

Community Mental Health Services as a Process Innovation: Appropriate Economic Evaluation

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ABSTRACT *This article considers the relevant framework for evaluating a major process innovation in mental health services, viz. community-based service provision. Such services involve multiple inputs from various channels (or departments) in government and 'the community'. Conventional economic theory of production is extended here to incorporate the notion that economic transactions are embedded in social relations, i.e. social capital is relevant to community-based service provision. Another fertile concept is that of 'co-production', due to Elinor Ostrom, a political scientist. Ostrom's conception of co-production between government and community inputs is outlined in the context of mental health services. A relevant question for evaluating this process innovation emerges from the co-production framework: is social capital from government a substitute for, or complementary to, social capital from community sources?*

Keywords: community-based services; co-production; economic evaluation; mental health services; process innovation; synergy

Introduction

Over several decades in the twentieth century, a controversial process innovation was adopted in public services for the mentally ill, which resulted in community-based service provision. The process innovation has also been known as deinstitutionalisation.

The key elements of the process innovation are, according to Talbott, as follows: reducing the rate of admissions to long-term, dedicated psychiatric hospitals; lowering the rate of discharges; and reforming service provision towards availability in general hospitals and community-based services.¹ These elements emerged by way of a set of political and bureaucratic procedures that were implemented over the latter half of the twentieth century. This turn of events was not confined to a single country. Rather, its adoption has been widespread in several Western countries, including the United Kingdom, the United

States and Australia.² Its implementation started in mental health,³ but it has occurred in the delivery of services for intellectual disability, physical disability and multiple disabilities also.⁴

The development of community-based services and the procedures of deinstitutionalisation occurred as a result of a major shift in beliefs and views about the effectiveness of social welfare policy for these groups of vulnerable people. This shift in beliefs had ideological, moral and political dimensions,⁵ and deinstitutionalisation is often referred to as a 'movement'. It is noteworthy that no formal policy statement justifying deinstitutionalisation as a social objective was ever prepared for public discussion in Australia.⁶

The approach in this article involves the application of economic tools of analysis in order to develop relevant questions for evaluating this process innovation arising from issues raised above. This paper addresses the following two questions: what is the relationship between social capital and government? Are these two phenomena, social capital and government, of a competitive (or substitute) nature, or are they of a non-competitive (or complementary) nature? While the answers to the previous two questions are empirical, a general theory of co-production,⁷ in which inputs from government and inputs from citizens are employed, offers a relevant framework to analyse the important questions.

Process Innovation and Health Services

Innovation affects either a product (resulting in a new good or service) or a process (which leads to new methods or techniques of production).⁸ The 'new' is not necessarily a substitute for the 'old'. With respect to process innovation, Blaug notes that the output of a process innovation is virtually never a perfect substitute for that of the existing process. The implication is that welfare implications exist for process innovation, which is exemplified in a single case suggested by Doessel: 'People may not be indifferent in the choice between taking cimetidine three times a day and undergoing surgery' in the treatment of peptic ulceration.⁹

A further aspect of innovation that is widely acknowledged in health services is the testing and trialling associated with innovation. Issues of safety are involved,¹⁰ as well as with quality and efficacy.¹¹ There are several examples available of 'innovations that were adopted before efficacy was demonstrated'.¹² One reason that this can occur is that markets fail to provide safety and efficacy in medical innovation, due to the 'public good' characteristics of safety and efficacy.¹³ Hence, grounds for a response by government exist *a priori*.

The thalidomide tragedy in the 1960s warned Australia's health departments that not only benefits, but also potential risks, exist in the use of so-called 'therapeutic products'. In response, the Commonwealth Government now provides the processes surrounding the introduction of new pharmaceuticals and medical devices. The Therapeutic Goods Administration (TGA) implements evaluation procedures.

In Australia, as with many Western countries, various agencies and organisations examine other aspects of the quality of health services. For example, medical boards in each Australian state supervise the registration and de-registration of medical practitioners, the Australian Council on Healthcare Standards implements voluntary accreditation of hospitals and other health services, and the recently formed Australian Safety and Efficacy Register of New Interventional Procedures—

Surgical, which is a review group operated by the Royal Australasian College of Surgeons. Needless to say, the efficacy of all these different forms of regulation (voluntary/compulsory, and so forth) depends on what actually happens in the processes. Economic theory predicts that, in the health sector, as in any sector, regulation may serve the public interest or it may be 'captured' by the interests of the producers.¹⁴

It is instructive in the context of the present topic to limit our scope to considering briefly some aspects of the TGA. This agency administers the *Therapeutic Goods Act 1989* which, since 1991, has provided 'a national framework for the regulation of therapeutic goods in Australia and ensure[d] their quality, safety and efficacy'.¹⁵

For the purposes of evaluation and assessment, the TGA defines a therapeutic good as 'a product for use in humans that is used in, or in connection with preventing, diagnosing, curing or alleviating a disease, ailment, defect or injury; influencing inhibiting or modifying a physiological process etc.'.¹⁶ Hence, the TGA is largely concerned with process innovations. Products are assessed as having either a higher level of risk (such as prescription medicines, some non-prescription medicines and medical devices) or a lower level of risk (many non-prescription medicines, including most complementary medicines, and low risk medical devices). The risk level is assessed in terms of the seriousness of the medical condition for which the product is intended to be used, potential harm through prolonged use, toxicity, the strength of a product, side effects, and so forth.

These processes in the TGA bring to mind deinstitutionalisation. Procedures were not present in Australia or overseas, and still are not present, to enable the assessment of the risks associated with the conversion of patients with serious mental illnesses into residents in the general community who are in need of community-based services. In short, matters of the quality, safety and efficacy of service re-location for people who once resided in psychiatric hospitals, or who once would have been such residents, are not subject to the same stringent regulation as 'therapeutic goods'.

Where an individual resides in a hospital, that setting jointly provides the following: accommodation services; treatments; medical/nursing care; and (where required) deprivation of liberty. Personal/familial support is limited. However in a hostel or a private home/flat/unit, the provision of those service characteristics is available in varying degrees.¹⁷ Furthermore, jointness in production is largely not retained under community-based services, i.e. the jointness of institutional care is fractured.

To this tale of woeful predictions of market failures, let it then be asked, 'Was testing for the safety and efficacy of deinstitutionalisation, as an innovation in social welfare policy, adequately evaluated in our economy?' The answer is that the market would be expected also to fail to provide that framework.

Hence, let us consider what such a framework would be. Accordingly, the next section discusses the limitations of conventional production theory in the context of community-based services. Then, in successive sections, the relevant conceptual framework about co-production is developed. In another section, conventional production theory is applied in a co-production framework, with an application to contemporary mental health services post-deinstitutionalisation. Another section briefly discusses some issues in empirical application. The article concludes with a final summary.

