboration and development of techniques like the hedonic price model. This quantitative transformation is reflected in a shift in thinking about the appropriate way to compensate the consumer for an erosion in spending power in the face of price inflation, and provided the intellectual underpinning of the COLI approach.

The shift toward the COLI conception of the CPI evolved slowly at the BLS in the wake of the Stigler committee recommendations (e.g., the shift to a rental-equivalent view of housing

expenditures). But the next major transforming event was initiated by Federal Reserve Board Chairman Alan Greenspan in 1995 in testimony to the Senate Finance Committee. Greenspan conjectured that the growth rate of the CPI, as it was then constituted, might have an upward bias of between one-half to one-and-a-half percentage points per year – a significant “error” given that the prevailing annual rate of inflation was around three percent at that time. An upward bias of this magnitude has important implications for the use of the CPI as a guide to anti-inflation policy, and even more important implications for the cost of programs like Social Security, which uses the CPI to index benefits for the effects of inflation.

The significance of this last fact was not lost on the Senate Finance Committee, which was then struggling with the twin problems of a large contemporary federal government deficit and prospective deficits in the Social Security Trust Fund. The Committee empaneled a group of prominent economists, who concurred with the Greenspan’s assessment of a significant bias in the CPI (Moulton (1996)). This led, in turn, to the establishment of the Boskin Commission, whose task was to delve more deeply into the potential source of CPI bias. When its work was finished, the commission concluded that the bias was around one percentage point, the mid-point of the Greenspan range, and attributed about half to methodological issues like substitution bias, and the other half to a failure of CPI fixed-basket methods to account for improvements in product quality and the development of new goods.

The Boskin Commission report was followed by a period of debate and reassessment of the various CPI problems critiqued by the Commission. The NAS report concluded that one outcome of the Commission’s work was to fully make the COLI approach “the measurement objective for the index (page 14)” by BLS, who “reported to Congress [in 1997] that it had been

using a COLI concept for many years to help make decisions about the CPI (page 14).” The NAS report stated that the Boskin Commission’s report “undoubtedly spurred BLS to broaden and make more explicit that commitment [to the COLI].” The subsequent changes wrought on the CPI caused an estimated three-quarters of one percentage point decrease in the average annual growth rate of the index. The establishment of the NAS panel at the request of BLS was another important legacy of the Boskin Commission, albeit indirect.

This brief history of the CPI program reveals the important role played by political economy considerations in the evolution of the program, from its early use as an inflation index during World War I, to the structural reforms of the last ten years. It is highly significant that the motivating force behind these structural changes emanated from the policy and political communities, indicating the importance that stakeholders and their representatives attach to the CPI. The full weight of this point is driven home by what is perhaps the most gripping finding of the Boskin Commission: the commission estimated that the cumulative effects of one percent per year bias would have added \$1 trillion to the national debt between 1997 and 2008 (including additional interest payments). They also observed that if the bias were viewed as a formal program of the federal government, it would rank as one of the largest sources of government outlays. These facts were evoked in order to point to the benefits of reforming the CPI. However, this \$1 trillion benefit could equally be seen as a transfer of income *from* those whose benefits were reduced *to* the general taxpayer. Whatever the technical merits of the case for eliminating the CPI bias, the size of the income transfers involved insure that the political economy dimension of the bias must also be considered.

III. The Political Economy of Price Measurement: Theoretical Framework

The political economy of measurement does not have an elegant mathematical formulation comparable to that of modern economic theory, but that does not make it any the less important in understanding the constraints and possibilities shaping government statistical programs like the CPI. The relevant principle of the political economy is this: like all other aspects of government in a democratic system, a nation's statistics are ultimately subject to the consent of the governed. This consent depends on many complex factors, but the *legitimacy* that attaches to an important statistic like the CPI is one of the most important. Legitimacy includes the NAS report's idea of "perceived credibility" of the hedonic price research underpinning the CPI, but goes well beyond it.

