"NON-MARKET FAILURE" REVISITED: THE ANATOMY AND PHYSIOLOGY OF GOVERNMENT DEFICIENCIES

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"Non-Market Failure" Revisited:

The Anatomy and Physiology of Government Deficiencies*

I. Market Performance Versus Government Performance

In 1977, J. K. Galbraith, presented a television series entitled "The Age of Uncertainty." Two years later, Milton Friedman followed with a television series entitled "Free to Choose," intended as a rebuttal to the Galbraith series although, as in some election campaigns, the adversary was not mentioned explicitly.[1]

"Age of Uncertainty" and "Free to Choose" dealt with the same subject: the market economy, how it originated and evolved, how it functions, its strengths and weaknesses, and the policy implications of its record. There the resemblance between the two series ended.

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This paper is an extension of "A Theory of Non-Market Failure: Framework for Implementation Analysis," The Journal of Law and Economics, April 1979. For a more detailed discussion of some points dealt with here in a summary fashion, the reader is referred to the earlier paper.

[1] Both Galbraith and Friedman produced best-seller books from their TV scripts, thereby providing evidence that their modes of personal economic behavior are quite similar, despite the sharp differences in their views about the behavior of the economic system.

While Galbraith, in the tradition of Marx and Schumpeter, fully acknowledged the manifold accomplishments of the market economy, he identified its evolution and maturation with macroeconomic instability ("uncertainty"), microeconomic inefficiency, and social inequity.[2] To remedy these deficiencies of the market, Galbraith and "The Age of Uncertainty" (AOU) viewed government policy and intervention as the essential means to bring about macrostability, microefficiency, and enhanced social equity.

For Friedman, in the tradition of Adam Smith, the salient characteristics of the market system are sharply different. A freely functioning market economy results, according to Friedman, in economic and technological progress, efficient utilization of resources, a rising standard of living that, with certain acknowledged exceptions, is distributed with reasonable equity, and a society characterized by social mobility and political freedom. For Friedman and "Free to Choose" (FTC), expansion of government beyond the minimal ("public goods") functions (e.g., defense and public order, but not the postal service!) impairs efficient resource use, impedes economic progress, and restricts social mobility and political freedom.

In analyzing the structure and operation ("anatomy" and "physiology") of government deficiencies, it is instructive to compare and explain the sharply constrasting views of the market and of government represented by Friedman and Galbraith, and by FTC and AOU, respectively.

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[2] To avoid any misunderstanding, it should be noted that, while Galbraith shared the Schumpeterian (as well as Marxian) view of the significant economic and technological accomplishments of capitalism and the market economy, Schumpeter held views concerning the system's efficiency and equity that were sharply different from those of Galbraith.

The pro-market view, represented by Friedman and FTC, is based on an idealized model of a perfectly competitive market, tending toward general equilibrium at a macroeconomic level and marginal optimization at a microeconomic level. This view draws support from the historical experiences of market economies in the industrialized west and Japan, and the dramatic recent experience of market economies in West Germany, Switzerland, Korea, Hong Kong, Taiwan, and Singapore. The Friedman and FTC argument against government intervention draws support from anecdotes about the propensity of large government organizations to mismanage their tasks (e.g., the post office, welfare agencies, defense, nationalized industries, etc.), as well as the disappointing economic records of countries like the United Kingdom and India, during several recent decades of socialist interventionism.

On the other hand, the pro-government view represented by Galbraith and AOU, is based on an idealized model of an informed, efficient, and humane government, able to identify and remedy failures of the market and achieve national goals formulated by democratic means, in accord with the precepts of welfare economics and the theory of economic planning developed by Lange and Lerner. This view draws empirical support from the generally favorable economic performance of the Scandinavian countries and the Netherlands, as well as such specific instances of efficient performance as Europe's government-operated railways. Similarly, the Galbraith/AOU argument against the market is based partly on anecdotes and examples of such negative market externalities as smog, airport noise, advertising billboards, and the depressingly low quality of commercial television. Significantly, the anti-market view is also

supported by a well-articulated theory of market failure, which comprises the core of welfare economics, and encompasses the problems created by public goods, externalities, and increasing returns, as well as the possible social inequity of "efficient" market outcomes.[3]

Thus, an interesting asymmetry emerges in comparing these pro-market/anti-government-intervention views with the pro-government/anti-market views:

	Market	Government (Non-market)
Pro-	Theory of competitive markets, supported by examples and country experience	Theory of planning, supported by examples and country experience
Anti-	Theory of market failure, supported by examples and experience	anecdotes and experience

The asymmetry is represented by the shaded rectangle in the southeast corner of the matrix: the argument between the pro-market/anti-government, and pro-government/anti-market, positions tends to be unbalanced because we lack a theory of government shortcomings ("non-market failures"), as a counterpart to the existing and well-formulated theory of market failure.

