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Psychiatry interacts with contemporary Western views: the *DSM-III* innovation and its adverse effects

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Economic studies of innovation are relevant to the mental health sector, not just for innovations in more conventional industries, such as telecommunications. We present an economic examination of the impact of an innovation in the mental health sector. The innovation examined here was first adopted in 1980 with the publication of a new edition of the nosology (or classification) for the diagnosis of mental illnesses and disorders, which is known familiarly as the DSM-III. *In our analysis, we incorporate the impact of that innovation, and another major force relevant to psychiatric diagnosis during that time period, i.e. a trend in the West towards the medicalisation of normal sorrows. This is now a documented phenomenon. By using conventional price–quantity space and focussing attention on the quantity outcome, we are able to consider the impact of these concurrent forces on the false positive rate in the diagnosis of mental illnesses in the West and on efficacious diagnostic practice in this sector. Diagnostic efficacy is relevant to treatment, but it is relevant also to resource allocation in the mental health sector. Our analysis highlights the vital place of innovation in diagnostic practices, and the funding of this, in the mental health sector*.

Introduction

The present study is concerned with an innovation in the classification and diagnosis of mental disorders, which is a little different from the kinds of innovation usually addressed by scholars of innovation. This innovation occurred in the psychiatric nosology associated with the *Diagnostic and Statistical Manual of Mental Disorders* produced by the American Psychiatric Association (APA). The innovation that concerns us was incorporated in the third edition, the *DSM-III*, and later revisions (APA, 1980, 1987, 1994, 2000).

There is some discussion herein as to how mental illness is defined. Views about mental illness differ. Mental illness is regarded by some (e.g. Bennett, 1953) as a biological phenomenon connected with brain-mind function; others regard mental illness through a biopsychosocial lens, which McLaren (2002) accurately notes involves no definitive model; some reject mainstream psychiatry entirely, amongst these being the 'anti-psychiatry' movement of the 1960s (with which names such as Szasz, Laing and Cooper are associated) and more recently Richard Bentall's stance that explains the psychoses from a psychological basis (e.g. Bentall, 2003); Andrew

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Scull and others explain mental illness from a sociological or political conception; and so forth. Despite all the disagreements, the focus in this paper is upon a single unifying dimension, which is a broad classification of 'mental disorder': 'mild', 'moderate' and 'severe'.

Note also that although the title of this paper refers to 'psychiatry', the concern of this paper is broadly applicable beyond psychiatry to other 'brain-mind' professions as well, including psychology, social work, and counselling in general. In addition, we address the tendency for the concept of mental illness to become widened, which is a tendency attributable to social and internal forces. Our analysis thereby highlights the vital place of innovation in diagnostic practices in the mental health sector.

Since Schumpeter's exposition of the view of innovation as 'creative destruction' (Schumpeter, 1942), economic scholarship on the process of innovation has adopted a broad purview. Its scope is the successful adoption of new ideas. Since Schumpeter, the emphasis is on successfully exploiting 'the competition from the new commodity, the new source of supply, the new type of organisation' (Schumpeter, 1942, p. 84). By implication, such emphases are relevant to any industry or sector.

This paper may be surprising as an economic study. Though not the usual subject of an innovation in health economics, it would not be correct to regard the *DSM-III* as a trivial development. It has been argued (e.g. Horwitz, 2002) that this innovation involved a Kuhnian revolution. The purpose of this paper is to add to the understanding of the economics of the development, diffusion and impact of new ideas, particularly in the attainment of mental health. Another purpose is to demonstrate the problems of empirical work in the economics of innovation. It is not uncommon that data are not collected on innovations: historically, the 'big' innovations (railways, the clock, the prehistoric need to make a fire, etc.) all tend to face the problem that the relevant data are missing, i.e. not collected.

The framework of innovation economics

Although the concern herein is somewhat unconventional in the literature, it is relevant to note that Swann (2009) suggests that adopting a narrow frame of reference in the economic study of innovation is not advisable. He cautions against too narrow a view of the intellectual heritage of the economics of innovation and the disciplines relevant to its understanding (see Freeman, 1982). Examining an innovation in an unconventional setting (such as the mental health sector) also enables one to draw upon wider perspectives about the diffusion of new ideas, as suggested by Swann (2009).

This study helps to illuminate an aspect of all innovation, *viz.* that innovations often have some unintended consequences. In addition, it is noteworthy that the evidence from economic history is that innovation is mostly the outcome of demand factors and supply factors (Rosenberg, 1994). This suggests the likelihood of external effects. It is well recognised that innovation does not exist in a social, cultural or anthropological vacuum. Mumford (1934) illustrates the social and cultural setting of innovation with his compelling case that the clock, rather than the steam engine, was the key mechanical invention of the modern industrial era.

