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PRODUCTIVITY IN THE URBAN PUBLIC SECTOR

by

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A critical issue in comparative urban policy research pertains to the productivity of agencies supplying urban public services. Many problems associated with the urban crisis relate to the failure of such urban public services as police, education, welfare, waste collection and disposal, and transportation. Productivity is defined here as the difference between: (1) the value of the output of urban delivery systems and (2) the value of the inputs used by such systems, while (3) controlling for the costs of production under different service conditions.[1] Productivity is a more complex phenomenon than many subjects of comparative urban research since it is not an attribute of any specific actor. We cannot simply agree upon a definition and apply a measurement instrument to a single source of data as we can with attributes of citizens, street-level bureaucrats, and public officials-or other actors. (Even this process is difficult as witnessed by the extended debates over such measures as IQ.) Productivity is measured by computing the relationship among three quite complicated concepts: (1) the inputs for an urban delivery system, (2) the outputs produced by that system, and (3) the relevant service conditions.

Before meaningful measurement of these three concepts can be undertaken, an earlier question must be addressed: Why would we expect some types of urban service delivery systems to be more productive than others? Without this prior question, we cannot expect to develop cumulative knowledge about productivity in the urban public sector. Specific information about particular systems does not provide us with any knowledge about why one system is more productive than another. If public decision makers want to know how to improve productivity, we need a well-developed and tested theory for why we find differences in productivity.

In this brief essay I intend first to discuss our need for more explicit theory. Since productivity is the result of a complex process involving many different actors, we need to address theoretically relevant questions about the nature of this process. These questions include:

(1) Who are the producers, what do they produce, and how are they organized?; (2) Who are consumers, what do they consume, and how are they organized?; (3) What are the relevant service conditions for studying productivity?; and (4) What are the incentive systems for different actors in different systems? Having briefly addressed these theoretical questions, I then examine some of the key problems associated with the measurement of inputs, of benefits, of service delivery systems, and of relevant service conditions. The final question addressed in this paper is whether it is possible to study productivity in the urban public sector.

The Need for Explicit Theory Development

Who Are the Producers and What Do They Produce?

This may seem like a strange question to those who assume that local governments are the producers of local public services. While this may be true for some services, the problem is to determine exactly which services a particular local government produces. Further, is the general city government a producer of local urban services, or is the general government better characterized as the organized purchasing unit for the citizens it serves? Let us answer that question by examining the activities of general city governments. A large proportion of the activities of the city manager, mayor, members of the city council, and others associated with the general city government are related to: (1) specifying the types of services desired by their citizens, (2) providing the funds to obtain these services, (3) obtaining the funds so provided from the citizens themselves or from other governmental units, and (4) monitoring the performance of those who produce the services. These activities are better conceptualized as pertaining to organized consumption of urban services than pertaining to their production.

If the general city government is not the producer of most urban public services, who is? The answer depends upon the particular type of service one wants to examine and the circumstances in a specific

location. In order to gain genuine comparability in our research, we need to define carefully the specific types of goods or services of interest in any study of productivity. Then, we need to specify the types of activities involved in the production of that type of good or service. Then, and only then, can we begin to locate the actors who are the producers of that service. In most cases we cannot rely upon data collected by the Census Bureau, ICMA, and the FBI.

For example, in our police studies we have found the concept of police services to be too broad and ambiguous for careful comparative urban research (Ostrom, Parks, and Whitaker, 1977a and 1977b). To do evaluative research, we first defined 10 different types of policing and carefully specified the types of activities involved in each of these types. Having defined each production activity, we then did fieldwork in 80 metropolitan areas and searched for the entities undertaking these activities. In our search for police patrol agencies we found school district police, park district police, township constables, bridge and harbor police, college campus police, military police, private firms, reservation police, and many other entities supplying patrol services, as well as city and county police agencies. If we had assumed that all city and county governments produce patrol and that they were the only producers of patrol, the producer list for each SMSA would have looked entirely different than our final inventories. This difference is crucial when one wants to examine both the inputs and the outputs of this production process. The list of enterprises producing laboratory analyses was dramatically different than the one for general area patrol. While we located over 1,400 producers of patrol services in the 80 SMSAs, we located only 82 producers of laboratory analyses. Many of these were state agencies that served entire metropolitan areas. Others were private laboratories; a few were located in large city police departments.