I do not mean to ignore or diminish the relevance and importance of public choice theory in explaining government deficiencies. The self-

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[3] For a fuller treatment, see my discussion of "The Inadequacies of Markets," Journal of Law and Economics, op. cit., pages 107-112. See also Buchanan's discussion of the intimate connection between welfare economics and the theory of market failure, in his paper for the Diessen symposium, James Buchanan, "The Achievement and the Limits of Public Choice in Diagnosing Government Failure and in Offering Bases for Constructive Reform," July 1980, p. 2.

interests of politicians and bureaucrats are important factors in understanding non-market processes.[4] Nevertheless, a complete theory of non-market failure requires more than is provided by public choice alone. Public choice theory tends to concentrate on the demand side of the problem, devoting relatively less attention to the conditions of supply. For example, the typical pattern of exclusivity (monopoly) in the conduct of non-market activities, the high degree of uncertainty surrounding the technology of producing many non-market outputs, and the frequency of "derived" or unanticipated externalities resulting from these outputs, are ignored or inadequately explained by existing public choice theory.

Moreover, public choice theory suffers from two other shortcomings. It ignores the role of organizational inertia, tradition and routines as contributors to non-market failures. These factors are even more likely to be influential in organizations insulated from the discipline imposed by the market than in organizations (firms) that are not thus insulated.

Furthermore, the theory that I believe is needed should embrace the wider range of activities, outputs, and "failures" covered by the "non-market" sector as a whole, rather than the "public" (government) sector alone. Although government is the largest member of the non-market sector, the others (foundations, and universities, in particular) are

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[4] See, for example, the previously cited paper by Buchanan, as well as William Niskanen, Bureaucracy and Representative Government, 1971; Barry Weingast, Kenneth Schepsle, and Christopher Johnson, "The Political Economy of Benefits and Costs: A Neo-Classical Approach to the Politics of Distribution," July 1979, Working Paper No. 47, Center for the Study of American Business, Washington University, St. Louis, Missouri; and George Stigler, "The Theory of Economic Regulation," Bell Journal of Economics and Management Science, Spring 1971.

numerous, vast, and growing, as well. The behavior and deficiencies of those other non-market organizations should be encompassed by a proper theory of non-market failure, in order to highlight similarities and differences, as well as to permit suitable comparisons with the market sector.

The dimensions of public choice theory, by itself, are too restricted to provide an adequate frame for this picture.

Lest the absence of suitable theory be dismissed as unimportant, it is worth recalling Keynes' familiar comment:

> "Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist... The power of vested interests is vastly exaggerated compared with the gradual encroachment of ideas."

A more fully developed theory of non-market failure is needed to provide better balance in the previous matrix, as well as a better guide to public policy.

II. Non-Market Success and Failure

Market failures of various sorts provide the principal rationale (some would say "rationalization") for attempted non-market (that is, government) remedies. In both cases, the "failures"--whether market or non-market--should be evaluated in terms of the same criteria of success: allocative efficiency,[1] and distributional equity judged according to some explicit social or ethical norm. Thus, non-market remedies "fail" to the extent they, too, result in outcomes that depart from the efficiency or distributional goals by which market outcomes are judged to fail.

Not only are the touchstones of market and non-market success similar, but the underlying reasons why non-market solutions fail have certain similarities to those which explain why market outcomes fail, as well. In the case of both market and non-market failures, incentives influencing individuals or organizations ("firms," in the one case, and entities acting for or constituting "government," in the other) may lead to outcomes that diverge substantially from what is socially preferable. Just as the absence of particular markets and precisely defined (or definable) property rights accounts for most market failures, so non-market failures are due to the absence of mechanisms for reconciling

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[1] Hence, in both the market and non-market cases, other efficiency criteria (e.g., dynamic efficiency, x-efficiency, and technological efficiency) are neglected. These other types of efficiency are omitted from the following discussion. Their omission does not imply that they have a less significant impact on economic performance than does allocative efficiency. For a discussion of the relative importance of the several types of efficiency, see my "Economic Efficiency and Inefficient Economics," Journal of Post Keynesian Economics, Fall 1979, Vol II., No. 1.

calculations by non-market decisionmakers of their private and organizational costs and benefits with total (social) costs and benefits.

Whereas market organizations derive their principal revenues from prices charged for outputs sold to buyers who can choose what to buy as well as whether to buy, non-market organizations derive their principal revenues from taxes, donations, or other non-price sources. The non-market sector thus includes foundations, public universities, and voluntary organizations like the Boy Scouts, as well as government.

As the largest of among all non-market organizations, government engages in four types of activities: (1) providing regulatory services (environmental regulation, radio and TV licensing, food and drug regulation, interstate commerce regulation); (2) producing "pure" public goods (national defense, crime prevention and maintenance of public order, space research and development); (3) producing quasi-public goods (education, postal services, health research); and (4) administering transfer payments (federal, state, and local welfare programs, social security, veterans' benefits).

These activities and their associated outputs have certain demand and supply characteristics that, in degree or in kind, distinguish them from market activities and output. The distinguishing characteristics can be used to generate non-market demand and supply functions, and these, in turn, result in particular types of "failures" (deficiencies) to which non-market activities are prone.