In previous work on the use of price hedonics in the CPI program, I likened the introduction or significant modification of the statistical system to a change in the taxation system. Any major reform of the tax system occurs only after considerable political debate, and when a new tax is introduced, there is typically a period of learning in which the consequences of the tax become apparent, and people adjust their behavior in light of the new tax incentives. Those affected by the change may succeed in negotiating modifications to the tax, and unintended consequences become apparent and are dealt with. The tax matures as stakeholders move down this learning curve, and the tax acquires legitimacy in the process (perhaps a grudging legitimacy in the eyes of many). This acquired legitimacy is akin to the notion of "equilibrium" in economic theory, and is the basis for the adage that "an old tax is a good tax."

Methodological changes to the national statistical system rarely trigger the kind of

tendentious debate that is routinely associated with changes to the tax system, but a similar principle applies to economic measurement for many of the same reasons: “old data are good data.” The Boskin Commission’s \$1 trillion estimate is a reminder that changes to the CPI can have major redistributive consequences of the same order of magnitude as major changes to the tax system. And, like taxes, the changes in the CPI can have significant economic and political transactions costs, because they create economic winners and losers who may seek redress in the political system as well as in wage and contract renegotiations. The theoretical rationale for a one-size-fits-all cost-of-living adjustment is precisely that it is a low transaction cost way of providing some relief from the effects of inflation without the need for costly and uncertain negotiations.⁵ The proposition that “old data are good data” follows as a corollary, since existing arrangements come to acquire a *de facto* legitimacy in a democratic system.

⁵ It is easy to imagine the chaos ensuing if an attempt were ever made to replace the current “one-size-fits-all” system with one in which every individual were to be given a COLA on the basis of their own, possibly unique, COLI experience. This is not administratively feasible, because individual COLIs are not an observable personal characteristic (even if they are assumed to exist) and would have to be estimated or imputed for everyone.

The issue of legitimacy is the strongest part of the case in favor of the fixed-basket COGI approach to the CPI. The simplicity and transparency of COGI noted by the NAS report is an important political economy argument in its favor, as is the fact that it was the accepted basis for the CPI for the first decades of the program's existence. However, the problems faced by the COGI approach in coping with changing economic circumstances is an important example of why the proposition that "old data are good data" is not sufficient for sustaining a sense of legitimacy over time.⁶ Taken to an extreme, it would imply a complete stasis in development of statistical programs. In the case of the CPI, this would mean repricing the fixed basket of 1913 goods, an obvious absurdity in measuring price changes in the year 2004. The challenge for political economy is to find an optimal rate of programmatic change that balances the weight of tradition and the economic and political transaction cost associated with altering the *status quo*, on the one hand, with the need for change driven by the dynamism of the economy, shifts in political consensus, and the development of new techniques in index number theory, on the other. The optimal rate of transition is not instantaneous, but neither is it zero.

It is desirable, from the standpoint of legitimacy, to have a set of *a priori* rules to guide

⁶ The debate over sampling versus enumeration in the population Census is another example of how the sense of legitimacy of "old data" can shift. The "old" approach to obtaining Census data relied on procedures whose aim was to obtain a whole-count enumeration of the population. This approach relies on a strict interpretation of the U.S. Constitution and the weight of tradition for its legitimacy. The legitimacy of this approach has been challenged on the grounds that the errors involved in an attempted full enumeration are not distributed equally across demographic groups, and that the sampling approach is a more accurate way of achieving the spirit of the Constitutional requirement for a population census (one which is also more consistent with the Constitutional principles of equal treatment under the law and the "one-person-one vote").

the process of programmatic change, rather than to rely primarily on pragmatism.⁷ An accepted set of rules, or conceptual framework, plays the role of “honest broker,” as free as possible from the opportunity for discretionary manipulation. Some degree of individual discretion and pragmatism is, of course, an inevitable necessity since no set of *a priori* rules can ever hope to anticipate and resolve every problem. So is the ultimate need to secure the consent of the governed by validating major changes to the statistical programs. However, the history of tax policy illustrates an important lesson about the perils of putting politics ahead of principle. It is worth noting, in this regard, that the decision by Congress to grant the Bureau of Labor Statistics a relative degree of independence was an explicit recognition by politicians themselves that the nation’s macroeconomic statistics needed to be guided primarily by principles rather than politics.