The success of a new idea can be examined from various perspectives but at the societal level, a society is subject to all the consequences of the adoption of both good ideas and false beliefs. A relevant historical example is how the miasma theory of disease was a new idea in the Middle Ages, and popular too (i.e. subject to demand and diffusion) for centuries, until the 1800s. In its time, it was also a commercially

exploitable idea, but the adoption of the notion that combating the miasma would overcome what is now known to be infectious diseases did not affect the mortality rate. It could not do so: it was a false belief, involving a misconception. Thus, a misconception was subject to widespread diffusion. Arguably, the resources used in the economic application of that innovation, the miasma theory of disease, were misallocated resources: the miasma theory of mortality was not income-creating because it did not contribute to length of life; it did the opposite: the misconception led to people's deaths. However, the diffusion of a 'correct' idea, the germ theory of disease, was a successful innovation in the full economic sense: it reduced the mortality rate and it contributed to increasing longevity (see McKeown, 1976; Magner, 1992; Mokyr, 2002).

It is relevant to observe that more is heard about the economics of innovation relating to some sectors and phenomena than to others. Does this matter? Some readers may wonder why the innovation in psychiatric nosology is of any consequence to anyone other than a highly specialist audience. This paper seeks to consider the economic implications of this view. There is an argument that the persistent scandals and crises in mental health worldwide have some connection with resource shortage and resource misallocation in this sector, and with lacunae in economic knowledge of various kinds in this sector. The mental health sector is in need of innovation not just for its clinical implications, but also for the resource re-allocation that will address the scandals, and the known resource shortages of this sector (Doessel *et al.*, 2010). Hence, economic studies of innovation in the mental health sector are worthy of wider attention. (See also the arguments about the institutional incentives and constraints in the progress of science (e.g. Diamond, 2008).)

The other broader lessons in this paper arise from the fact that there are considerable impediments to undertaking empirical analyses of innovations for which appropriate data are not available. This paper addresses the need for empirical work on innovation by providing a stylised account through time. Griliches' (1957) empirical study of hybrid corn has shown already the amenability of innovation and technological change to the empirical study of diffusion. Empirical work on any innovation topic is seldom undertaken without difficulty, but perhaps this applies particularly to the mental health sector.

There is already an empirical literature about mental health sector innovations. However, these studies are mostly in the cost-effectiveness genre. Evaluative studies of the mental health sector encompass therapies, programmes, projects, treatment settings, data collection, etc. This emphasis contrasts with the empirical emphases and concerns of Griliches (e.g. 1957, 1958, 1963, 1964), Griliches and Cockburn (1994), Mansfield (1995) (reviewed by Diamond (2003)), and others. Griliches' main research themes include the role of economic incentives in the development of knowledge and its diffusion, determining the appropriate rates of return from publicly-financed research and education, and measuring changes in the quality of inputs and new goods in productivity measurement (and price index formation). Diamond (2004) provides one review of Griliches' contribution.

This is not to suggest that the themes analysed by Griliches have had no influence on studies of the mental health sector. There are several studies in that genre, but the number of these is tiny relative to those in the cost-effectiveness genre (not cited in this paper). For example, there are various approaches to measuring the improvement gained from pharmacotherapy in the treatment of depression, including the Selective Serotonin Re-uptake Inhibitors (SSRIs), such as Berndt and Greenberg (1995),

Berndt, Cockburn *et al.* (1997), Berndt, Frank *et al.* (1997), Frank *et al.* (1998, 1999), Triplett (1999), Greenberg *et al.* (2003) and Ling *et al.* (2008).

The literature on the impact of SSRIs is subject to some controversy (e.g. Kirsch *et al.*, 2008; Ionniddis, 2008). One contention frequently heard is that the adoption of a new pharmacotherapy is less a medical innovation and more about effective marketing. Lichtenberg and Virabhak (2007) find some empirical evidence to the contrary and that 'pharmaceutical-embodied technical progress' (their term) promotes economic growth and lessens inequality. Lichtenberg and Virabhaks' results are about the general health sector. The outputs of the mental health sector are notoriously more difficult to measure. When accurate and economically relevant clinical data become available, the quality improvement and productivity gains from pharmaceutical innovation in the mental health sector can be determined more accurately. In this broad innovation economics framework, there is also another type of study about the mental health sector (Williams and Doessel, 2007). This adopts an historical, or time series, perspective, and is concerned with the place of knowledge accumulation in this sector, in the lineage of Mokyr (2002).

The next section will provide some descriptive context for the *DSM* and will comment on the current folk taxonomy of mental disorders. Another section will explain the empirical approach suggested here. A stylised account of the impact of the innovation will then be provided. This is in two parts. First, there is an account of the epidemiological fundamentals relevant to the economic arguments herein and, second, a section that presents our geometric analysis of the economic effects of the *DSM-III*.