Citizens as Coproducers of Public Services

For many urban services, citizens may be important coproducers of the service itself. In the case of mental health, it is impossible for

a psychiatrist to help a patient without the active cooperation of the patient. Both students and their parents are necessary coproducers of education. If citizens do not call upon the police when something suspicious happens in their neighborhood, or if they do not lock their own homes and take other precautions, the load on police is much heavier than when citizens actively pursue their own safety. Our implicit theoretical models have been influenced by the image of the factory where a good is produced without any special involvement of the consumer. However, when we turn to the urban public sector, we need to develop theories that specifically include the activities that citizens take in producing urban public services.

How is the Production System Organized?

While many decry the degree of overlap and duplication in service production in urban areas, most scholars have assumed that there is a single producer for each service for each jurisdiction. However, depending upon the service being considered, a wide diversity of different producers may exist serving the same area. Terms such as coordination, duplication, multiplicity, overlap, specialization, and dominance are frequently used without specific theoretical definitions. In our own study of police organization in 80 metropolitan areas we developed quantitative measures of these and other structural attributes of the production system (as well as other measures of the consumption side). However, considerably more work needs to be done in developing these concepts as they relate to differing theoretical formulations concerning their consequences. Without explicit theories and empirical testing of those theories, we cannot know whether production systems characterized by a large number of producers are more or less efficient in producing particular types of services than systems characterized by the dominance of one large producer. With such theories and appropriate empirical research we should be able to offer generalizations about the effects of structure upon productivity.

Who Are the Consumers and What Do They Consume?

In addition to better theoretical specification of production activities and the consequent ability to locate a set of producers for each type of service, a parallel effort is necessary for consumption. Further work is needed on the theory of public goods to identify those urban public goods and services that are consumed primarily by individual family units, those goods consumed primarily by relatively small neighborhood units, and those goods consumed by all citizens living in a large territory whether they are conscious of such consumption or not. Solid waste collection services would usually be classified as consumed primarily by the individual households receiving the service (with small externalities for those in the neighborhood enjoying public health and amenity values). General area patrol is of benefit to relatively small neighborhoods in which a patrol unit is located. Air pollution control usually benefits a very broad area depending upon the characteristics of specific air sheds.

In addition to thinking more about the set of consumers for various types of urban services, we also need to pay more attention to units of consumption. In such packageable services as solid waste collection, this is a relatively easy question. Individual family units can be thought of consuming a "pickup" unit averaging so much weight at a particular time interval and location. In some cases, the unit might be a once-a-week, curbside pickup averaging a certain weight, and in other cases the unit might be a twice-a-week pickup averaging in an alley a certain weight. However, as soon as one moves to less packageable services, the problem of conceptualizing the appropriate unit becomes far more difficult. In education, do students consume a "year of education," or is it better to conceptualize the unit consumed as the attainment of a particular skill level? If we think of the unit in the first manner, then it is not too different from simple custodial care. In this view, school districts that increase the number of students in a classroom increase their productivity. If we think of education as the attainment of skills, however, crowding more students into the same space may seriously impair learning and reduce productivity.

How is Provision of Consumption Organized?

Parallel questions to those raised concerning the effect of alternative ways of organizing the production side of urban service delivery can be raised concerning the consumption side. Within any particular governmental jurisdiction, we should be developing more explicit theories of how citizen preferences are articulated and aggregated within differently structured cities. It would appear that when a city council is divided into relatively small wards and that each councilman must reside in and be elected for the ward, greater attention will be given to the diversity in preferences than when a city council is elected at large. We also need to speculate about the effects of different ways of assessing taxes on the information that citizens receive about the costs of different mixes of urban services and on their capacity to articulate their demands for such services. Size of jurisdictions can also be expected to have an effect upon the way that demands are articulated for different types of urban public goods and services.