III. Non-Market Demand

On the demand side, the distinguishing characteristics include the following:

A. A dramatic increase in the past few decades in public awareness of the shortcomings of market outcomes. Contributing to this increase are both the real and intensified shortcomings (e.g., the growth of toxic wastes and pollutants, increased population density and, consequently, the greater importance of externalities, etc.), and the vigorous and increased activity of the information media, environmental groups, and consumer organizations in publicizing these shortcomings. Increased awareness of monopolies, oligopolies, imperfect markets, of negative externalities (for example, pollution, pathogenic side effects of drugs and foods, spoliation of public lands, waters, and beaches), and of distributional inequities, has resulted in intensified and politically effective demands by voters, and their sometimes self-appointed agents, for remedial action by government.

It is worth emphasizing that these demands depend as much on public perceptions of the shortcomings, as on the shortcomings themselves. Moreover, because of the difficulty of accurately measuring these market failures, substantial divergences between perceptions and realities may persist for extended periods. It thus becomes of central importance for the theory of non-market failure to consider the process by which public perceptions of market failures are formed, a point we will return to later.

B. In the political process which mediates public demands for remedial action by government, rewards often accrue to legislators and executives who articulate and publicize problems and legislate proposed solutions, but rarely assume responsibility for implementing them.

C. In part as a consequence of this reward structure, and of the short terms associated with elected office, the rate of time discount of political actors tends to be higher than that of "society."[1] There is often an appreciable disjuncture between the time horizons of political actors, and the time required to analyze, experiment, and understand a particular problem (or market inadequacy) in order to see whether a practical remedy exists at all.

D. However, a loose variant of the market law of demand operates also in the non-market area: as costs and "prices" (as defined below) rise, demands for non-market activities and output have some tendency to decline. Taxpayers and voters become aware that they are paying more for government activity, yet often enjoying it less or, at the least, not equivalently to what they are paying.

The result of the demand characteristics referred to in (A) through (C) is often a premature, but politically effective, demand to establish

[1] An empirical test relevant to propositions C and B has been suggested to me by Charles Phelps. Because the term of office for U.S. Senators is three times as long as that for Representatives, we should expect greater reluctance in the Senate than in the House of Representatives to enact legislation associated with ballooning downstream costs but yielding modest benefits in the near term. Conversely, we should expect greater initiative and receptivity from the Senate than the House with respect to legislation associated with moderate current costs and large future benefits. For example, the contrasting records of the Senate and the House regarding defense appropriations and nuclear waste legislation would seem to be consistent with this predicted pattern.

public programs for producing some non-marketed output, as a response to an originally perceived market inadequacy or failure. The equal opportunity and model cities programs of the 1960s in the United States, and the decision in the early 1970s to emphasize "targeted" cancer research, are examples. In such cases, the political effectiveness of public demands can lead to non-market activities with infeasible objectives and redundant costs.

The demand characteristic noted in (D) can, at some point and to some extent, act as an offset to characteristics (A) through (C): beyond some point, the mounting costs and increasing "tax-price" of non-market activities may lead to a reduction in the quantity of those activities that is demanded. The fiscal containment movement in the United States (e.g., Proposition 13 in California, and the tax and spending limitations that have been proposed or enacted in about two dozen other American states), and in Britain in recent years, exemplify this characteristic.

In light of these characteristics, we might specify, as a heuristic device, a function indicating the aggregate demand for non-market activities, and the component demands for particular non-market activities:

$$D_i = D_i(\hat{X},\hat{M},\hat{I},\hat{G},\hat{E},R,P,Y) \qquad (1)$$

and

$$D = \sum_{1}^{n}(D_i), \qquad (2)$$

where

D_i = demand for the i^{th} non-market output, with i=1, 2...n (for government activities, the n-outputs fall within the four general types described in the text),

D = aggregate demand for the n non-market activities (expressed in dollars, because of the difficulty of measuring many non-market outputs in physical units, and the accounting convention of expressing non-market outputs as equal to their input costs),

$\hat{X}$ = perceived externalities resulting from market activities (expressed in dollars),[2]

$\hat{M}$ = perceived degree of monopoly (perhaps measured by the concentration of industry, or by the difference between prevailing prices of market goods and their competitive prices),

$\hat{I}$ = perceived market imperfections (including barriers to entry, discriminatory access to credit, the extent of patent or other technological restrictions, etc.), perhaps measured as a qualitatively scaled variable,

$\hat{G}$ = perceived "need" or demand for pure public goods such as defense, (measured in dollar terms, by the (vertical) summation of individual demands for public goods),

$\hat{E}$ = perceived inequities, reflecting some specified standard of equity (e.g., according to equality of outcome, or equality of opportunity; or equity according to Rawls, or Marx, or the Old Testament, or the New Testament), and measured accordingly (e.g., by an appropriate Gini coefficient, or a qualitatively scaled variable),[3]

R = the tax rate,

P = the cost of a "unit" of non-market activity (because of the aforementioned difficulty of measuring non-market output in physical units, this cost may be measured as the average input cost per man-year of non-market activity, e.g., the average government wage

Y = national income (expressed in dollars)

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[2] If v_{mj}^{s} represents the externalities experienced by all k individuals as a result of an individual i's consumption of the j^{th} unit of a good, s, then $X = \sum_{s=1}^{n} \sum_{m=i+1}^{k} v_{mj}^{s}$, where n is the number of goods produced. $\hat{X}$ is the perceived magnitude of X.