'Empirical' method when no data have been collected

Our paper joins the dispute within psychiatry (and other cognate, or brain-mind, professions, such as psychology) as to the nature of mental disorder. It is necessary here to 'get down into the trenches', since our particular emphasis is to indicate the implications of two concurrent phenomena: the diffusion of the *DSM-III* and the diffusion of a Western cultural habit of medicalising or pathologising the 'normal' stresses of life. This paper is in part concerned with what Rosenberg (1994) describes in his framework, mentioned above, *viz.* the economic implications of how knowledge, or information (e.g. about mental illness), comes to be embedded in a new innovation (as in a nosology) which subsequently became a new technology (in this case, a diagnostic technology). Rosenberg (1994, p. 1) argues that attention should also be paid to interdependencies and trade-offs in the innovation process, which 'will often feed back upon science and powerfully shape the direction taken by scientific research'. Also, it is important to pay 'explicit attention to the qualitative features of information acquisition'. In addition, 'the particular sequence of events and institutions within particular industries' (Rosenberg, 1994, p. 2) are relevant path dependency matters: all these points are relevant to the *DSM-III*.

In the next two sub-sections, we outline the approach applied here to overcoming the impediments to undertaking an 'empirical' analysis of innovation, given that appropriate time-series data are not available. This approach can be likened to the problems of research method classified in Peter Swann's *Putting Econometrics in its Place* (Swann, 2006). In particular, Swann describes the applied economist's toolbox of techniques, only one of which is econometrics. It is useful that some problems with which applied economists have grappled for decades are now described, and named, in this monograph.

It needs to be explained at the outset that we have some confidence in proceeding with this analysis because we already have some existing results (from cross-sectional analysis). These results refer to resource misallocation in the mental health sector which relates to a phenomenon we have termed 'structural imbalance' (Doessel *et al.*, 2008; Doessel *et al.*, 2010). Those results will now be summarised.

Two cross-sectional studies

These two studies measure the phenomenon of 'unmet need', a term used by clinicians. 'Need' in this context simply means 'a diagnosis of mental illness'. Unmet need is reported (anecdotally) in the mental health sector from time to time. (See, for example, Stoller (1955), Dax (1961), a more recent book-length treatment of this phenomenon (Andrews and Henderson, 2000), and major epidemiological studies in the United States (e.g. Robins and Regier, 1991; Kessler *et al*., 1994).) Also, reports of its impact on various population groups are available, such as those by Hunter (1993), Thornicroft *et al*. (2000) and Beautrais *et al*. (2000). Unmet need involves health services being physically available, but subject to zero consumption by those whose conditions have been diagnosed. In the mental health sector, zero consumption can have two meanings: first, it can mean that there is no need for mental health resources; and, second, it can be symptomatic of those people with a need for services whom 'the system' is not reaching. (See also the general discussions of unmet need (Andrews and Henderson, 2000).)

'Met non-need' is another phenomenon, not unrelated to 'unmet need'. It involves the use of mental health resources by people who do not have a diagnosis (or symptoms) of mental illness. There are co-existing factors underlying 'met non-need': the outcome of a medicalising culture; the expansion of the market for developing personal potential; and the growth in service providers whose interest is in mental health phenomena other than mental illness, such as success in sport and executive life, as well as the 'worried well' (Begel, 1992; Sperry, 1993; Bell, 2005).

Doessel *et al.* (2008) apply the term 'structural imbalance' to the co-existence of unmet need and met non-need in the mental health sector. A question that we have sought to address about unmet need is 'What is its extent?', but there is also a second question to ask: 'What is the extent of met non-need?'. Doessel *et al.* (2008) provide an empirical specification of structural imbalance with Australian data from the national survey of *Mental Health and Wellbeing*. In a subsequent cross-sectional study to measure structural imbalance in Australia's mental health sector for population subgroups, Doessel *et al.* (2010) analyse both need (as defined here) and service utilisation. The results show the presence of structural imbalance. The unmet need category represents 11.0% of the Australian population with 62% of mentally ill people (1,477,500 people) receiving no mental health services. A group of 591,600 people (4.4% of the population) consumes mental health services, but does not meet the criteria of mental illness. Thus, met non-need is also a relatively large problem. Evidence also exists that these two problems vary with diagnosis (depression, anxiety disorders, etc.).

A role for cliometrics

The initial results reported in the sub-section above suggest either the sensitivity or specificity of mental health sector diagnoses is poor, or its financing is badly organised,

or its techniques are misapplied. The outcome is an elevated occurrence of false positives, an alternative way of referring to the met non-need category of people. Although more work needs to be done on structural imbalance, the above cross-sectional evidence has led the present authors to consider the possibility of time-series evidence of structural imbalance. In this context, it is useful to consider some literature from the new economic history, or cliometrics.