Economic Theory and Community-Based Services

Organisations providing community-based services and strategies depart from those modelled in the conventional theory of the firm. Community-based services have objectives that are not simply those of a single-objective firm in the private sector, conventionally maximising profit in a constrained environment. Rather, organisations involved in community-based strategies tend to pursue a range of objectives. Although the pursuit of such objectives is probably constrained by its technological environment and by its market environment, the environments differ also from the conventional models in complex ways. Some of these points of difference will now be considered.

First, while treatment technology for some of the psychiatric illnesses is quite advanced in effectiveness, this is not true for all the diagnoses of psychiatric illness. Both misdiagnosis and poor management of patients suffering with a major depressive disorder are well-documented as a common occurrence and a difficult problem to rectify in general practice, such as indicated in a study by McCoombs *et al.*¹⁸ These authors document 'patterns of anti-depressant use by the California Medicaid population receiving treatment primarily from general practitioners. The results indicate as many as two-thirds of all patients using antidepressants were under treatment for problems other than depression or were being dosed sub-optimally'.¹⁹ The results suggest that the standard antidepressants were either not particularly effective, were not being consumed at recognised therapeutic doses for customary lengths of therapy, or were not being used correctly by community-based physicians. Also, McCoombs *et al.* report that treatment failure for major depressive disorders was estimated to cost approximately \$1,000 per patient in additional health care services during the first year after the commencement of therapy. The costs mainly accrued in the first six months, and were concentrated in hospital in-patient services.

Second, the economic behaviour associated with community-based services and strategies is partly explained by models that incorporate the household production function.²⁰

Third, rationing of services providing mental health care has formed a sector that has been, from the 1850s until recently, highly regulated. Some economists argue that the sector effectively was socialised until the 1970s.²¹ For example, within the allocations of government budgets, medical practitioners and bureaucrats decided who was to be admitted for treatment, the kind of treatment to be provided, and how long patients were to remain hospitalised. An added layer of rationing occurred via the judicial system. In the United States, for example, precedent-setting court decisions effectively set levels of inputs for the production of services. Moreover, statutes relating to committal served to decide which individuals were to (or be forced to) receive treatment. The present transformations in service provision have resulted in care mostly occurring outside the hospital setting. In Australia, there has been a gradual expansion in private psychiatry practice, and a shift in the payment mechanism for psychiatrists and other mental health practitioners from employment in the public sector to the funding of private psychiatrists by way of the *Medicare Benefits Schedule*. Mental health care can no longer be regarded as 'socialised' in Australia.

Fourth, the simplified model is of a single-output firm employing in the short run two inputs, a variable input, labour, and a fixed input, capital. The multiple inputs, employed to provide community-based mental health services, are drawn from various channels within the government and 'the community'.

A key channel of service provision in the community is the family. Caring for family members with severe and persistent mental illness involves family costs.²² This raises an important issue to which economic theory can contribute, as suggested by Franks:

The fact that families may be providing substitute resources/goods for the formal service system is an important finding for policy makers. In a society where all resources for human services are scarce it would serve the cause of efficiency to determine how formal (governmental) and informal (family) resources could act as complements to each other rather than substitutes.²³

Franks makes reference to a model of families suggested by Moroney.²⁴ In Moroney's model, families are conceptualised as resource providers, with 'shared responsibilities' between the family and the State. The implication of this framework is that government resources and the resources of family networks are joint inputs into care and support for a disabled person.²⁵

This notion suggests public-private 'collaboration' is occurring in health and human services, often currently referred to a 'partnership' between public and private groups. This involves seeking 'to develop community infrastructure for assessment, planning, and evaluation of community health needs and to integrate health and human services into collaborative service networks'.²⁶ A range of groups is often in a collaborative network, including, for example, private health providers, public health departments, human service agencies, local government agencies, educational institutions, health plans and managed care organisations, and business coalitions. Mental health care has not escaped this phenomenon.²⁷

The individualistic framework of analysis of neo-classical economic theory has led, over time, to several 'unanswered questions' for social science.²⁸ (Some of these questions are apparent in this article.) There are many attempts in the literature to reformulate economic theory in order to incorporate social relations, for example, the New Institutional Economics.²⁹

One such attempt is the formulation of the concept of social capital. Although 'social capital' has become a neologism, its conceptual origins originate from the fact that some capital accrues in social relationships, that is, when individuals relate socially.³⁰ Social capital describes 'the set of resources that inhere in family relations and in community social organisation and that are useful for the cognitive or social development of a child or young person'.³¹ This statement implies that human capital cannot be expanded if social capital is inadequate. The recent theories of social capital predict an intrinsic role for social relationships in individuals' capacities to function effectively. Social relationships are not merely a pleasurable adjunct to the pursuit and achievement of outcomes by individuals. Three accounts of social capital are available in Coleman,³² Putnam³³ and Becker.³⁴ Glaeser, Laibson and Sacerdote provide another economic approach to social capital accumulation.³⁵

Issues concerning the relationship between social capital and government, and whether these phenomena are substitutes or complements, will now be addressed.

Synergy

One way of exploring the relationship between social capital and government in community-based services is to test for the presence of synergy. 'Synergy' arises

from co-operation and, in particular, refers to instances when the effectiveness of co-operative action is greater than the summed effect achieved by independent action. Detecting the presence of synergy may be difficult when the nature of the synergistic relationship is quite subtle.

It is understandable that some readers may be inclined to treat the word 'synergy' as a manifestation of current gibberish, along with other terms like 'total quality management', 'networking' and so forth.³⁶ However, there is some important content to the material covered by the term 'synergy', as used by Ostrom.

In the literature there are two opposing hypotheses relating to synergy between government and the stock of human capital. One hypothesis arises from an argument put forward by Coleman.³⁷ Coleman argues that when government acts, this 'crowds out' informal networks.³⁸ The resulting depreciation in the stock of social capital occurs because the government activity does not provide the same range of values and functions as the activity that arises from informal networks. The result is that the community is worse off. The government 'crowding out' effect here is, according to Coleman, just one of the classes of 'crowding out' factors causing individuals to be less dependent on one another. Two other causal factors for the phenomenon of 'crowding out' relate to rising affluence and the widening net of social security.

An opposing position is provided by Putnam who argues the case that government activities and social capital are complementary.³⁹ Another way of stating the argument is as follows:

There is evidence that the existence of the state and the rules it establishes and enforces can strengthen and increase the efficiency of [local organisations and institutions] and that, at least in coalition with other urban-based groups, [local organisations and institutions] can give rise to collective action increasing the power of the state.⁴⁰

The resolution of these two opposing arguments is an empirical matter and, while empirical work is not undertaken here, one must always ascertain, in evaluative exercises of an innovation, whether what is measured serves to clarify the nature of the process innovation being evaluated. To this end, this article presents a framework for testing the 'synergy hypothesis', and a concept similar to synergy, namely, co-production.