[3] For a discussion of the perplexing problem of defining and measuring "equity," see my "Ethics and Policy Analysis," The Rand Corporation, P-6463-1, February 1980.

The symbol, $\hat{}$, above a variable denotes the perceived, rather than the actual, level of the variable, a point we will return to later.

In accord with the previous discussion of characteristics of demand, the partial derivatives of aggregate non-market demand D, with respect to $\hat{M}$, $\hat{I}$, $\hat{G}$, $\hat{E}$ and the absolute value of $\hat{X}$, are expected to be positive, although the partial derivatives of some of the separate D_i's with respect to each of these variables may be zero. For example, the demand for defense-related non-market output will presumably be unaffected by the perceived degree of monopoly, or externalities, or social inequities. On the other hand, the demand for regulatory programs will be affected by the perceived degree of monopoly and of externalities, and the demand for income transfers will be affected by perceived inequities.

The partial derivatives of aggregate non-market demand D, with respect to the tax rate R, and the wage cost P, are presumed to be negative.[4] In a rough sense, R is the "tax price" associated with non-market activity, so both the D_i's and aggregate D will tend to fall as R rises. The government wage rate P is a particular factor cost of non-market output to which taxpayers (voters) may be especially sensitive. If government wage rates rise (relative to non-government wages), public reaction may be invidious and adverse, and public demand for non-market activity can be expected to diminish.

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[4] There is some similarity between my treatment here of the demand for non-market activities and that of Buchanan in his The Demand and Supply of Public Goods, Chicago, 1968. For example, his point about the "functional relationship between quantity demanded and the 'tax-price'," is the same as my comment about the negative partial derivative of D with respect to R. But thereafter our two arguments (in both meanings of that term) diverge.

National income Y, is included in the demand function on the premise that there is likely to be a positive income elasticity of demand for non-market output, as there is for most market output. However, this premise is perhaps more arguable in the case of non-market than market demand. For some of the n non-market activities (for example, those relating to the administration of social welfare and other redistributive programs) demand may vary inversely with Y: the demand for certain non-market activities may be higher in business cycle troughs than at the peaks.

But even if, on balance, aggregate non-market demand tends toward a positive income elasticity, there is yet another complication. If the tax structure is "progressive," the effect on non-market demand of a change in real income, Y, may be offset by the interaction between the income change and the resulting changes in the average tax rate and aggregate tax take. While higher income will incline voters toward increased non-market demand, the higher percentage tax liability resulting from their higher income will tend to diminish non-market demand.[5]

The foregoing observations suggest that the income elasticity of non-market demand, though positive, may be only moderately so.

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[5] Thus, $dD/dY = \partial D/\partial Y + (\partial R/\partial Y \cdot \partial D/\partial R)$. The bracketed expression is the indirect tax-rate effect of income changes. It will provide a partial offset to the direct effect of income change on non-market demand ($\partial D/\partial Y>0$), because $\partial R/\partial Y>0$, and $\partial D/\partial R<0$.

IV. Perceptions and Realities

The notion of "perception," reflected by the symbol, ^, applied to five of the arguments in the demand function, requires elaboration. A useful distinction has been made by Coddington between the existence of "knowledge deficiencies" (covering "risk, uncertainty, mistakenness, ignorance, deception, and delusion"), and the provision of "knowledge surrogates" (referring to "conjecture, expectation, perception, learning, adaptations, and so on"), in response to these deficiencies.[1] While there is some link between "expectation" and "perception," as "knowledge surrogates," there is an important difference between them.

In the rational expectations literature, it is assumed that the process by which expectations are "rationally" generated yields an estimate of the "expected" value of a variable that is a better approximation of its "true" value than is the current "actual" value of that variable. In contrast to this view, a different result may ensue from the process by which "perceptions" of the non-market failure variables, X, I, M, G, and E, are generated: the perceived values may persistently diverge from the "true" values, for reasons suggested in the previous discussion of demand characteristics (A) - (C) above.

For example, the incentives of the news media, and of political actors, and of special interest groups, often lead them to magnify newsworthy instances of market failure (e.g., collusion, restricted

[1] See Coddington, Alan, "Creaking Semaphore and Beyond: A Consideration of Shackle's, Epistemics and Economics," in British Journal of Philosophy of Science June 1975, pp. 151-163, cited in Brian Kantor, "Rational Expectations and Economic Thought," Journal of Economic Literature, December 1979, pg. 1429.

entry, corruption, monopolistic profits), and to highlight the frequent inequity of market outcomes in itself and as a major source of prevailing or potential (social) instability.

Several additional influences may operate to distort perceptions.