We need further theoretical and empirical examination of questions concerning the fragmentation of political authority within larger geographic areas such as metropolitan areas. Many of the articles that have been written on fragmentation do not examine the question of the interaction between fragmentation and overlap. It seems obvious that a metropolitan area characterized both by a large number of independent smaller units operating at one level and by overlapping units of governments is quite a different structure than one characterized only by a large number of independent smaller units. In our own studies we have begun to define such concepts as fragmentation, independence, and autonomy as quantitative measures of the structure of consuming units in metropolitan areas. However, considerably more theoretical work is needed in this area.

What Are the Relevant Service Conditions?

When one wants to compare the productivity of one type of service delivery system with another, it is essential to control for relevant

service conditions. Because of weather conditions, it costs more to maintain streets in the northeastern than it does in the southwestern United States. Because of higher crime incidence it costs more to reduce crime in neighborhoods with shopping centers than in neighborhoods without shopping centers. Comparative urban scholars who study productivity need to learn a great deal about the technology of specific urban services in order to specify the theoretical relationships between service conditions and productivity. We cannot simply draw a random sample of cities, compute population density and racial change, and satisfy ourselves that we have either controlled for relative service conditions or that the service condition differences in our sample are random. We need to rely more on quasi-experimental designs or on very large samples where data on relevant service conditions have been collected.

What Are the Incentive Systems for Different Actors in Different Systems?

In addition to defining the production process for specific services in such a way as to better identify producers, consumers, and relevant service conditions, we also need to undertake theoretical work On the types of incentive systems that operate in differently organized delivery systems. We can build on the work of Downs (1967), Alchian and Demsetz (1972), Niskanen (1975), Savas (1977), and many others who have attempted to specify the types of incentives likely to operate in differently structured systems.

Downs, for example, stresses that in a competitive private goods market, the producer is faced with competitors wanting to buy the same factors of production and with competitors wanting to sell the same product. In such a double bind, any one producer faces much the same competitive pressures as any other producer in a given market. The incentives created by this double bind leads a private entrepreneur to search for solutions which increase productivity. Producers of some urban public services face neither a competitive market for factors of production nor for their product. Savas has described the counter-productive tendencies of municipal monopolies and documented the effects of such incentive systems in the area of solid-waste collection and disposal.

Niskanen (1975) has begun to develop a general theory of managerial behavior by assuming that managers of organizations maximize a function that includes the manager's monetary as well as the nonmonetary income including such perquisites as leisure time, the social and physical amenities of a position, and prestige in the community. He demonstrates theoretically that the incentives present in most urban public agencies will lead to budgets that are usually too large. The excess budget will be used to oversupply services and thereby increase the size of the agency or to produce perquisites for agency personnel or both. Variables that might affect this process in Niskanen's model are the presence of alternative producers, the extent of civil service control, unionization, the extent of legislative oversight, the size of city councils, and their ward structures.

While Niskanen's theoretical work focuses on the behavior of managers under different incentive systems, Lipsky (1976) has focused attention on street-level bureaucrats and the importance of their discretion in the delivery of many urban services. Under many circumstances street-level bureaucrats are motivated to shirk rather than to increase productivity. Manning has described the process in the area of policing in the following manner:

> Other than promotion, with its vagaries and multiple meanings, officers seek a number of day-to-day compensations called in slang terms "fiddles," "skiving," '"perks," "mumps," "gimmicks," and "gifts." Since they create a basis for incentives and morale and are quite unofficial, they can be treated as compensations for being a lower participant. On a day-to-day basis, policemen attempt to line up "easy members," jobs that allow them to take it easy, to be out of sight, to enjoy the comfort of the station, or to follow a regular nine-to-five schedule (Manning, 1977: 151).