One of the earliest applications of the new economic history was determining the economic effect of railways on economic growth. There was a view, neatly stated by Jenks (1944), that railway expansion was the most important innovation of the nineteenth century. Fogel (1962) challenged this conclusion on the basis of his calculations of 'social savings'. Social savings were calculated by undertaking a counterfactual exercise, i.e. determining the costs of transporting products by a combination of rail, wagon and water transport, and the costs of transporting these same products without railways. The difference between these two measures was defined as the social savings attributable to the railroad. Fogel's conclusion was that the railroad did not make an overwhelming contribution to the production potential of the economy (Fogel, 1964, p. 235; also Fogel, 1966). His analysis has been subject to various criticisms, such as those of Nerlove (1966) and David (1969). However, the issue of implicit assumptions (underlying Fogel's work) relating to the roles of capital and technological change is crucial. It has been argued by Temin (1973) that whether social savings understate, measure accurately, or overstate economic gains, depends on assumptions made about capital and technological change. (See also Hunt (1967), Coelho (1968), and especially Thomas and Shelter (1968) who provide some comparable estimates for other innovations (red fife wheat and the chilled-steel plow, steam-powered ocean vessels, etc.)

But the point of this controversy for us is that relevant data to evaluate the railway innovation did not exist; and attempts to construct relevant data are fraught with both conceptual and empirical problems. The great innovations in history often present problems with availability of appropriate data, as the relevant data have seldom been collected. Thus, our question involving the *DSM-III* is not unique in facing data limitations in time-series analysis.

It is possible to develop a stylised account through time of the impact of the two very significant developments in the mental health sector: the *DSM-III* and the pathologising of normal sorrows. A stylised account is provided using conventional price–quantity space, and is given in the following sections. We 'measure' the impact of these various developments in the mental health sector by answering two specific research questions proposed here. First, what changes have occurred on the quantity dimension in price–quantity space since the *DSM-III* (particularly in the 'distance' between the quantity of serious mental disorders and the quantity of all mental disorders)? Second, to what extent has the proportion of serious mental disorders relative to all mental disorders changed through time?

Effectively, our procedure employs some simple economic theory associated with price–quantity space, and applies this to several (admittedly arbitrary) time periods in recent decades. Thus, ours is a stylised economic history without any quantitative analysis. This is not a unique situation [e.g. the development of clocks, measurements, etc., as described by Swann (2006)]. It might actually be thought that we are employing here one of 10 (non-econometric) techniques in the applied economist's 'golf bag' (to use Swann's metaphor).

Innovation in psychiatric nosology

The *DSM-III* is regarded by some (Horwitz, 2002) as bearing the markers of a Kuhnian scientific revolution. The markers that can be observed in the new nosology include a paradigm shift (Klerman, 1990), the accumulation of anomalies under the paradigm of the *DSM-II* and previous classifications (Wakefield, 1998), the singular drive of American psychiatrist Robert Spitzer to bring about change (Spiegel, 2003), and other markers as documented by Horwitz (2002). Kuhn (1962) also indicates that, with scientific revolutions, a transition period occurs, during which time change takes place slowly and with difficulty. Frances' (2009) discussion considers the 'unintended consequences' of the paradigm shifts in psychiatric nosology. Wakefield (1998) has also pointed to the 'unintended' variable.

However, it would not be correct to regard this revolution as complete, entire or perfect. It is argued by some that the *DSM* is 'flawed and limited in a number of ways' (Wakefield, 1998, p. 966). Thus, it would not be appropriate here to conceive of the new *DSM* paradigm in a related goods framework, i.e. as a substitute to, or a complement of, the *DSM-II* (see Krupinski and Alexander, 1983). Rather, it is more appropriate to regard the *DSM-III* as exhibiting continuity with past paradigms.[1] Apart from formal professional classifications, such as the *DSM*, there are also folk taxonomies about mental illness. These are the views of mental illness which are embodied in the attitudes of the general population (e.g. Horwitz, 2002; Horwitz and Wakefield, 2007), as well as in the community of mental health professionals (Haslam, 2008; Flanagan and Blashfield, 2007; also Williams, 2009).

Some scientific trends in psychiatric nosology

Definitions and classifications in any field (biology, climate types, etc.) are seldom constant through time. As knowledge is discovered, changes may be needed in terminology and nomenclature. This certainly has been the case with diagnosis and psychiatric nomenclature within the mental health sector: diagnostic categories have changed. Stone (1997) and Shorter (1997) provide historical accounts of pre-twentieth century definitions and diagnosticians. Relatively few conditions were recognised at the start of the twentieth century, *viz.* mania, melancholia, monomania, paresis, dementia and epilepsy (with variations across space and time). 'Madness' and 'insanity' can be applied pejoratively, but in the past they were also applied compassionately. They were reserved for disruptive, withdrawn or very strange behaviour, whilst milder forms of distress were classified as 'nerves', 'hysteria', 'lovesickness' or 'neurasthenia'. (For another account of the widening process, see Spiegel (2003); empirical data can be found in Krupinski and Alexander (1983).)