Co-production

The term 'co-production' refers to descriptions of joint activity in two quite separate contexts: the construction of sewerage systems in Recife in Brazil; and primary education in Nigeria.⁴¹ Co-production is defined as follows:

By coproduction, I mean the process through which inputs used to produce a good or service are contributed by individuals who are not 'in' the same organisation. The 'regular' producer of education, health or infrastructure services is most frequently a government agency. Whether the regular producer is the only producer of these goods and services depends both on the nature of the good or service itself and on the incentives that encourage the active participation of others ... Coproduction implies that citizens can play an active role in producing public goods and services of consequence to them.⁴²

Elinor Ostrom, a political scientist, writes that the concept of co-production was developed by colleagues in the Workshop in Political Theory and Policy Analysis in America in the late 1970s 'as we struggled with dominant theories of urban governance underlying policy recommendations of massive centralization'.⁴³ The struggle to which she refers arose over a proposition at the time that centralising local government services would enable a more effective and efficient service because clients would be served by professional staff employed by a large bureaucratic agency. The empirical evidence was to the contrary.

After studying police services in metropolitan areas, however, not a single instance was found where a large, centralized police department was able to provide better direct service, more equitably delivered, or at lower cost to neighborhoods inside the central city when these were carefully matched to similar neighborhoods located in surrounding jurisdictions.⁴⁴

These findings were replicated repeatedly over a 15-year period.

The efforts of Ostrom and her colleagues to understand these strong empirical results led to an understanding of some implicit assumptions that had been made in regard to service provision by government.

Implicit Assumptions about Government Service Provision

Ostrom outlines three implicit assumptions or 'myths', in Ostrom's words. It appeared these were obfuscating a reality that the theories, which were being used at the time to describe government service provision, ought to have been clarifying.

Implicit Assumption 1: About the Composition of the Industry Providing Immediate Response Services. It had been assumed that a single producer was responsible for the services. The reality was that public agencies, such as municipalities, and private firms, such as those providing security services, were involved together in the provision of (so-named) immediate response services. Put otherwise, the security services were being provided by a public-private industry, not a bureaucratic apparatus of a single government agency.

Implicit Assumption 2: About the Nature of Service Providers. Each police and security officer has a personal stock of human capital belonging to the individual in service to the bureaucracy. The personal stock of human capital does not necessarily turn as easily as a cog in a machine. 'A motivated officer uses time in many ways that enhance the safety of a beat. An officer who is not motivated finds many ways to escape the summons of the police radio and get some sleep'.⁴⁵ Variations in human capital, and people's motivations, must be recognised.

Implicit Assumption 3: About Jointness in Service Provision. Ostrom and her colleagues suspected that, unlike the production of goods, the production of services is not undertaken only by the service provider. Service production calls for active participation from the client, the recipient of the service. That is, the so-called service provider is not the only provider of the service. In schooling, for example, teachers depend on the co-operation of students to achieve a learning outcome. Teachers depend also on the support of parents in, say, ensuring homework is done,

counting on parents to nurture in the home the interests and abilities that are fostered at school. Ostrom says:

... We developed the term ‘coproduction’ to describe the potential relationships that could exist between the ‘regular’ producer (street-level police officers, school teachers, or health workers) and ‘clients’ who want to be transformed by the service into safer, better educated, or healthier persons. Coproduction is one way that synergy between what a government does and what citizens do can occur.⁴⁶

An Economic Interpretation of the Implicit Assumptions

The three implicit assumptions (above) can be understood in the light of conventional economic theory in the following manner using standard economic terminology.

Implicit Assumption 1. A single source for the budget for the production of services does not exist. Rather, different firms, public and/or private, comprise the source of funds. In conceptualising the ‘total budget’, it is not appropriate to conceive of funds being ‘pooled’ into a single source. Rather, the ‘total budget’ is (conceptually) the sum of the costs of the inputs provided by the different firms.

Implicit Assumption 2. The production of services can violate the assumption of production theory in economics that production is least-cost and/or efficient. ‘Production functions describe what is *technically feasible* when the firm operates *efficiently*; that is, when the firm uses each combination of inputs as effectively as possible’,⁴⁷ or as Greene puts it, ‘a production function represents some sort of ideal, the *maximum output* attainable given a set of inputs’ (emphasis in original).⁴⁸ The problem here is a situation of technical inefficiency or X-inefficiency.⁴⁹ In other words, production takes place at a point under the production possibility frontier.

Implicit Assumption 3. The time of the client and of the client’s family and friends is another input in the production of services, as argued by Becker.⁵⁰ Inputs of time must be included in the ‘total budget’ for the activity.

An Application of Production Theory to Co-production

In her analysis of co-production, Ostrom invokes the conventional economic theory of production. The conceptual diagrams presented by Ostrom involve isoquants (although she does not use the term isoquant). However, instead of the conventional inputs, namely, capital and labour, Ostrom models ‘inputs from government’ and ‘inputs from citizens’.

A brief comment about this terminology is in order here. Recall that Ostrom is a political scientist and note that the term she uses, ‘citizens’, is a common part of the political science vocabulary. Mental health workers are more likely to use the term ‘the community’ instead of ‘citizens’. Economists, on the other hand, may refer to ‘private inputs’ (without wishing to imply business firms, of course). To understand the relevance of Ostrom’s analysis, it is helpful to realise that the purpose here is not to emphasise the differences in terminology, differences that

can often drive wedges between those disciplines that confront common problems and issues; rather, the approach here seeks to illuminate some common ground.

In the analysis that follows, the relationship between two input-types is analysed using the economic theory of production in order to gain a better understanding of the nature of co-production itself, with an application later in the article to deinstitutionalisation in mental health care.

The Case of No Synergy

Ostrom first considers a special case, the instance where the two input-types are strictly substitutable. In such cases, government inputs can be perfectly replaced by inputs from 'citizen-producers' (which is how Ostrom refers to them). No potential for synergy exists in the 'straight-line isoquant case' and there is nothing to be gained, in an economic sense, in looking for avenues of co-producing. Rather, it is necessary to determine whether a greater level of technical efficiency is attained either by public sector production or by citizen-production.