Economic theory is the obvious candidate for the job of honest broker. Theory provides an *a priori* set of technical rules that has evolved over time through an intellectual trial by combat. The theory-based COLI provides a model for adjusting the CPI for a change in relative prices, for defining the appropriate domain of the index, and for updating it in the face of product innovations. The fixed-basket COGI approach, on the other hand, offers no guidance on these issues and must rely on discretionary and pragmatic judgments (many of which are informed by

⁷ The issue of rules versus discretion is a familiar debate in monetary policy. The value of accepted rules that regulate decisions involving the direct transfer of money or political power is more important, because of the costly disputes over even minor points that might otherwise arise. More generally, institutions necessarily operate through rules, and are to some extent defined by the rules that are seen as legitimate.

theory anyway). Those who argue that any set of economic principles, including the COLI framework, reflects implicit value judgments and therefore cannot be advertised as an objective value-free science may have a point, but it is largely irrelevant to the issue at hand. What is important from the political economy standpoint is the objectivity of standard economic theory that arises from the fact that it is an *a priori* body of systematic principles, and not the value-free objectivity of those principles. Those critics are free to propose any alternative theory they wish, subject to the proviso that all alternatives, including standard economics, are subject to the final verdict of the political process. A more serious criticism is raised in the NAS report: economic theory, specifically the theory of utility, is not entirely adequate to the task of shaping the CPI. This is a deep criticism that will be treated in the following section. However, a final issue about the role of expert advice needs to be addressed first.

The application of economic principles to the design of macroeconomic statistics like the CPI naturally requires a cadre of statistical agency staff and outside experts adept at applying those principles. This research community tends, with some justification, to see its role as “optimizing” the CPI by bringing to bear the best available technical answers. The “best” in this context does not include political economy considerations, which is often seen by the researchers as jeopardizing the rate of adoption of the “best science.” Unfortunately for this view, different basic researchers may have different ideas of what is best: it is generally easier for individual researchers to persuade themselves that their research is worthy than it is for them to persuade each other. This is one of the main factors that slows the optimal rate of diffusion of new knowledge, and is the source of the NAS panel’s reticence about applying existing research in some areas without further development, and about the need for the research to achieve

“perceived credibility.” Indeed, the need for “perceived credibility” in many areas of science is exactly what the NAS panel process is all about: various branches within the National Research Council of the National Academies (in this case, the Committee on National Statistics) are routinely called on to empanel committees of experts to define the limits (and limitations) of the appropriate science on issues of public policy, like the CPI. Thus, the NAS-NRC is itself a direct part of the political economy process of knowledge diffusion, as is the NAS report itself.

IV. Economic Theory and the Cost-of-Living Index

The argument that economic theory can serve as a honest broker in the political economy process, and the proposition that the COLI approach to the CPI dominates the COGI on its own grounds, does have the flaw noted in the NAS report and elsewhere. The COLI approach is based on utility theory with its postulates of rational choice, and on special assumptions about the nature of the utility function. The very existence of this theory has been challenged by psychologists and the NAS report concludes that:

“In contrast to the core assumptions of the economic theory of consumer behavior, experimental research in psychology and decision making indicates that choice, or *revealed preference*, is at best an imperfect measure of experienced utility. Choices are often based on erroneous assumptions, always dependent on the given context, and frequently fail to increase experienced utility even when the consumer has abundant experience with the product of choice” (page 54).