For example, a distorting influence can be exercised by pressure groups whose special interests may be advanced by government intervention.[2] As a result, such groups often undertake politically effective efforts to emphasize and exaggerate both the shortcomings of the market, and the social benefits to be obtained from government action. Examples are provided by the political pressure of teachers' unions on behalf of expanded government funds for education, the trucking industry and teamsters union on behalf of various restrictions to limit competition in surface transportation, and the airline industry (at least, the competitively weaker firms) in favor of government regulation of routes and fares.[3]

A second distorting effect arises from the tendency of government--especially, but not exclusively, the bureaucracy--to be hypersensitive to market shortcomings in the optimistic belief that it (the bureaucracy, or the legislature) possesses the means to remedy them. That the Occupational Safety and Hazards Agency (OSHA) will be or become exces-

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[2] I am indebted to Professor Horst Hanusch for calling attention to this point in his comments on an earlier draft of my paper at the Diessen conference. See his "Philosophy of Government Failures: Some Comments," Diessen, July 1980; see also Stigler, op cit.

[3] Describing the point in its French manifestation, Alain Peyrefitte makes the following comment: "Public administration belongs to civil servants. But additionally, religion belongs to the clergy, health to physicians, education to teachers, intelligence to intellectuals, and chairmanships to Polytechniciens," Le Mal Francais, Paris, Plon, 1976, p. 319.

sively prone to seek and even exaggerate potential dangers presented by the work place, or that the Food and Drug Administration (FDA) will tend to be more concerned about the dangers of allowing pharmaceutical preparations on the market too soon rather than too late, are these agencies' own inevitable occupational hazards.

In Europe and other parts of the world to a much greater extent than in the United States, a third influence may tend to exaggerate the market's shortcomings: the legacy of socialist ideology, a pervasive element in Western European political parties and trade unions. Starting from the premise that capitalism is inherently prone to instability, exploitation, and inequity, there is a strong predisposition to find confirmatory evidence. The power of a self-confirming hypothesis is not less in this context than in others.

As a result of such distorting influences, events that represent what are perhaps outliers, or the tails, of the "true" distributions of market phenomena may be "perceived" by the public and the electorate as the means, or medians, or modes of the distributions. The result of this process is that "perceived" values of the variables may be systematically different from their "true" values, because the triggering ("newsworthy") event, though "actual," doesn't represent the central tendency or frequency it is supposed to represent: thus $\hat{X}$, $\hat{I}$, $\hat{M}$, $\hat{E}$, $\hat{G}$ may be systematically different from X, I, M, E, G.

One way of viewing the process by which "perceptions" may diverge from "reality" is to specify a "perceptions function" of the following simple form:

$$\hat{Q} = Q_a + Q_t \qquad (3)$$

where Q_a is the actual or "true" level of a particular market failure, and, hence of a non-market demand variable, and Q_t is the transitory disturbance introduced by the several types of distorting influences discussed above. Consequently, the disturbance term, Q_t, may not have a zero mean, but instead may be systematically biased.[4]

A nice example of a Q_t distortion is provided by a recent treatment in the news media of the imperfect working of the "market" for admissions to American medical schools. The New York Times in a featured story on December 11, 1979, reported that there were 340,000 applications for only 16,700 places in first-year medical classes at the nation's 126 medical schools. Based on these statistics, a second story concluded, "The chance of getting into medical school is about 1 in 21 nationwide."[5]

The clear and exciting ("newsworthy") implication of the story was that the system was grossly imperfect, that the outcome was (presumably) both inequitable and inefficient, and that something ought to be done about it (presumably, by government intervention).

The Times articles failed to report that, based on data from the preceding year, each medical school applicant filed an average of 9.2 applications! On this basis, the actual chance of admission to medical

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[4] This is not inconsistent with the view that, even if Q_t were equal to zero, society might, while aware of this, still be more concerned with (i.e., choose to devote more resources to) the outliers than the mean value. A skewed social loss function can be applied to a normal distribution with zero mean. However, in this case, society would be proceeding on the basis of accurate, rather than distorted, information: "perceptions" and "reality" would be identical. With the mechanism described in Eq. (3), they would not be. I am indebted to Joseph Newhouse and Peter Stan for calling my attention to this point.

[5] See "Odds Against Medical-School Admission Exaggerated," New England Journal of Medicine, May 1, 1980.

school is about 1 in 2.2; stated differently, 45% of the applicants could expect to be admitted. The accurate figures were distinctly news-unworthy!

It may be conjectured that public "perceptions" of the malfunctioning system were influenced as much by the Q_t distortion in the Times article as by the "true" value of the admissions probabilities.[6]

It is worth noting that, of the several distorting influences described above, two may generate countervailing forces that can offset and possibly reverse the tendency to exaggerate market failures. For example, the pressure groups that seek government intervention to remedy market shortcomings may be neutralized or outmatched by opposing groups that prefer the market's unregulated outcomes: industry pressure groups that seek to benefit from regulatory intervention may be opposed by consumer groups that seek to preserve competition (and vice versa).

And the media, if free and uncontrolled, may find newsworthiness in the miscarriages of government, no less than of the market place: corruption, nepotism, waste, conflicts of interest and so on. Watergate, Abscam, Medicaid fraud, Billy Carter, Bert Lance, and Tong Sun Park are some recent examples. Government failures, as well as market failures, provide opportunities for newsworthy exaggerations. As a result, the disturbance term, Q_t, may assume negative, as well as positive, values.