To illustrate the case, Ostrom gives the example of garbage collection. The alternatives are as follows: government sends a truck to collect garbage, a collective input; or that citizens be required to take their own garbage to 'a designated location', a private input. The choice between the two alternatives will depend on 'the wage rate paid to public officials as compared to the opportunity costs facing citizens for spending their time in transport'.⁵¹ Assume $W_{\text{pub}} = \$10/\text{hour}$ and $W_{\text{priv}} = \$20/\text{hour}$, where W_{pub} is the public wage rate and W_{priv} is the private wage rate. Assume $TC = \$100$. At the two 'extreme' cases, the public input will be 10 hours, and private input will be five hours. In Figure 1(a) below, AB is the relevant isocost line.⁵² Since inputs are perfectly substitutable, the isoquants, Q_1 and Q_2 , are straight lines. The point of tangency between the isoquant Q_2 and the isocost line AB is at A, a 'corner solution'. The technically efficient production of garbage services would be to have garbage collection occurring collectively.

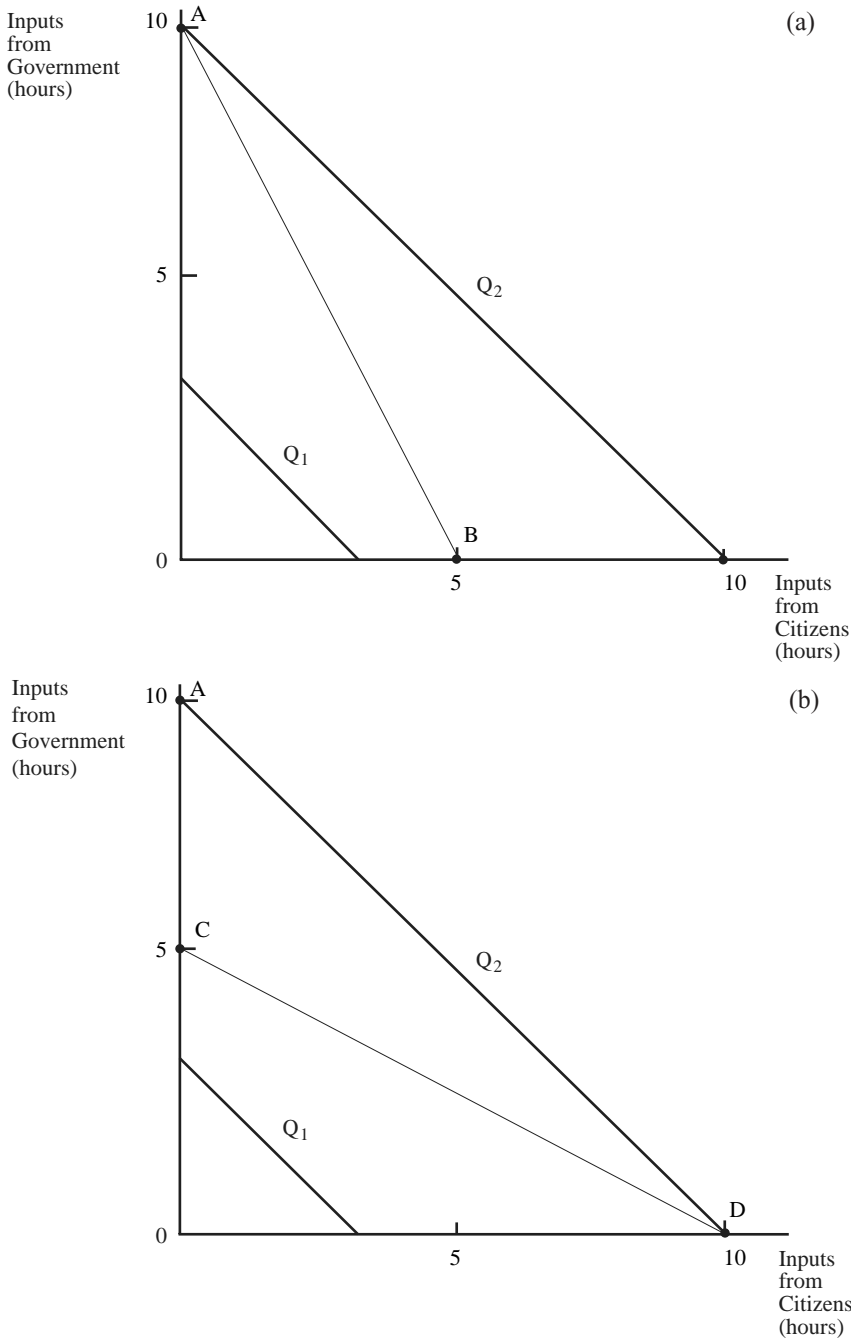
If the wage rates are reversed, such that $W_{\text{pub}} = \$20/\text{hour}$ and $W_{\text{priv}} = \$10/\text{hour}$, then the isocost line would be CD as in Figure 1(b). In this instance, the 'corner solution' occurs at point D, and the technically efficient production of garbage services is to have garbage collected as a private activity.

In both cases (above), there is no possibility of combining inputs from the public and private sectors. That is, no synergy exists. These two cases also imply extreme cases in cost sharing. In Figure 1(a), the cost share from government is unity, with citizens contributing a zero cost share. In Figure 1(b), these shares are reversed. The more general case of cost-sharing will be depicted in Figure 2 shortly.

The Case where Synergy Exists

Synergy is present where the 'inputs from a government and citizens are complementary'.⁵³ The output is optimally produced by some combination of the input-types. Put otherwise, it is not optimal to rely just on inputs of citizens or on inputs from government. Instead, many combinations of input-types exist which achieve an identical level of output of the service. In such cases, the isoquants are downward sloping and convex to the origin, as in Figure 2 below.

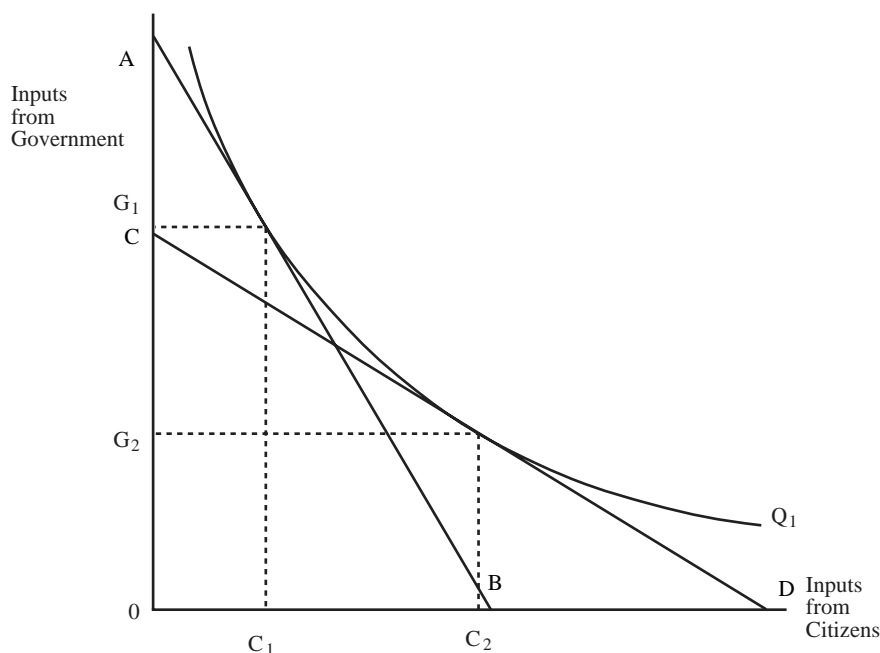
Assume the instance where the public wage rate is less than the private wage rate. This wage relativity is depicted by the slope of the isocost line, AB. The optimal combination of inputs that achieves Q_1 is OG_1 of government input and OC_1



Source: Adapted from Ostrom (1996, Figure 1).