Moreover, even if utility functions are assumed to exist, they almost certainly fail to exhibit the requisite properties of homotheticity and separability. The first of these issues involves the problem of the “path dependence” or uniqueness of the index (Hulten (1973), Samuelson and

Swamy (1974)). Unless the utility function exhibits the property of path independence, there is, in general, no unique representation of the cost-of-living index. Path independence involves, among other things, the property of homotheticity, which, in turn, requires unitary income elasticities, and thus the assumption that goods are neither luxuries nor necessities. This led Samuelson and Swamy to remark that:

“Nor should we shoot the honest theorist who points out to us the unavoidable truth that in nonhomothetic cases of realistic life, one must not expect to make naive measurements that untutored common sense longs for; we must accept the sad facts of life, and be grateful for the more complicated procedures economic theory devises (page 592).”

This “don’t shoot, I’m just an honest economist” remark is a refreshingly honest admission of the limits to the applicability of economic theory by one of the greatest of all economic theorists. It hardly encourages heavy reliance on economic theory as the sole, or even main, basis for the CPI.

The problem of path dependence is also linked to the problem of separability (Hulten (1973)). The NAS report notes two separate aspects of this problem: one concerning the domain of the index and the other, aggregation of preferences to achieve a group COLI. The first aspect involves the fact that the utility level (indifference curve) associated with a subset of goods selected for constructing the COLI-CPI will inevitably depend on goods not included in the bundle.⁸ For example, the relative value of high-performance automobiles depends on the

⁸ Put somewhat more precisely, a utility function $U(Y,X)$ is separable into a function of the bundle of goods X when the tradeoff between the components of X (the marginal rate of substitution) is invariant to the amount of any of the other goods in the bundle. In this case, a sub-indifference curve can be defined for the bundle X that doesn’t shift and turn with changes in Y . In cost-of-living indexes, the indifference curve is associated with a given standard of living. If a unique price index based on a fixed standard of living is desired and the domain is to

condition of the roads on which the auto is expected to travel and on the nature of the traffic laws. The former is a plausible candidate for inclusion in the CPI, while the latter are background or environmental variables that are not. This is the source of the NAS report's distinction between unconditional and conditional indexes, the latter being conditioned on a given set of "outside" variables.

The preceding remarks refer to the COLI for a single consumer. The CPI is a group index and, if the CPI is to be based on the COLI approach, the relevant COLI must refer to the standard of living of the group and not just of a single individual. The formulation of a group COLI leads to the issue of how to aggregate across individuals, and the problem of path dependence rears its head here, as well. Even if a unique COLI can be defined for every individual, it is unlikely to exist for the group as a whole. And, if all else succeeds, there is still a potential problem with the COLI approach: tastes may change over time, leading to a shifting and ambiguous notion of living standard.

One way out of this conundrum is to appeal to the representative consumer model. This approach avoids the problems associated with aggregation by focusing on the "average" consumer within a group, and endowing this representative agent with all the properties needed for a well-defined COLI. The NAS report notes that

be X, it must be invariant to changes in Y, and therefore must have the separability property. When the separability condition fails, a change in Y will lead to a change in the marginal rate of substitution within X, and a multiplicity of possible COLIs (a situation the NAS report terms "inconvenient" on page 49).

“Indeed, it is often difficult to discuss COLIs with non-economists, policy makers, or the public at large without some sort of appeal to [this] concept (page 241).”

This statement seems to suggest that the representative consumer model is a “user friendly” way of discussing the COLI with non-specialists. However, the report also denounces the representative consumer approach in the following terms:

“This imaginary person has a living standard that is somehow supposed to represent a national level of living and for which a cost-of-living index number can sensibly be defined. Such fictions can be justified only under extremely implausible conditions (page 51).”