There are currently two main classification systems of mental disorders. Apart from the *DSM*, there is the mental health section of the diagnostic classification for all health conditions, the *International Classification of Diseases*, now in its tenth edition (*ICD-10*), which is produced by the World Health Organization (WHO). Chapter V of the *ICD-10* focuses on mental and behavioural disorders.[2] Though the *DSM* is not applied worldwide, the nosology associated with the *DSM* is highly influential in clinical practice internationally.

It is extremely important to note that diagnostic testing of mental illness is not of a scientific/mechanical type, as is the case with pathology tests of blood/tissue, radiology, scans, MRIs, taking blood pressure, temperature, pulse rate, etc. Rather, the

diagnostic process involves clinical observation and (patient) self-report of thoughts, thinking and behaviour. Diagnostic testing is applied in both a clinical setting and in epidemiological surveys employing survey instruments (such as WHO's *Composite International Diagnostic Interview*). The latter involves carefully defined and worded structured questions.

The efficacy of any diagnostic test for medical purposes (whether it be radiology, pathology, etc., and whether for diagnosing heart disease, cancer, the fracture of a limb, influenza, etc.) is important. Efficacy is determined by quantifying the sensitivity and specificity of the test. These measures are calculated on the rates of false positive and false negative test outcomes (Yerushalmy (1947); and further developments by Vecchio (1966)). Accurate nosology is fundamental to accurate diagnostic testing. These diagnostic concepts apply equally to psychiatric testing, though their practical application is not without difficulty.

An important structural component of the *DSM-III* was the use of five 'domains' or, since the *DSM-IV*, 'axes'. These axes are:

Axis I: clinical disorders, including major mental disorders (except personality disorders) and also developmental and learning disorders;
Axis II: underlying pervasive or personality conditions, as well as mental retardation;
Axis III: acute medical conditions and physical disorders that are connected to a mental disorder;
Axis IV: psychosocial and environmental problems, contributing to the disorder, such as limited social support networks; and
Axis V: the global assessment of functioning (which involves psychological, social and job-related functions being evaluated on a continuum between mental health and extreme mental disorder).

Some examples of the first three axes may be helpful. Among the Axis I disorders are depression, bipolar disorder, schizophrenia, anxiety disorders, attention-deficit hyperactivity disorder (ADHD), and phobias. Axis II includes such conditions as obsessive–compulsive disorders and mental retardation, and also the personality disorders. These conditions are numerous and include paranoid personality disorder, schizoid personality disorder, schizotypal personality disorder, borderline personality disorder, antisocial personality disorder, narcissistic personality disorder, histrionic personality disorder, avoidant personality disorder, and dependant personality disorder. The common Axis III disorders are brain injuries and other medical/physical disorders which may either aggravate existing diseases or present symptoms similar to other disorders.

Mental disorders appear to be classified quite differently in the *ICD-10* as there are 10 headings.[3] Whilst it is not appropriate to address here the differences in the two classification systems, it can be stated simply that recent revisions of the *DSM* and the *ICD* have produced codings that make the manuals broadly comparable (though some important outstanding differences do exist). It is more relevant to note that the numeric code for each mental disorder in both the *DSM* and *ICD* coding systems has relevance for the administration of health services. Also, the reimbursement of health expenses through private or public health insurance, as well as government funding of state-provided services often depends on *DSM* or *ICD* codes. In addition, medical nomenclature serves clinical purposes; nomenclature facilitates communication among service providers, between service providers and patients, and decision-making in treatment. Data recording and statistical analysis of data also depend on a taxonomy of illnesses being available.

It is useful to appreciate the 'flavour' of psychiatric nosology. The *DSM-III* is a particularly complex document. Alongside its limitations (of which only some are discussed here), there is no doubt that the *DSM-III* was a very significant and welcome advance on the *DSM-II*. The *DSM-III* was a watershed in several ways. It was applauded at the time as an advance towards a more scientific approach to psychiatric classification. Largely because of Robert Spitzer's tireless efforts (Spiegel, 2003), this scientific approach is significant, given Earl's (2003) argument that the entrepreneur is a 'constructor of connections': Spitzer can be considered the dominant innovator or entrepreneur of psychiatric nosology. Shorter (1997) demonstrates the scientific importance of the data gathering that Spitzer undertook about psychiatric conditions for the preparation of *DSM-III*. Shorter (1997, p. 297) records Spitzer's comments about the meetings of the American Psychiatric Association (APA) in the 1960s: 'The academic psychiatrists interested in presenting their work on descriptive diagnosis would be scheduled for the final day in the late afternoon. No one would attend. Psychiatrists simply were not interested in diagnosis'. It is now widely acknowledged that the *DSM-III* improved diagnostic reliability for many mental disorders and thus lowered the false negative rate.