Figure 1. Perfectly substitutable contributions to an output from government and citizens.

of citizen input. If the public wage rate is greater than the private wage rate, that is, the isocost line is CD, then the optimal combination of inputs to achieve Q_1 is OG_2 of government input and OC_2 of citizen input.



Source: Adapted from Ostrom (1996, Figure 2).

Figure 2. Complementary contributions to an output from government and citizens.

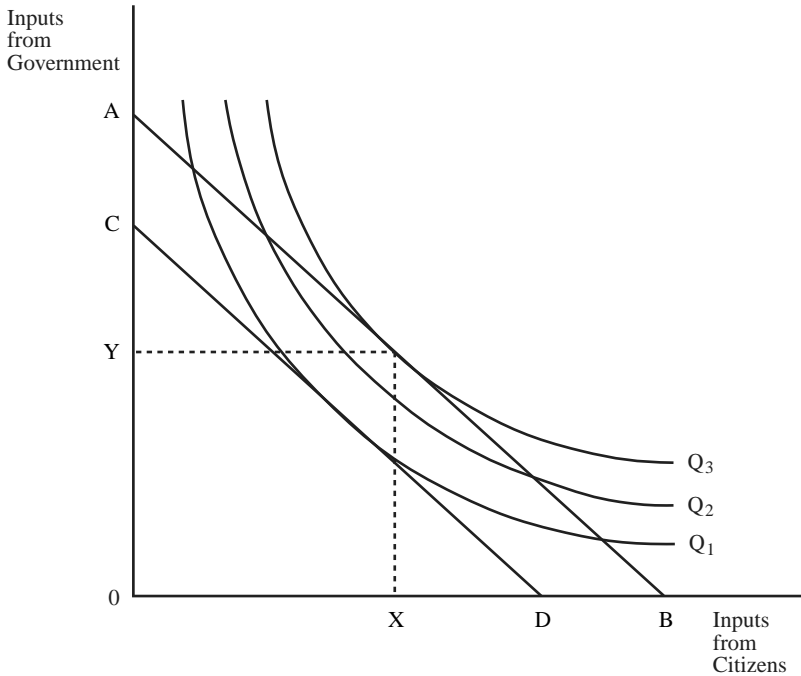
Ostrom then states, *a priori*, that 'Many poor regions and neighborhoods are characterized by severe underutilization of the knowledge, skills and time of residents—which means that the opportunity costs of devoting these inputs to the creation of valued public outputs are low'.⁵⁴ Restating the notion diagrammatically, Ostrom's judgement implies that the shape of the isocost line in many developing countries is more like CD than AB in Figure 2.

In this section so far, with the use of the conceptual tools of conventional production theory, light has been shed on co-production, in the manner of Ostrom who conceives of the presence/absence of synergy between two rather unconventional inputs, inputs from government and inputs from citizens. She goes on to point out that her analysis has assumed no possibility of slackness in input performance, rather 'full motivation to perform to capacity', as she puts it.⁵⁵ In the following section, the motivational disposition of workers is addressed.

The Issue of Motivation

The following account is of Ostrom's analysis of the issue of motivation, with some emendations. Ostrom illustrates her analysis with the following example from education. The account that follows will use that example and after that, an application will be made to mental health services.

In Figure 3, AB is an isocost line for a service in education, or health for that matter. Q_2 is an isoquant representing a given quantity of education or health. Isoquant Q_2 is technically feasible and OY units of government input are employed and OX units of citizens' inputs are employed. Now if health practitioners or



Source: Adapted from Ostrom (1996, Figure 3).

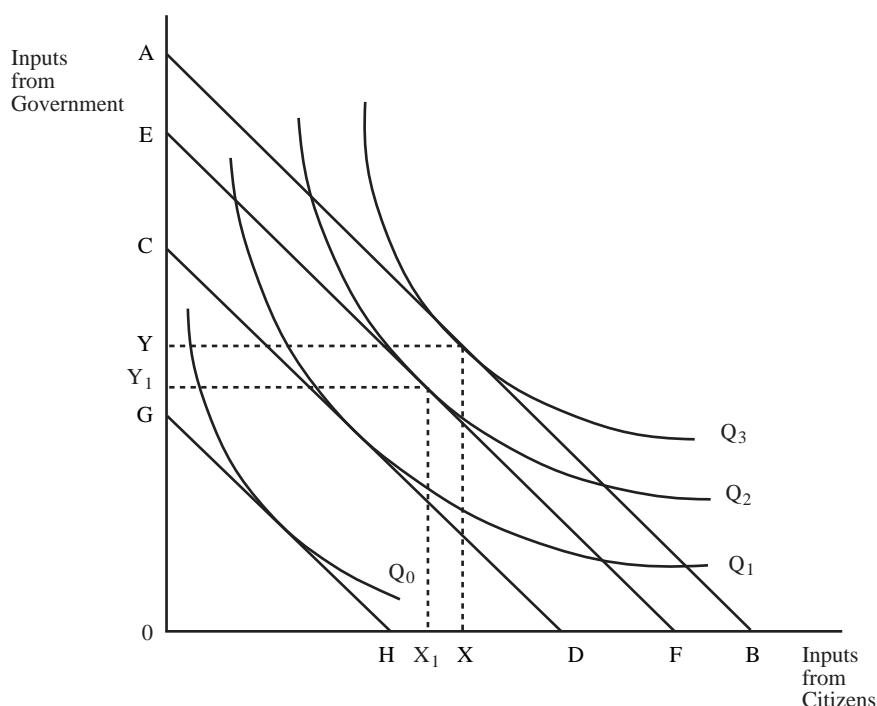
Figure 3. Co-production in the presence of low motivation.

teachers are poorly motivated, the OY units of government inputs and OX units of citizens' inputs will not produce Q_2 output but a lower level of output, say, Q_1 . Put otherwise, the OY and OX inputs are still employed but the community does not obtain the relevant Q_2 output.