Recent emphasis on productivity in the public sector may have made it even easier for street-level bureaucrats to shirk. Any time that employees are judged by their own statistics on activities rather than external evaluation of results, we can expect that such recorded activities will rise. It is easy to find some time for oneself if it is possible to please one's superior by turning in statistics about activities under

one's own control. When traffic ticket quotas are in force, most police officers can go out and fill their quota in the first few hours of work and relax for the rest of the shift. Gouldner (1954) long ago described the vicious circles that resulted from increased demands within a bureaucratic setting for "working within the rules." Blau provided empirical evidence of vicious circles when performance evaluation in a state employment agency was based on a new record system designed to keep track of the number of referrals of clients to prospective employers (Blau, 1955). Referral rates went up, but the proportion of successful referrals declined. Hatry (1978) has pointed to other anomalies where increasing the amount of mail processed by each postal employee has been accompanied by an increase in the average time it takes for mail to be delivered. Different internal incentive systems can be expected to have important effects upon productivity.

It is also important to do theoretical work on the incentives or disincentives for citizens to become active coproducers of urban public services. Opportunities for coproduction probably vary with the type of service. When the results are largely felt by an individual family unit (such as the increased security resulting from better locks on doors and windows, the purchase of a watch dog, marking valuable property with an ID number, etc) and general service levels decline, one would expect that most citizens will increase investments in their own security. Coproduction of individual safety measures should rise in neighborhoods with increasing crime. We also need to speculate about the types of incentives that might lead citizens to undertake activities that benefit their neighbors as much or more than their own family units.

Development of Better Measures

Reliable measures that are closely related to theoretical concepts are needed. In particular, we require better measures of inputs and outputs of the structure of urban delivery systems, and of service conditions.

Measurement of Input

Before we can measure the input side of a productivity equation, we must identify the relevant set of producers involved in a particular process. Then, and only then, can we begin to ascertain the amount and type of inputs involved. Once the set of producers is identified, we face a variety of difficult problems in determining what inputs are involved and how to arrive at a reliable and valid cost estimate for these inputs. In this short concept paper I can only mention some of the decisions that have to be made to estimate the costs of producing a particular urban service.

Let us examine the process of determining the costs of all direct police services such as patrol, traffic control and investigation, and criminal investigation in a city with the following producers: (1) a city police department, (2) a county sheriff, (3) a college campus police department, (4) a military base with its own security force, and (5) a state highway patrolled by the state police. This is not an unusually complex situation. For each of the producers, one needs first to get an accurate accounting of their expenditures (assuming that one is willing to use expenditures as proxy measures for costs). Each of the above producers will use different accounting procedures. Obtaining equivalent costs figures from each of them will require considerable persistence in the field and cooperation by the agencies.

Some of these agencies do not have an annual budget as such and do not prepare their own expenditure totals for the year. Neither the commanding officer of the base security force nor the commanding officer of the military base has a budget or expenditure record in the traditional sense. To estimate costs one has to obtain information about the specific numbers of personnel involved and their pay rates including benefits. Expenditures for vehicles and other equipment are also not recorded at a local base. Gaining reliable measures of input for the military base (or any other federal establishment) will probably be the most difficult task. However, a similar range of problems exist for computation of expenditures for the state police. Here, it may be possible to dig through a state budget and final expenditure report to begin to get estimates for expenditures at the local level.

While records for the city, county, and university police are probably maintained in the area, getting equivalent figures from these sources is still extremely difficult. In some cases the expenditure records for some employees and even some equipment are in entirely different record systems. Given the large number of police personnel who have been hired under Revenue Sharing funds, LEAA funds, and even the CETA program, trying simply to compute total personnel costs is a difficult task.

Once total cost estimates are made, then the problem becomes one of assigning them to a particular jurisdiction. The state police and the county sheriff both patrol locally in areas outside a particular jurisdiction. Some formula must be developed for assigning costs to the production of services inside one area as compared to another. Few existing records help the analyst make such decisions.