Some of problems with the COLI and representative consumer have been addressed by innovative research, and partial fixes have been proposed. However, the NAS’ main point about the lack realism of consumer theory is too hard to refute. Indeed, much the same can be said about the supply side of economy, where the aggregation conditions for production functions and inputs are equally implausible (Fisher (1969), Hulten (1973)). However, this negative critique leads to a more general question: if the assumptions of theory have to be exactly valid in order for theory to be applicable to any important issue of public policy, not just the CPI, can theory ever be used to inform policy? The NAS report seems to advocate “taking a pragmatic approach,” in the quotation cited in the opening paragraphs of this paper, but does not spell out any conceptual basis for this pragmatism, nor does it indicate how to judge between competing pragmatic prescriptions. The possibility that different panels of experts may arrive at different judgments about the CPI subjects the pragmatic approach to a variant of the path dependence

problem that causes the COLI approach to be wanting.

The irony of this line of attack is that no one would seriously propose using this framework to estimate an exact COLI from every individual's utility function even if all the assumptions of utility theory were completely valid. This is a computationally and administratively impossible task, even if the many econometric difficulties involved could be satisfactorily overcome. The critique of theory should therefore start with the CPI as it stands and examine how theory might better achieve the goals of the program. The political economy discussed in the preceding section made the case that the COGI framework cannot meet these goals in a dynamic economy, whereas COLI theory can do "rough justice" to these goals. The insights provided by the COLI model procedures include the use of flexible index number formulae with a frequent change of weights to deal with substitution bias, the need to revise the composition (or domain) of the CPI basket to reflect the goods that consumers actually want (i.e., that enter their budget sets and utility functions), and the theoretical role of new goods and quality change in changing consumer welfare.⁹ It is possible to argue about the magnitude and existence of a precise substitution bias, but not with the associated fact that demand curves slope downward; it is possible to argue against the existence of a precise utility function, but not with

⁹ The full implication of this point is best made by citing the following remark by Triplett (2001): "Constructing a CPI is not just a matter of choosing a formula that combines the detailed component prices Hundreds and perhaps thousands of decisions must be made in measuring those detailed component indexes. Those decisions are not solely statistical or sampling or collection and processing decisions. Many of them involve economic questions Applying the theory of the COL index to the CPI means that those ... decisions are guided by a consistent, overall decision-making framework, which is the economic theory of consumption (page F315)."

the associated fact that consumers do actually choose goods is reflected in their changing expenditure patterns; one can challenge whether consumers living on fixed incomes should have their COLAs reduced because of product innovation, but not whether product innovation makes people better off, all else being equal.

When it is applied this way, COLI theory does not impose itself as a total concept, but instead acts as a rule-based “informing paradigm” or “parable” for meeting the goals of the CPI program.¹⁰ The fact that theory is rule-based and places limits on discretionary pragmatism is important for its perceived legitimacy and thus enhances its value whatever its other perceived deficiencies. As for the accuracy of a CPI informed by COLI principles, this is an empirical matter, and it is the perceptions of those affected by inflation (or who are charged with managing it) that counts the most. It is worth noting, in this regard, that the pressure for changing the CPI in the mid 1990s came from the last of these groups, whose perception of an upward bias in the existing CPI led to a demand for a greater use of economic prescriptions in the program rather than less.

¹⁰ Parables are stories told to illustrate a valid point or principle. Thus, the fictitious nature of theoretical constructs like the representative consumer are not necessarily useless just because they are not true. The remark by Triplett (2001) is particularly pertinent here: “Theory always abstracts. Krugman (1998, p. 19) has noted that ‘Economic theory is ... a menagerie of thought experiments – parables, if you will – that are intended to capture the logic of economic processes in a simplified way’. That is often lost sight of in criticisms that confuse descriptive usefulness with analytic usefulness (page F318).”