The 'waste' can be measured in two ways. By constructing a new isocost line, CD, parallel to AB and tangential to isoquant Q_1 , then the measure of the 'waste' in monetary terms is either the distance AC or DB. The 'waste', measured in terms of lower education or health output, is also found by the quantitative difference between the isoquants, Q_1 and Q_2 .

An examination follows where a compounding effect occurs due to spending less on education, and poor motivation. Whether education spending is reduced by government or by the community, the effect is to shift the isocost line towards the origin, thus producing a further decline in educational output. The effect is determined by the empirical value of the resulting isoquant.

Figure 4 incorporates spending cuts into the previous account of poor motivation, represented in Figure 3. Let us begin with a total 'budget' represented by the isocost line AB: *ceteris paribus*, an optimal outcome is given by the tangency condition with isoquant Q_3 , involving OY units of government inputs and OX units of private (or community) inputs. If poor motivation exists, then the educational sector will be subject to 'waste', in that, although the total budget is indicated by the isocost line, AB, the actual output is indicated by the (lower) isoquant Q_2 . The effect of this inefficiency (arising from poor motivation) is equivalent to the effect of government inputs being reduced to OY₁ and community inputs being decreased to OX₁.



Source: Adapted from Ostrom (1996, Figure 3).

Figure 4. Poor motivation compounded by spending cuts.

Let us now assume that the government and/or the citizens *reduce* their financial commitments to education, such that the available resources are now indicated by the isocost line CD. It is believed that the reduced budget will enable the production of education as indicated by the isoquant Q_1 . The reason given for the reduced resources allocated to the educational sector may be that the teaching staff is 'slack' and students are not learning.

The effect of this decreased financial commitment is to create another round of falling motivation or poor motivation from staff. This further decrease in motivation, induced by the reduced expenditure commitment, leads to a further decrease in educational output to Q_0 . In other words, there may be a 'cumulative causation' process, or a vicious cycle at work. This concept of cumulative causation was developed by Myrdal, in the context of race relations in the US.⁵⁶ It was subsequently employed to explain the disparities in (regional) economic growth.⁵⁷

The example above has illustrated that educational output has declined from Q_2 to Q_1 , and then further to Q_0 .

Co-production and Community-Based Services

Consider the shift in direction in the organisation and financing of mental health services in many Western nations. The shift involves a trend towards government acting as buyers, rather than as providers of services. This trend within the deinstitutionalisation movement raises many issues. McGuire and Riordan, for example, consider the incentives and information issues that ensure the community provider serves the state interest.⁵⁸ They regard these issues as the central problem in state

contracting of mental health services. They note the evidence that community mental health centres, when they received contracts from government with no incentive provisions, simply '*did not* target services to the seriously mentally ill'.⁵⁹ In other words, community mental health centres 'cream-skimmed'. In the context of the move towards privatisation of government activity in mental health care, these are not trivial concerns but the focus of this section is upon yet another issue concerning 'community-based' mental health service provision.

Although professional treatment alleviates some symptoms and disabilities, chronic problems remain, affecting the daily living of a range of individuals with serious mental illnesses. Housing, shopping, personal care, food preparation, transport, income support, banking and so on are difficult for such individuals. This is due largely to the illnesses intensifying the challenges in decision-making and performance of the tasks of 'getting through the day'. Previously institutionalised, this population struggles with daily living, struggling in different ways. Living in the community now, this group of individuals seems to depend rather haphazardly on social capital, that is, on greater efforts from family, from friends, and perhaps even from passers-by, as well as from community mental health care and other government agencies, to provide care and support, and treatment.

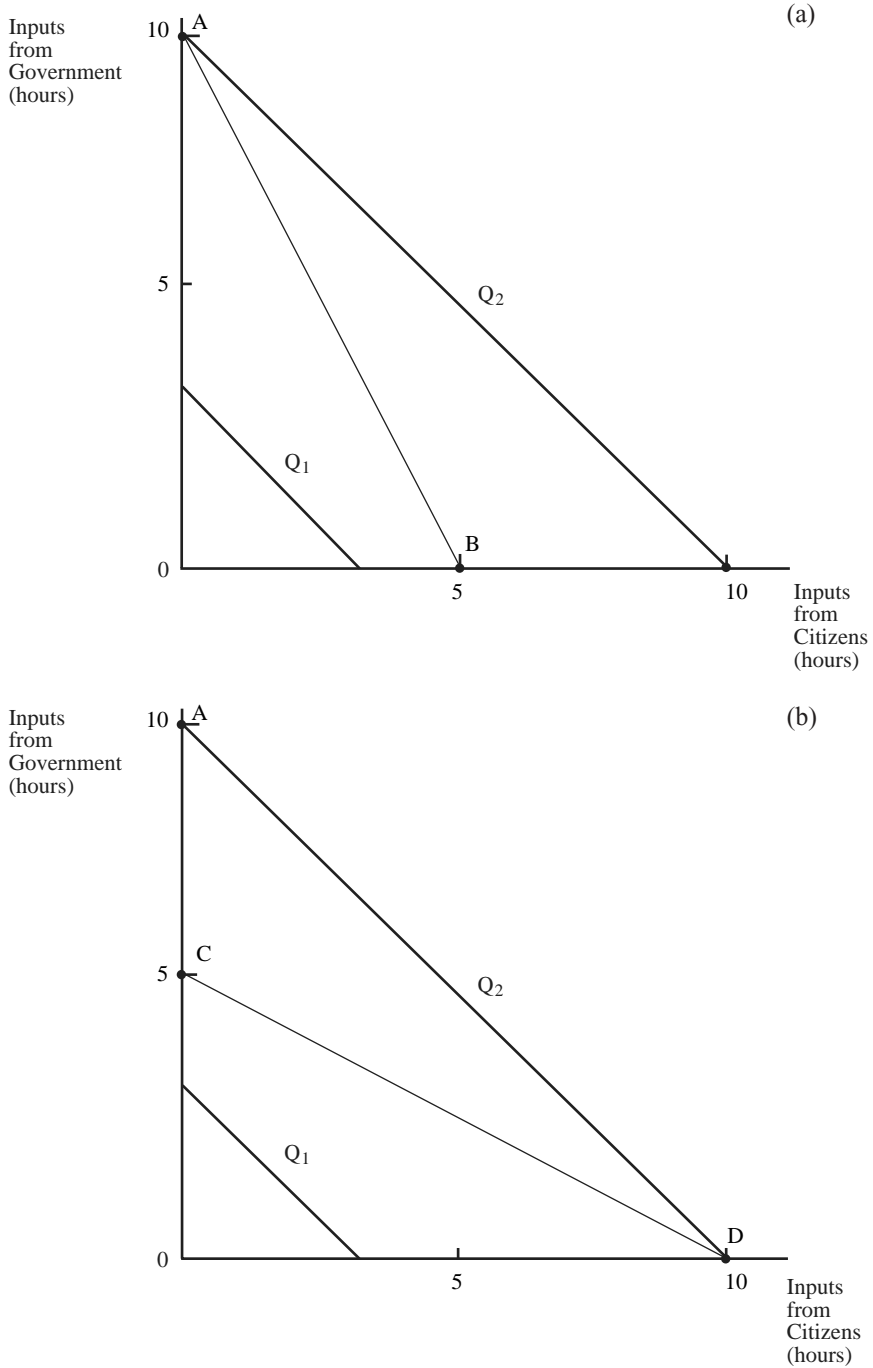
It is highly pertinent in this context, then, to recall the following: what is the relationship between social capital and government in this process innovation in mental health services? Are these two phenomena substitutes or are they complements? With community-based mental health care, 'inputs from citizens' and 'inputs from government' are evident. The general theory of co-production is employed once again here to help shed light on the optimal input combination from citizens and government for providing the multiple outputs of treatment, care and support for individuals with mental illnesses and disabilities.