The difficulty of determining the costs of urban service production are very great and cannot be undertaken on a routine basis unless uniform accounting systems exist. The state of Wisconsin has for some time used a highly detailed expenditure reporting form for all types of local governments. Detail about the specific services provided and expenditures for each service recorded is provided. Some effort is made to determine the accuracy of the specific service estimates as well as the totals. It is probably more cost effective to undertake some types of productivity studies in Wisconsin because of the nature of the data sources. However, even this system helps to solve only a subset of the problems alluded to above.

Measurement of Outputs

While the problems of measuring inputs are considerable, the problems associated with measuring outputs are equally difficult or worse. The first steps are related back to the definition of who the consumers are of a particular service and what unit of service they consume or use. When the unit being consumed is a relatively discrete "product," it is much easier to compute benefits than when residents jointly consume a "state of affairs." For discrete products such as solid waste delivery,

one can frequently use shadow prices derived from those exchanges where prices are used to assign value to a particular unit. Computing the number of users is usually not as difficult either. Consequently, one can estimate total outputs for discrete products easier than one can estimate outputs or the production of a general state of affairs.

However, when one turns to services such as education and police, the problems of computing the value of outputs multiply. If one assumes that the value of education is the attainment of skills, then it is necessary to develop valid and reliable instruments to measure the skills attained. Little agreement exists on what outputs police produce. Should the output be conceptualized as a reduction of recorded crime (or of "real" victimization rates) as a result of police activity? Or, should the real benefit be thought of as a reduction in the potential fear that citizens have about crime in their neighborhood?

Because of the difficulty in solving the problems of measuring benefits, many productivity studies have examined the relative costs of producing activities. It is frequently easier to get reliable measures of activities than to obtain measures of benefits. However, given that our knowledge of the relationship of activities to benefits is limited, reliance on activity measures alone can lead to harmful consequences. If social scientists report that particular ways of organizing service delivery systems are a more productive way of producing activities without knowing whether those activities are beneficial, public decision makers may adopt reforms to encourage those activities. If the activities turn out to be ineffective or counter-productive, public decisions are made that reduce rather than increase benefits. A recent example of this process may have been the large sums invested to decrease police response time on the assumption that such a decrease produced benefits. A recent study in Kansas City has not found much evidence to support increased expenditures to reduce police response time since the time it takes citizens to report most crimes far exceeds the time it takes police to respond. It may be that the most productive way of spending future resources related to response time is to encourage citizens as coproducers to report crime incidents more rapidly.

To the extent that we wish to measure the benefits of production processes that affect general states of affairs, we will need to rely upon surveys of those who are affected. Considerable effort needs to be devoted to the development of valid and reliable questions and scales for the measurement of benefit levels. While it is sometimes possible to use survey data collected for other purposes, unless the sample frame is closely related to the universe of consumers, we may include consumers of different production processes in the same group. In order to use survey data, we need to ensure that small area geo-coding is attached to each individual case and that relatively large samples are collected. Otherwise, there is no way of aggregating individual assessments of benefits into a meaningful score at a higher level of analysis.

Measurement of the Structure of Urban Service Delivery Systems

If one addresses the question of what difference the structure of urban service delivery systems makes on productivity, it is necessary to develop measures of such structure. Our own efforts to do so have utilized a service structure matrix with the producers of a particular service in a metropolitan area arrayed as the rows and the consuming units arrayed as the columns. A complex coding scheme has been developed to represent the relationships between producers and consumers. Once the various dyadic relationships have been determined, the structure of the system can be measured using different measures computed from the matrix for a metropolitan area. We would like to see further development and refinement of this method for measuring the structure of urban service delivery systems as well as further efforts to examine various performance characteristics of differently structured systems.

Measurement of Service Conditions

In order to assume that the cost estimates for different service arrangements are comparable, one needs either to assume that the service conditions facing production systems are similar or to control statistically

for variation in service conditions. Again, this presents a difficult task to specify theoretically relevant service conditions and to examine the empirical effect of different service conditions on the costs of providing similar levels of service. The problems here are relatively obvious and I will not expand upon them in this paper.

Is it Possible to Study Urban Public Sector Productivity?