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[6] The nuclear reactor accident at Three Mile Island in 1979 provides another example. As a result of the news media's treatment of the accident, the public's perception of the chance of a serious meltdown in the reactor's core was probably as high as 10% or at least 1%. In fact, the chance was probably never greater than .001% or .0001%. If we denote the negative externalities associated with an actual meltdown as X, then the perceived externalities, $\hat{X}$, given these probability assumptions, would be $X_a(10^3)$, and the transitory distortion, X_t, is (9.99×10^2) - times the true value, X_a, according to Eq. (3).

To the extent that the newsworthy is simply whatever is unusual, the result may be a tendency to oscillate between overemphasis on market failures and exaggeration of government failures, rather than to report either accurately.

Thus, Q_t may, at one time, be greater than zero, while at another, it may be less than zero. Perceptions will be off the mark in both cases, but in different directions. Based on the last several decades' experience in the United States and Western Europe, at least up to the late 1970s, the influences tending to bias perceptions of market failure in an upward direction seem to have been politically more influential than those in opposition.

In sum, if the process by which perceptions of market failures are generated yields distorted estimates, then the demand for non-market intervention and activities can be excessive, thereby leading to various non-market failures and government "deficiencies." An important assumption in underlying this conclusion should be made explicit: I assume that the political process generally responds to public perceptions. Consequently, if perceptions are distorted, as I have argued they may be, the response of government will be accordingly deformed.

V. Non-Market Supply

There are also distinguishing characteristics pertaining to the supply side of non-market activities:

A. Non-market outputs are often hard to define in principle, ill-defined in practice, and extremely difficult to measure as to quantity, or to evaluate as to quality. This, of course, is why non-market outputs are measured in the national accounts as the value of the inputs used in producing them.

Non-market outputs are usually intermediate products which are, at best, only "proxies" for the intended final output: for example, restrictions or prohibitions on the distribution of drugs and foods by the Food and Drug Administration; licenses issued or rejected by the Federal Communications Commission; forces and equipment developed and employed by the military services; and cases processed and payments disbursed by social welfare agencies. The quality of non-market output is especially hard to ascertain, in part because the information about quality that would, in the case of marketed outputs, be transmitted by consumer behavior is missing. Consider, for example, the difficulty of determining whether the "quality" of education, or welfare programs, or environmental regulation, or food and drug regulation, is "better" or "worse" now than two or three years ago.

Of course, difficulty of measurement varies widely among the different non-market outputs. For example, the Post Office can be readily compared in its performance (with respect to costs and service) to United Parcel Service; public schools can be compared, with somewhat

greater difficulty, to private and parochial schools; and police departments can be compared, perhaps with still greater difficulty, to private security agencies.

More typically, however, appropriate metrics for non-market outputs (e.g., defense, regulatory activities, social welfare programs, etc.) are elusive and arguable. In general, measuring non-market outputs by their inputs is accepted because measuring outputs directly is so difficult.

B. Non-market outputs in government are usually produced by a single agency whose exclusive cognizance ("monopoly") in a particular field is legislatively mandated, administratively accepted, or both (for example, the regulatory agencies, NASA's role in space, and the public school system, with only very limited competition provided in the latter case by private and parochial schools). It is rare that this exclusivity is contested. Where it is (for example, between the Air Force and the Army in providing some forms of battlefield air support), resolution is frequently on grounds unrelated to output efficiency or quality.

In sum, the absence of sustained competition is another factor contributing to the difficulty of evaluating the quality of non-market output.

C. The technology of producing non-market outputs is frequently unknown, or, if known, has a high variance associated with it.

An example of uncertain technology in the educational domain is provided by the Coleman report and other studies of student performance according to standardized test scores. These studies leave very little

in the variance of student academic performance to be accounted for by such variables as class size or expenditures per pupil or teacher/pupil ratios, once proper allowance has been made for the social and economic status of the students and their families. Yet we know very little about how to "produce" education. For one thing, we don't know whether the cognitive and verbal skills measured by the standardized tests constitute the proper set of "educational" objectives to be sought. Even if this were known, our understanding is remarkably limited concerning the optimum mix of curriculum, types and training of teachers, classroom or "field" experience and applications, "learning by doing," and the other ingredients of educational technology.

In the national security domain, where it is commonly assumed that technology is both advanced and well understood, we have at best only a limited understanding of the technical (production-function) relationships among the inputs of military equipment, manpower, training, logistics support, command, control, communications, and intelligence, required to maximize the intended final output of "national security," for specified inputs.

More insubstantial still is our understanding of the technologies associated with producing such other non-market outputs as welfare services and transfer payments (without thereby creating perverse effects on labor supply, and on the psychological well-being and motivations of recipients), or providing food and drug regulations that adequately and properly allow for the risks (as well as ignorance) facing potential consumers (without thereby introducing sharply perverse incentives for further research and development in the pharmaceutical industry).