V. Individual CPI Issues

This paper has offered a defense of the COLI approach as a valid paradigm for the CPI, based on political economy principles and what might be called “economics lite.” This perspective has implications for many of the specific issues discussed in NAS report. For example, the use of the fixed-weight Laspeyres may make sense in the static COGI world, but it has little to recommend it in a dynamic world. The economic perspective also suggests that the appropriate domain of the price index is the basket of goods and services actually in the consumers’ market sets, with “environmental background” factors excluded (the panel’s Conclusions 2-1 and 2-2). Theory also provides a means of addressing the problems raised by product innovation and obsolescence, a sufficiently complex issue that it requires special comment.

A. Changes in Product Quality

Products come and go in a dynamic world, with the result that the market basket of the 1913 CPI is vastly different from the current basket. As the composition of the market basket changes, there is the technical problem of how to bring in the new or improved goods as older varieties and obsolete goods disappear. This is done in a variety of ways described in the NAS report, but the net result was judged unsatisfactory by Shapiro and Wilcox (1996), who estimated that the failure to account for quality change led to an upward bias at 0.25 percentage points per

year (with a “new goods” bias of 0.20 percentage points). The Boskin Commission put the combined bias at 0.60 percentage points, but did not split it into the two components.

The NAS report singles out the hedonic price regression approach as the most promising way of dealing with this quality bias. However, the report’s Recommendation 4-3 urged the BLS to adopt a “more cautious integration of hedonically adjusted price change estimates into the CPI (page 141).” This recommendation reflected the panel’s view that there is not enough experience with hedonic techniques in non-high technology items, and that the instability of estimated parameters in some existing studies raised “perceived credibility” issues. The panel sensibly recommended more research and experimentation, but as noted above, did not spell out what it meant by “perceived credibility” or just how much credibility was needed before the technique was acceptable. Ironically, new research by Pakes (2002) directly challenged this second recommendation by arguing that parameter stability was irrelevant to the problem of adjusting the CPI for quality change. More research has been done or is under way, and the present state of the debate is thus highly unsettled, further complicating the issue of perceived credibility.

Clearly, more needs to be said about hedonic modeling and the stability of the parameters and forecasts. Here is where one of the major problems with the hedonic approach comes to the surface: the “characteristic” variables on the right hand side of the hedonic regression (whose unstable parameters are the focal point of the debate) should be determined by the theoretical structure of the underlying choice model, but in practice they seldom if ever are. Part of the debate over the selection of characteristics has distinguished between ones related to inputs and others related to outputs (computer processor speed versus number of MIPS instructions actually

processed). Another part has raised the question of separability of characteristics (inside versus outside), and observed that processor speed or MIPS depends on “external” goods like software (alternatively, automobile horsepower or speed, on the one hand, versus road quality on the other). Without an underlying structural model tying goods to their component characteristics, the question of parameter stability and robustness of alternative quality-adjustment forecasts becomes an important problem.

B. New Goods

Product innovation also takes the form of “new” products that were unavailable in the past: open heart surgery, cellular telephones, automatic teller machines, the internet, and personal computers are prominent examples. Hicks (1940) proposed a theoretical solution to the problem of measuring the consumer surplus associated with the arrival of such goods in the market place, based on comparing the so-called “reservation price” at which none of the good would have been demanded anyway to the price at which it is introduced. The CPI currently makes no adjustments to account for the benefits of new goods, and has historically been slow in even incorporating such goods in the CPI sample of goods. As noted above, the estimates of Shapiro and Wilcox suggests that this results in a 0.20 percentage point upward bias in the CPI. Nordhaus (1997) takes a more emphatic view of the bias, arguing that the history of lighting suggests that “by the very nature of their construction, price indexes miss the most important technological revolutions in history (page 54).” Hausman (1997) proposes an econometric

framework for measuring the omitted benefits.

The NAS recommended against making an adjustment in the CPI for new goods in its Conclusion 5-1. It bases this conclusion on what it sees as the problems with Hausman's econometric framework, and cites several criticisms by Bresnahan (1997). The NAS report takes the position that

“Research into welfare and price effects associated with new goods is important and deserves attention, but it is unlikely that such a program will produce a consensus methodology in the near future. Given the level of uncertainty among economists about the accuracy and replicability of current econometric techniques for estimating virtual demand, it would be imprudent for BLS to attempt to adjust the CPI to account for increased welfare that occurs at the point when new products are introduced (page 160).”