A consistent theme throughout this concept paper has been the difficulty of studying the productivity of different urban service delivery systems. I think that is an important theme, but I do not want to end on this note. The theme has led me and other scholars to be critical of many past studies conducted by comparative urban scholars who have relied almost entirely on data sets that were not collected to examine the costs and benefits of particular types of urban production processes.

The various difficulties pointed out in this essay will, I hope, convince anyone who was not already convinced that future studies of urban service delivery systems and their productivity should not rely exclusively on machine-readable data obtained from the Bureau of the Census or other sources when the data are not related to theoretically meaningful concepts. Unless we develop our theories of urban service delivery more explicitly and base future studies on theoretically specified models, we cannot hope to reach informed conclusions.

But I am optimistic about the feasibility of undertaking well-grounded empirical studies in this area. With an investment both in self-conscious theory specification and the development of empirical measures closely tied to theoretically concepts, we can address the question of what types of urban service delivery systems are more productive. This is an important question. Data collection in this area will be more expensive than past studies that have relied upon familiar sources of data. Where existing data bases are organized in a theoretically meaningful manner, it is important to improve and

update them. They can be utilized to test the implications derived from different theories concerning the variables that affect public sector productivity in urban areas. It may be possible to reduce the cost of future research in this area by building on existing theoretically organized data bases. If we can do so, we can be more productive in our study of urban, public sector productivity.

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Footnotes

[1]I am purposefully using the term "difference" rather than the term "ratio" to describe the relationship between inputs and outputs. For a discussion of why it is important to think about productivity or efficiency as a difference relationship rather than a ratio relationship, see Percy and Parks (1977). See also Simon (1961), Hitch (1958), and Niskanen (1975).

References

Alchian, Armen A. and Harold Demsetz (1972) "Production, Information Costs, and Economic Organization." American Economic Review, Vol. 62 (December), 777-795.

Blau, Peter (19S5) The Dynamics of Bureaucracy. Chicago, Illinois: University of Chicago Press.

Downs, Anthony (1967) Inside Bureaucracy. Boston, Massachusetts: Little, Brown and Co.

Gouldner, Alvin W. (1954) Patterns of Industrial Bureaucracy. Glencoe, Illinois: Free Press.

Hatry, Harry P. (1978) "Effectiveness/Productivity Measurement Research and Technical Assistance Needs." Paper presented at the American Association for the Advancement of Science, Inter-governmental Research and Development Project, Workshop on Management, Finance, and Personnel.

Hitch, Charles (1958) "Economics and Military Operations Research." The Review of Economics and Statistics, Vol. 40 (Summer), 199-209.

Lipsky, Michael (1976) "Toward a Theory of Street-Level Bureaucracy." In Willis D. Hawley and Michael Lipsky, eds., Theoretical Perspectives on Urban Politics. Englewood Cliffs, New Jersey: Printice-Hall.

Manning, Peter K. (1977) Police Work The Social Organization of Policing. Cambridge, Massachusetts: The MIT Press.

Niskanen, William A. (1975) "Efficiency-Inducing Patterns of Organization." Paper presented at the meetings of the American Society of Public Administration, Chicago, Illinois.

Ostrom, Elinor, Roger B. Parks, and Gordon P. Whitaker (1977) Patterns of Metropolitan Policing. Cambridge, Massachusetts: Ballinger Books.

Ostrom, Elinor, Roger B. Parks, and Gordon P. Whitaker (1977) Policing Metropolitan America. Washington, D.C.: U.S. Government Printing Office.

Percy, Stephen L. and Roger B. Parks (1977) "Measuring Efficiency Without Ratios." Working Paper W77-16. Bloomington, Indiana: Indiana University, Workshop in Political Theory and Policy Analysis.

Savas, E. S. (1971) "Municipal Monopoly." Harper's Magazine, (December), 55-60.

Savas, E. S. (1977) "An Empirical Study of Competition in Municipal Service Delivery." Public Administration Review, Vol. 37. No. 6 (November/December), 717-724.

Simon, Herbert A. (1961) Administrative Behavior. Second Edition. New York, New York: The Macmillian Company.