D. Non-market output is generally not connected with any "bottom line" for evaluating performance comparable to the profit-and-loss statement of market output. Closely related to this absence of a bottom line is the absence of a reliable mechanism for terminating non-market activities if they are unsuccessful.

E. It seems reasonable to posit the existence of a mechanism in the realm of non-market activities analogous to the positively sloped supply curve for market activities: the supply of non-market outputs (measured, faute de mieux, by the costs (budgets) expended in producing them) will tend to rise as average government wage rates (represented, say, by average civil service pay scales) rise, and as tax rates rise. When government pay scales rise in relative terms, staffs of government agencies will grow and the total costs they expend (i.e., our metric for non-market "supply") will rise. Also, when tax rates rise, hence public revenues increase, we may assume that aggregate non-market supply will increase to utilize the added revenues. (Conversely, such reforms as Proposition 13, and other limits on tax rates, will tend to restrict and discourage non-market activities.)

F. Finally, it seems reasonable to assume that the supply of non-market activity is positively affected by national income and by public income, these being generally correlated with one another. As national income rises, yielding greater public revenues, the supply of (i.e., costs expended on) non-market activities will tend to rise in response. New programs will be generated, or existing programs expanded, to utilize the additional resources that have become available. Clearly, some non-market activities are more likely to expand than others, e.g.,

perhaps health and educational and environmental programs are more likely to grow with increased national income than are redistributive welfare programs, and the reverse is likely to happen when income falls. Nevertheless, there will probably be a tendency for aggregate non-market supply to rise and fall with income.

In light of these distinguishing characteristics, we may specify a heuristic supply function indicating the aggregate supply of non-market activities, as well as the component supply functions for particular non-market activities:

$$S_i = S_i(V_i, m_i, \sigma(T_i), P, R, Y) \tag{4}$$

and

$$S = \sum_{1}^{n} (S_i), \tag{5}$$

where

S_i = the supply of the i^{th} non-market activity (i=1,2...n),

S = the aggregate supply of the n activities (expressed in dollars of total input costs or budgets of the non-market activities),

V_i = measurement accuracy of the i^{th} non-market activity (V_i may be considered a qualitatively scaled variable reflecting the accuracy or precision with which the i^{th} non-market product can be measured),

m_i = degree of exclusivity (monopoly) characterizing the i^{th} non-market activity,[1]

$\sigma(T_i)$ = the variance in the input/output relations associated with the technologies of non-market activities,

[1] Note that m_i differs from M referred to in the demand function above (p. 11): m_i refers to the degree of monopoly enjoyed by the non-market agency conducting the i^{th} activity (in light of competing activities conducted elsewhere in the non-market sector or the market sector), whereas M refers to the degree of monopoly in the market sector.

P = the cost of a "unit" of non-market input, as defined earlier,

R = the tax rate,

Y = national income.

In accord with the preceding discussion, the partial derivatives associated with V_i and m_i are assumed to be, respectively, negative and positive. When agencies conduct non-market activities with the benefit of an imprecise measure of their performance, their supply costs (and budgets) S_i, will tend to be high. When agencies conduct non-market activities without competition from within or without the non-market sector (i.e., $m_i \rightarrow$high), then S_i will also tend to be high.

Also, in accord with the preceding discussion, the partial derivatives associated with R, P, and Y are expected to be positive.

The partial derivative of non-market supply costs (budgets) with respect to the technological uncertainty of production, $\sigma(T_i)$, are also expected to be positive on the following grounds: A particular non-market activity, j, whose associated technology has a high variance ($\sigma(T_j) \rightarrow$large), may consume substantial inputs while yielding little "final" (intended) output. On the other hand, if the cognizant agency is "lucky," and the technology turns out to yield at least the intended output for less than budgeted costs, we assume the agency will tend to pad its budget or featherbed its staff to absorb the underrun. In the absence of profit as a maximand, the agency will at least measure up to its budget to avoid the frequent penalty for efficient non-market performance: namely, savings realized in <u>one</u> period lead to budget reductions in the next!

VI. Equilibrium, Non-Market Failures, and Government Deficiencies

The framework developed above suggests the possibility of equilibrium between particular and aggregate non-market demands and supplies.

Three arguments are common to both demand and supply functions: the tax-rate R; the non-market wage rate P; and national income Y. I have suggested that the slopes of R and P will be opposite in the two functions: negative in the aggregate non-market demand function, and positive in the aggregate supply function.

Moreover, there is at least a general, if often weak, political process operating to correct divergences between non-market demands and supplies, in the aggregate and for particular types of non-market output. For example, if the demand for non-market activities resulting from Eq. (1) and (2) exceeds the supply resulting from Eq. (4) and (5), there will be a tendency in the political arena for P and/or R to rise (the Civil Service system and the Office of Personnel Management will be able to press for higher government salaries P, and the Congressional finance and budget processes will be inclined to enact higher tax rates R), thereby tending to increase non-market supply, and reduce demand, in accord with the partial derivatives specified earlier. Conversely, if supply exceeds demand, there will be a (probably weak) tendency for elected officials and the political process to mediate the excess supply by lowering taxes and/or relative government pay scales, thereby moving down the S-function and outward (southeast) on the D-function, thus tending toward an equilibrium.