This is reasonable judgment call by a panel of experts in the field, and must be honored on political economy grounds alone because it reveals the strong absence of the necessary “perceived credibility.” However, the panel might have been clearer on the source of the problem. On the one hand, the remarks cited above suggest that the problem with the Hicks-Hausman approach is essentially one of implementation. On the other hand, the report goes on to state on the same page that

“Several members of the panel – particularly those advocating separate price and cost-of-living indexes – are unconvinced that adjusting the CPI to account for point-of-introduction would be a good idea even if the practical estimation problems could be solved.”

Under this second view, it is unclear why the additional research called “important” in the first quotation is necessary at all.

The confusion is compounded by the another position taken in the same chapter. After discussing how the new goods problem differs from the quality change problem (new goods

have new characteristics not present in existing goods, whereas quality improvement involves more of the same characteristics), the report concedes that

“These contrasts notwithstanding, no sharp dividing line separates a new good from a quality improved product (page 156).”

The dividing line shifts according to the level of aggregation of the analysis. In Nordhaus’ history of lighting example, the electric light bulb is a new good if compared with an oil lamp, but it is a quality change if the good in question is “lighting.” Similarly, the Intel Pentium processor is a new good in a narrow sense, but a quality improvement in a larger context. Since all categories of goods necessarily represent some degree of aggregation, the NAS report’s recommendations about the different treatment of new goods and quality change seems contradictory: at a high degree of *disaggregation*, the virtual price change (and benefit) associated with the new goods would not be counted; in a more aggregated analysis, the same goods would be treated as an improvement within the broad category of like goods and would be treated under quality-change rules in which price changes and benefits are counted. Clearly, more needs to be said on this issue.

C. Product Innovation Redux

The role of the CPI as an indicator of inflation, on the one hand, and as an index for cost-of-living adjustments, on the other, is central to the debate over the desirability of adjusting the CPI for new goods bias. Economic theory indicates that the adjustment is clearly warranted when the goal is to measure price inflation (and real economic growth). Otherwise, those

industries in which investment in product-oriented innovation (i.e., new and better output) occurs will appear to have a lower rate of output growth and larger price increases than industries that make equal investments in process-oriented innovation (more output). This reasoning underpins the decision by the Bureau of Economic Analysis to adjust the price of computers for quality improvement in compiling the national accounts.

However, this rationale does not necessarily justify the use of the COLI form of the CPI as an index for cost-of-living adjustments.¹¹ COLAs are ultimately based on contract negotiation and political action, not on theoretical economic reasoning. For the reasons set forth earlier in this paper, the parties to a contract negotiation (public or private) may well decide that the CPI provides an acceptable way of indexing the agreement for inflation, but this does not mean that they must automatically agree on all the specific provisions associated with the COLI approach. Indeed, COLA recipients may well choose not to endorse the practice of adjusting the CPI for quality change and new goods, because this means they will receive just enough COLA compensation to keep them at a fixed level of utility (or base-line indifference curve) until the contract is revised. They may bargain, instead, for a COLA that allows them to share in the benefit of product innovation (for example, by using a COLI that is not corrected for quality change and new goods, or by opting for a wage-based method of indexation). The theorist can only indicate the steps needed, in principle, to implement a fixed-standard of living index if that is what is desired. Theory *per se* cannot establish that this is the correct solution. However, this point cuts both ways: if experts cannot prove that the quality and new product adjustments are

¹¹ “I argue that a major problem is not the Consumer Price Index itself, but what it is used for; it is foolish to index benefits thoughtlessly and mechanically to a concept that is hard to define and harder to measure” Deaton (1998), page 38.

theoretically necessary and correct, neither can they prove that they are unnecessary.