The Case of No Synergy

Consider first a limiting case, an instance where the two input-types, given in the previous section, are perfectly substitutable. In the limiting case, government inputs can be perfectly replaced by inputs from 'citizen-producers'. In this 'straight-line isoquant case', no potential for synergy exists. There is nothing to be gained, in an economic sense, in looking for avenues of co-producing. Rather, it is necessary to determine whether a greater level of technical efficiency is attained either by public sector production or by citizen-production.

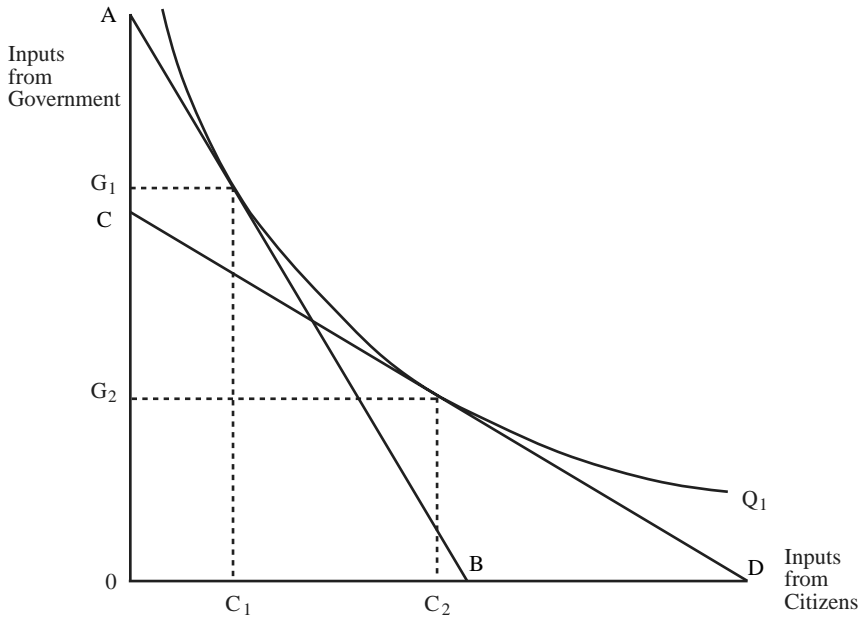
To illustrate the case, suppose the two following alternatives exist. Either, government monopolises the provision of services of mental health care, say, within the walls of a hospital; or citizens take into their homes and community their own relatives, friends and patients, caring for them. They draw solely upon citizen inputs. Suppose the question as to which of the two alternatives just given is optimal, depends on the wage rate paid to public servants as compared to the opportunity costs facing citizens for spending their time in care, treatment and support.

Assume $W_{\text{pub}} = \$10/\text{hour}$ and $W_{\text{priv}} = \$20/\text{hour}$, where W_{pub} is the public wage rate and W_{priv} is the private wage rate.⁶⁰ Assume $TC = \$100$. At the two 'extreme' cases, the public input will be 10 hours and private input will be five hours. In Figure 5 below, AB is the relevant isocost line. Since inputs are perfectly substitutable, the isoquants, Q_1 and Q_2 , are straight lines. The point of tangency between the isoquant Q_2 and the isocost line AB is at A, giving rise to a 'corner solution'. In this



Source: Adapted from Figure 1.

Figure 5. Perfectly substitutable inputs from government and citizens for providing mental health care.



Source: Adapted from Figure 2.

Figure 6. Complementary inputs from government and citizens for providing mental health care.

special case, the technically efficient arrangement for mental health care is government provision.

If the wage rates are reversed, such that $W_{\text{pub}} = \$20/\text{hour}$ and $W_{\text{prv}} = \$10/\text{hour}$, then the isocost line would be CD as in Figure 5(b). In this alternative case, the 'corner solution' occurs at point D, and the technically efficient production of mental health care is to have treatment, care and support as a citizen-provided activity.

In both cases modelled above, it is not possible to combine inputs from the public and private sectors. That is, no synergy exists, to use Ostrom's term.

The Case where Synergy Exists

Synergy is present where complementarity exists between the inputs from government and from citizens. Because the output is optimally produced by some combination of both input-types, it is not optimal to rely either on inputs of citizens or on inputs from government: combinations of input-types achieve the same level of output of the service. As in the previous analysis associated with Figure 2, the single isoquant, Q_1 , in Figure 6 is downward sloping and convex to the origin.

Assume once again an instance where the public wage rate is less than the private wage rate, as depicted by the isocost line, AB. The amounts, OG_1 of government input and OC_1 of citizen input, achieve the level of output indicated by Q_1 . If, on the other hand, the public wage rate is greater than the private wage rate and if the isocost line is CD, then the optimal combination of inputs to achieve Q_1 is OG_2 of government input and OC_2 of citizen input.

Having addressed the conceptual matter of substitutability/complementarity between citizen and government inputs in the context of mental health services, let us address the matter of the degree to which synergy is present, or absent, between these inputs.

Synergy in Mental Health Service Provision

The degree to which synergy does, or does not, exist between government and citizen inputs in mental health care is an unknown phenomenon. However, the deinstitutionalisation movement has been predicated on assumptions that synergy exists between these inputs.