The income variable Y, presents a problem. Not only are both non-market demand and supply functions likely to have positive slopes with respect to Y but, more important, there must be multiple equilibria between the two functions in Y-space. The political process can, not too unreasonably, be considered to mediate divergences between S and D: by adding programs, appropriations, and expenditures if there is excess demand, or curtailing them if there is excess supply. But this process will go on, albeit weakly and imperfectly, at all levels of income, rather than defining a unique income level at which non-market demands and supplies are equilibrated.

In Figure 1, the hypothetical S and D functions cannot be regarded as defining a unique equilibrium at (S_e,D_e), (Y_e): income will as likely be above or below the Y_e point. On either side of it the political process will operate, imperfectly and tardily, to bring non-market demand and supply toward convergence, as indicated by the arrows:

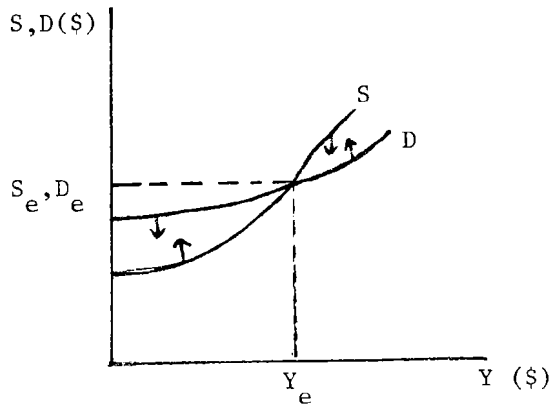

Figure 1

What about the arguments that are not common to the non-market demand and supply functions: namely, the perceived levels of externalities $\hat{X}$, monopoly $\hat{M}$, market imperfections $\hat{I}$, public goods demand $\hat{G}$, and inequities $\hat{E}$, in the non-market demand function; and the measurement accuracy V_i, exclusivity of non-market production m_i, and technological uncertainty $\sigma(T_i)$, in the non-market supply function? From the standpoint of the partial equilibrium context implied by the preceding discussion, these become shift variables which raise or lower the D and S functions to establish multiple and changing equilibria in the R, P, and Y space common to the two functions.

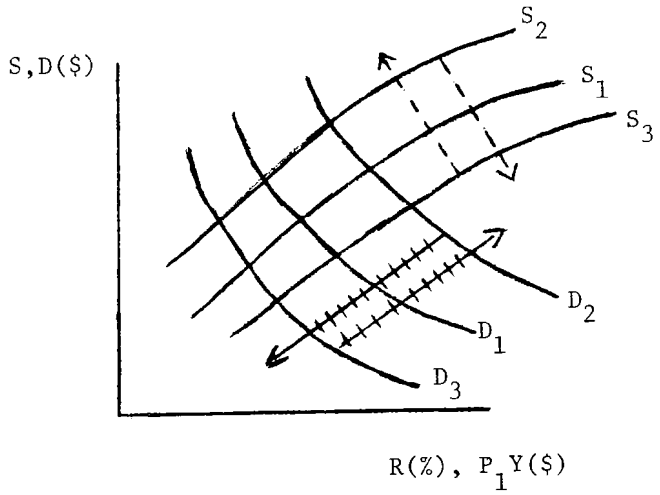

Figure 2

In Figure 2, the solid arrows represent the effect of the shift variables in the non-market demand function, and the dotted arrows the effect of the shift variables in the non-market supply function. The nine intersections illustrate the multiple equilibria between non-market

demand and supply in R, P, or Y space.

In a general equilibrium model, the shift variables would become endogenous, and a unique and stable equilibrium might be reached, or at least an equilibrium that is defined at each point in time. But general equilibrium is more a matter of pure mathematics and aesthetics than of the real and messy world of non-market demands and supplies. In this world, the equilibria are partial, multiple, and transitory, and the shift variables are more numerous, powerful and changeable than the equilibrating ones.

The most significant attribute of these partial equilibria is that they are all likely to be characterized by inefficiencies and inequities! The reason is that the non-market demands and supplies, whether in equilibrium or between equilibria, themselves embody inefficiencies or inequities--that is, non-market "failures": demand functions may be distorted by the perceptual characteristics of the shift variables; and supply fuctions may for reasons discussed earlier, exhibit inflated costs without any reliable mechanism to realize technically feasible savings.

Thus, non-market failures and the deficiencis of government performance derive directly from the anatomy and physiology--the structure and function--of non-market demand and supply.[1]

Just as the existing theory of market failure provides a useful corrective to the theory of perfectly functioning markets, so the theory

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[1] From this structure, my JLE article derived a typology of non-market failure (in terms of "internalities," redundant and rising costs, derived externalities, and distributional inequity), and suggested how it might be compared with the existing typology of market failure. See "A Theory of Non-Market Failure," op cit., pp. 116-132.

of non-market failure should be a corrective to the implicit theory of perfectly functioning governments: the deficiencies of government (and of other non-market organizations) are no less formidable, and no more tractable, than those of markets.

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