Another important advance was the definition or 'characterisation' of mental disorder in the *DSM*. From the third edition, mental disorder has been defined as involving:

> … a clinically significant behavioral or psychological syndrome or pattern that occurs in an individual, and that is associated with present distress (e.g. a painful symptom) or disability (i.e. impairment in one or more areas of functioning), or with a significant increased risk of suffering death, pain, disability, or an important loss of freedom. In addition, the pattern or syndrome must not merely be an expectable or culturally sanctioned pattern of response to a particular event, for example, the death of a loved one.

Although '… no definition adequately specifies precise boundaries for the concept of mental disorder … different situations call for different definitions'. Moreover, 'there is no assumption that each category of mental disorder is a completely discrete entity with absolute boundaries dividing it from other mental disorders or from no mental disorder'. Since the publication of the *DSM-IV*, it is noteworthy that:

> … there is also no assumption that all individuals described as having the same disorder are alike in all important ways … *DSM-IV* allows polythetic criteria sets, in which individuals need only present with a sub-set of items from a longer list (e.g. the diagnosis of Borderline Personality Disorder requires only five out of nine items) (APA, 2000, pp. *xxxi–xxxi*).

This characterisation of mental disorder is quoted here from the *DSM-IV-TR*, but the conception has been in the *DSM* since the *DSM-III*.

The key point to note here is that 'clinical significance' criteria are included in nearly half of all the *DSM-IV* diagnostic categories. This 'clinical significance' criterion poses some difficulties: first, it lacked an empirical basis, and second, the effect of its inclusion on the false positive rate was unknown. Would it raise the false positive rate or lower it, and would it do so at a cost, in terms of false negatives? There was an implicit assumption that dysfunction is a reliable measure of true disorder.

Another aspect of the innovation was a preference in clinical and research settings for continua. Zachar and Kendler (2007) note that having a preference for continua relates to conceiving of 'pathological ends of functional dimensions'. In other words, in the clinical setting, illnesses are not regarded as having discrete boundaries (which would imply the existence of categories). The implication is that classification is now

perceived of in terms of degree rather than kind. Zachar and Kendler suggest that the current continuum conception of mental disorders is not unique to mental illness: as the conception of hypertension or osteoporosis involves continua, mental disorders are also regarded as transition points along a continuum. With continua, there is much heterogeneity across a single diagnostic category, which relates to people's behaviour and functioning.

One must keep in mind the state of psychiatry both just prior to the publication of the *DSM-III*, and subsequently. Spiegel (2003) records a comment made by Theodore Millon, one of the members of the *DSM-III* task force: 'I think the majority of us recognized that the amount of good, solid science upon which we were making our decisions was pretty modest'. However, Spiegel (2003) notes also the following points by David Shaffer:

> Despite the manual's imposing physical appearance … one of the objections was that it appeared to be more authoritative than it was. The way it was laid out made it seem like a textbook, as if it was a depository of all known facts … the average reader would feel that it carried great authority and weight, which was not necessarily merited.

It is relevant also to note that *DSM-III* is characterised by another attribute of innovation. This attribute is the momentum in innovation towards 'dimension increasing' activity (Swann, 1990), after Lancaster's characteristic theory of demand (1966a, 1966b, 1971). In the twentieth century, the diagnostic categories of mental disorders expanded. Consider Table 1. In 1952, the first *DSM* contained 106 disorders listed in a manual of 130 pages. By 1994, the *DSM-IV* listed 297 conditions in a manual of 886 pages.

This study is concerned with an economic account of how mental illness has expanded since the *DSM-III*. It is not being argued here, or implied, that the *DSM-III* was devised and drawn up with the objective of widening the net of mental illness. Rather, it is an unintended consequence, a by-product or effect, of Spitzer's handiwork. In this context, it is useful to recall that Rosenberg (1994) argues that it is difficult to predict the effects of innovation. As an illustration, Rosenberg points to the great diversity in communications technologies or their components: the radio, the laser, the telephone, the Morse key, the transistor, the integrated circuit, the computer, etc.

Some argue that the increase in the number of diagnostic categories suggests an improvement in psychiatry's practices because it indicates careful recording of all possible ways in which mental illness manifests. However, others argue that this

Table 1. The number of pages and number of diagnoses contained in sequential versions of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, various)

Basis of nomenclature	Year	Total no. of diagnoses	Notes
DSM-I	1952	106	130 page manual
DSM-II	1968	182	134 page manual
DSM-III	1980	265	494 page manual
DSM-III-R	1987	292	567 page manual
DSM-IV	1994	297	886 page manual

Note: A section on mental disorders was included in the *ICD* for the first time in 1949, with the publication of *ICD-6.*

widening is an example of medicalisation, a matter to which attention turns in the next section. Although our focus in this paper is on increases in the provision of services for mental illness (regardless of how this is defined and delineated), it is relevant to observe that another part of the health sector that experienced expansion at much the same time is the pharmaceutical industry. This industry is complex (Schweitzer, 2007). Furthermore, it is an industry that is not powerless when confronting national governments. It has some influence over medical practitioners in their prescribing habits. In addition, the industry does not have an unblemished record in mental health (Healy, 2004). The critical term 'Big Pharma' is often applied to the industry. However, this issue is beyond the scope of this paper.