By way of contrast to such assumptions about deinstitutionalisation, consider care-giving by households. Typical care-giving by households involved with mental illness is not thought to be like that of a relative with physical or developmental disabilities. For example, it normally does not involve nursing duties, as is the case with physically or developmentally delayed relatives. According to Lefley, it involves:

hours devoted to activities of daily living ... [and] ... multiple expenditures of time and energy in trying to obtain timely services from mental health, welfare and medical systems, and interactions with legal and criminal justice systems. ... The emotional stress involved with dealing with behaviors that may be disruptive, assaultive, self-destructive, socially constraining and, above all, incomprehensible, *has been accompanied by a notable lack of information and help from the treatment system.*⁶¹

This statement suggest that an approach to co-production in mental health care, conceptualising the presence/absence of synergy between inputs from government and inputs from citizens, is fundamentally important in the evaluation of change in mental health services. Appropriate empirical analysis is vital: the presence or absence of synergy is *not* a matter of belief or assertion.

Motivation and Community-Based Mental Health Services

The likely occurrence of compounding effects has been considered already via Ostrom's example of lowering expenditures on education. In the current context, it is not necessary to re-apply Ostrom's approach once again to the case of motivation and mental health care. That case will not be presented here. However, it is an important qualification to consider that poor motivation, compounded by decreased expenditure on mental health care, may well generate a downward spiral of lowered mental health output.

Some Notes on Empirical Estimation

Process innovation in mental health service provision relates to a number of broad processes, including medication *vs* therapy and counselling, public *vs* private production and/or funding, and so forth. This article is concerned with a single innovation. The previous theoretical discussion leads to some empirically testable propositions that would enable us to determine if the outputs of contemporary mental health services were, or were not, increased by the adoption of co-production

between the public and private sectors. Some theoretical analysis of the outputs of mental health services can be found in Williams and Doessel.⁶²

For the empirical task of concern in this article, the approach outlined here actually involves conventional production and cost studies: it is necessary to estimate the extent of input substitution that is feasible in the production of mental health status. Thus, the empirical study of this process innovation in mental health services needs first to consider the nature of the isoquants associated with the production function of mental health services,⁶³ and the magnitude of the elasticity of substitution. This is the relevant concept that will specify the substitutability of inputs to the production process.⁶⁴

Next, the inputs would need to be identified and priced, both for government and for private/community inputs. The pricing of community inputs raises difficult problems but such problems need to be addressed because the alternative, i.e. not pricing them, is to value them implicitly at zero.

Attention then would need to turn to the nature of the data required about the services provided. The key requirement for useful data in mental health care is to address the problem that the phenomenon, mental illness or disability, is highly heterogeneous and that a 'mental health service' is a very imprecise term.

If an empirical exercise is going to succeed in analysing 'like' with 'like', then disaggregated data need to be collected. More precisely, if the services provided in a home are going to be compared successfully with those provided in an institution, then data about such service provision need to be standardised for disability level.

To illustrate this point, consider a brief example from another context. Just as it would be quite preposterous, for example, for an agricultural economist to estimate a single production function for wheat, bananas and milk, likewise, in the context here, estimating a single production function for mental health care would be just as ridiculous.

To repeat, mental health services represent a heterogeneous phenomenon. It varies with the differing disability levels associated with the severity of various illnesses/disorders. Data that are disaggregated by disability level are required.

By empirically estimating the production functions associated with each level of severity of the illness/disability, it would then be possible to determine the degree of substitutability/complementarity between government and citizen inputs for each disability level. Knowing these phenomena is the essence of the evaluation of the impact of adopting community-based mental health service provision in the public sector.

Conclusion

In this article, a research agenda is outlined, which suggests an approach to the evaluation of a single, but major, process innovation in public sector mental health services, *viz.* the introduction of community-based service provision.

This framework enables evaluative analysis, i.e. information beyond anecdotal evidence. This article suggests the appropriate conceptual framework within which empirical work can be undertaken. It also demonstrates clearly that empirical work on issues associated with mental health service delivery does not need to be a-theoretical.

Deinstitutionalisation was the vehicle by which a process innovation was implemented in the mental health sector of many Western countries. Its implementation

is now completed. However, in its adoption, the relevant economic data necessary to analyse this process innovation were not collected, thus precluding any economic analysis then or now. This failure is not unique to economic data and economic evaluation.⁶⁵

Some may wish to draw a moral from a tale of missed opportunities and missed analyses. The moral is that we should not repeat the pessimistic description of humanity's disposition not to learn, as indicated in the oft-quoted statement by Hegel (1770–1831) that '[w]hat experience and history teach is this—that peoples and governments never have learned anything from history, or acted on principles deduced from it'.⁶⁶ If another massive social experiment is undertaken, of the magnitude of the deinstitutionalisation movement, then the relevant data must be collected so that evaluation can take place.

The deinstitutionalisation movement assumed that it could abstract from two quite important factors. First, fundamental empirical relationships behind this process innovation were assumed away. From another perspective it could be said that 'deinstitutionalisation' is a piece of jargon for a sector that changed its technology drastically without exploring the empirical relationships between the level of the output, and the quantity and availability of the inputs. Second, the adoption of this process innovation abstracted from the severity of illness, treating mental health service provision as a homogeneous product. This it is not. It is a heterogeneous product. Data that are disaggregated by disability level and illness type enable an understanding of the diverse impacts of deinstitutionalisation.

Finally, it is hoped that this article will provoke economists and policy-makers to give more thought to the following issues: to the relevant data for statistical analyses, and to data that are remaining uncollected; to matters of market failure in mental health services; and to issues of experimentation in social welfare policy. In spite of its relatively unfettered spin into the twenty-first century, one hopes that the process innovation involving community mental health services is not like thalidomide, but this will never be known.

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61. Lefley, *op. cit.*, pp. 6–7, emphasis added.
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63. Essentially, it is being suggested that it is unlikely that the isoquants are entirely capricious, incomprehensible phenomena.
64. Generally, the empirical task is to determine the 'ease' with which inputs can substitute for one another. This implies determining the shape of the single isoquant, not the shape of the whole isoquant map. It might be thought that the marginal rate of technical substitution, or the slope of the isoquant, provides a measure of this responsiveness, but a little reflection indicates that the slope is not scale-free. Bringing together Marshall's concept of elasticity and the long-standing concept of substitution, J. R. Hicks in 1932 and Joan Robinson in 1933 provided the scale-free building blocks to the measuring rod we now know as the elasticity of substitution, for which the symbol is (commonly) σ . Consequential to these early developments, share elasticities were introduced in the late 1960s and early 1970s. The advent of duality theory also means that it does not matter whether production or cost functions are estimated. Furthermore, since the advent of flexible functional forms, estimation using, say, the transcendental logarithmic (the 'translog') should typically be undertaken. The importance of σ is that it enables the empirical specification of extreme, and other special, cases.
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