D. Subgroup Indexes and Plutocratic versus Democratic Weights

An entire chapter is devoted to the question of “whose index?” The main issue is the appropriateness of a ‘one-size-fits-all’ CPI for indexing the benefits of subgroups, like the elderly, whose consumption patterns may differ from the pattern of the population as a whole. If this is true, the CPI constructed from weights based on the whole population may provide a biased estimate of the inflation experienced by the elderly, and policy makers may want to take this into account in setting Social Security pension policy. This is appropriately treated in the NAS report as an empirical question for which more research into demographic expenditure patterns is needed.

The associated political economy question of the transaction costs associated with a proliferation subgroup indexes is not given as much prominence as it perhaps deserves. The report does cite, on page 229, the Boskin Commission’s observation that “In principle, if not in practice, a separate cost of living index could be developed for each and every household based on their actual consumption and prices paid.” Taking the subgroup index issue to this extreme would obviously cause the CPI program to sink under the burden of an administratively unworkable and hugely costly system. There is obviously a trade-off between the benefits of improved subgroup accuracy and the increasing cost of achieving this accuracy by dividing the subgroups ever more narrowly. Another political economy cost arises from the realities of collective choice, which suggest that once an exception is made for one demographic group (e.g.,

the elderly) the same arguments can be applied to finer demographic gradations (e.g., the elderly poor, the elderly poor living in high cost regions, and so on). There is no the natural limit to this process except the power of special interest groups, and as transaction costs increase, a “rough justice “ approach becomes increasingly attractive.

This chapter of the report also calls attention to the distinction between “plutocratic” and “democratic” price indexes. The report notes on page 222 that

“The Consumer Price Index (CPI) is now a plutocratic index: the weight of each household’s consumption pattern in the overall index is proportional to that household’s total consumption expenditures. Since consumer expenditures rise with income, this approach gives more influence in the construction of national and regional indexes to the consumption patterns and prices paid by the rich than to those of the poor (page 222).”

The alternative democratic approach

“Would construct individual price (or cost-of-living) indexes for a representative sample of the whole population and then average them, assigning the same weight to each person, regardless of the magnitude of their consumption expenditures (page 223).”

The plutocratic index is appropriate for the measuring the actual rate of inflation in the macro economy. However, the choice between plutocratic and demographic indexes is ultimately a political matter. The job of the technical expert is to assess the consequences of the alternative approaches.

However, as above, the political economy of the problem might usefully be spelled out. Suppose, for example, that everyone in the society happens to agree that the prevailing distribution of income is optimal. In a democratic society, the plutocratic weights based on current expenditure shares would therefore be judged to be socially optimal as well, implying that the plutocratic and politically optimal weights are identical. If, on the other hand, the actual

and optimal distributions of income diverge, the two sets of weights will be different, but they will come back together if an optimal redistribution of income occurs through a system of taxes and transfers. This line of argument suggests that the problem with the plutocratic weights is really a matter of the failure of the political process to deliver an optimal distribution, and not an issue about the design of the CPI. The optimal distribution of income, in this case, may not be strictly equalitarian or “democratic,” since democracies have not, as a rule, opted for pure egalitarian outcomes. In this situation, a CPI based on “democratic” weights can hardly justify being described as politically democratic.

VI. Concluding Remarks

The NAS report contains a great quantity of valuable material and deserves much praise. Moreover, it took an intellectual *tour de force* to find the common ground of the competing points on so many different issues. However, it is also unfortunate in this regard, because it might have been better to present the different paradigms as competing alternatives, so that the differences, not just the common ground, could be explored. This paper has tried to make the case for one of these views over the other, based on political economy principles and a view of economic theory that is more suitable for policy purposes than pure textbook theory. This is not a conventional way to approach the problems of the CPI, and the theory of political economy as applied to measurement is not at all well established. This paper is offered as a first step in this direction.

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