A concurrent innovation: the medicalisation of 'normal' stresses in Western culture

There is now an extensive academic literature examining the 'Age of Depression', the 'medicalisation' of 'normal sorrows', and the 'Loss of Sadness'. This terminology relates to mental health states that are at the milder end of a spectrum of severity. One definition of medicalisation is 'a process by which nonmedical problems become defined and treated as medical problems, usually in terms of illnesses and disorders' (Conrad, 2007, p. 4). Medicalising sorrow can lead to an increase in the number of false positives seeking treatment in mental health settings.

Just as the *DSM* has been the subject of controversy, so are current or contemporary definitions of mental disorder (see Parker, 2007; Hickie, 2007). All populations have opinions about depression and mental illnesses. Such views are readily entrenched in popular and folk beliefs, and even in the practices of the providers of professional services (see Stone, 1997).

Furedi (2004, p. 203) argues that the widening of the diagnostic net is the result of an inner vacuum: 'It is truly a regrettable state of affairs when so many of us seek solace and affirmation through a diagnosis'. According to Wakefield and First (2003, p. 29), there is a problem of focus. There needs to be attention not on 'whether mental disorders exist at all but rather on whether mental health professions, using *DSM* criteria, are overdiagnosing in such a way that many kinds of human problems are deemed pathological'. This tendency to over-inclusiveness is what Wakefield and First mean by 'the false positive problem'.

There has now developed a concern that the distinction between mental disorder and 'nondisorder problems of living' is not clear enough. Wakefield and First are quite specific in what they regard as examples of 'nondisorders', and they list normal intense emotional reactions, social deviance, conflict between an individual and social institutions, personal unhappiness, lack of fit between an individual and a specific social role, or relationship or environment, and socially disapproved or negatively evaluated behaviour. Kirk (2005) also discusses the practical implication of the conflation of normal sadness and depressive disorder. The same arguments are applied not only to depressive states, but also to post-traumatic stress disorder, and attention deficit hyperactivity disorder (Conrad, 2007; also Davis, 2008).

The source of this problem is specific, according to Horwitz and Wakefield (2007). It is the criterion-based approach developed in 1972 by John Feighner and his colleagues. In the terminology of information economics or innovation economics, this criterion-based approach was 'the invention'. Spitzer then generalised the approach for other conditions in *DSM-III* and the innovation, called the 'Research Diagnostic Criteria' (RDC), became operational through the publication of *DSM-III*.

Feighner *et al.* (1972) wanted to propose a set of criteria which based classification not on best clinical judgement and experience, but on fixed criteria that had to be met in order for a patient to be classified as having a diagnosis. The research community applauded the Feighner criteria: Horwitz and Wakefield (2007) note that Feighner's paper became the single most cited paper in the history of psychiatry in 1989 (p. 95). It was welcomed because it was also a response to various challenges confronting psychiatry at that time (Mayes and Horwitz, 2005).

The RDC approach then underwent diffusion. This occurred easily and widely. The avenue for the diffusion was the incorporation of an RDC approach into the *DSM* (thus freeing the *DSM* from its Freudian bind). The RDC approach was disseminated via the *DSM* itself, promoting scientifically-based diagnosis among mental health professionals.

From one perspective, such a chain of events can be regarded as good. However, Horwitz and Wakefield (2007, p. 103) argue that something extra happened: the *DSM-III*, in one fell swoop, 'inadvertently rejected the previous 2,500 years of clinical diagnosis tradition that explored the context and meaning of symptoms in deciding whether someone is suffering from intense normal sadness or a depressive disorder'. Ironically, some of the traditions of folklore had perhaps also aided understanding of mental illness. The implication is that the diffusion of the *DSM-III* worsened the false positive rate for several types of diagnoses. The relevance here is that diffusion of innovation (the process by which new technology is adopted) can occur not only for correct or good ideas but for misconceptions too. Incorrect notions can be subject to diffusion. Bad ideas can be 'catchy' when the conditions are right for them to be received.

This process is documented by the plethora of books with titles concerned with these matters: *The Loss of Sadness: How Psychiatry Transformed Normal Sorrow into Depressive Disorder*; *Shyness: How Normal Behaviour Became a Sickness*; *The Worried Well*; *The Medicalization of Society: On the Transformation of Human Conditions into Treatable Disorders*; *Creating Mental Illness*; *Against Happiness: In Praise of Melancholy*; *Let Them Eat Prozac: The Unhealthy Relationship between the Pharmaceutical Industry and Depression*; *Prescriptions for the Mind: A Critical View of Contemporary Psychiatry*; *The Age of Melancholy: Major Depression and its Social Origins*; *Comfortably Numb: How Psychiatry is Medicating a Nation*; *One Nation under Therapy: How the Helping Culture is Eroding Self-reliance*, and so forth. Most of these titles are not the works of popular journalism, but serious academic studies concerned with psychiatric diagnosis and classification.

Some epidemiological fundamentals

We now present a stylised account of the implications of the events, described above, for three time periods in the twentieth century. The first is the period prior to the *DSM-III* innovation; the second is the period after the introduction of the *DSM-III*; and, finally, there is the era that saw the reshaping of some attitudes to mental disorder in Western culture. These three stylised periods are shown in Figure 1(a), (b) and (c), which depict the measured prevalence of mental disorder in a conceptual way.

A number of assumptions underlie Figure 1. First, we make a distinction between core mental disorders (or serious mental disorders) and other mental disorders. Thus, we assume that total mental disorders in any period can be disaggregated into these two categories. Second, we make a working assumption that the prevalence of core mental disorders is (more or less) constant in the three time periods identified, and

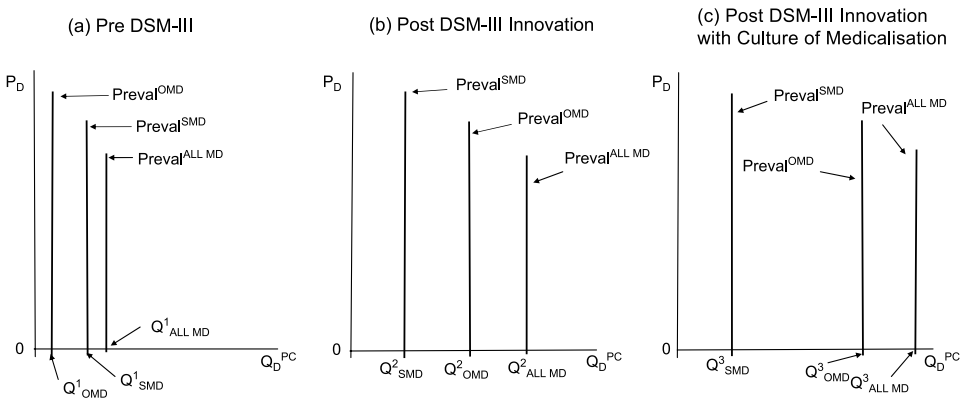

Figure 1. The (stylised) per capita prevalence of SMD, other MD and all MD in three periods of the twentieth century

Notes: $\text{Preval}^{\text{SMD}}$ is the per capita prevalence of 'serious mental disorders', and is constant in the three time periods.
$\text{Preval}^{\text{OMD}}$ is the per capita prevalence of 'other mental disorders', and is not constant in the three time periods.
$\text{Preval}^{\text{ALL MD}}$ is the per capita prevalence of 'all mental disorders', and is not constant in the three time periods.
$\text{Preval}^{\text{ALL MD}}$ is the sum of $\text{Preval}^{\text{SMD}}$ and $\text{Preval}^{\text{OMD}}$.
P_{D} is the price of a diagnosis of a mental disorder.
Q_{D}^{PC} is the per capita quantity of diagnoses of mental disorders.

characterised, here. Third, it is assumed that the prevalence of mental disorders is determined by diagnoses undertaken by relevant medical practitioners. In other words, the services of these medical practitioners can be dichotomised into diagnostic services and therapeutic services. Fourth, we express all measures in per capita terms, since changes in the size of the relevant population may be substantial in the time periods considered. We conclude by pointing out that we depict prevalence in price–quantity space, i.e. a space in which the per capita quantity of people with mental disorders is measured on the *X* axis and the price of diagnoses on the *Y* axis. It is important to note that all lines in these three diagrams are parallel to the *Y* axis: what this implies is that the measured prevalence of the two categories of mental disorders (and hence all mental disorders) is completely unresponsive to the price of diagnoses of mental disorders. In other words, the prevalence measures of mental disorders are perfectly inelastic with respect to the price of diagnoses. This is, of course, what you would expect. The reason that we use price–quantity space in Figure 1 is that this space will be used shortly to depict some relevant economic variables. In other words, price–quantity space will be used subsequently for further analysis.

The vertical lines $\text{Preval}^{\text{SMD}}$, $\text{Preval}^{\text{OMD}}$ and $\text{Preval}^{\text{ALL MD}}$ indicate the prevalences of Serious Mental Disorders (SMD), Other Mental Disorders (OMD) and All Mental Disorders (All MD), respectively. On the *X* axis, we measure per capita quantities of mental disorder diagnoses (Q_{D}^{Pc}) of the two types of mental disorder (SMD and OMD) as well as the total (All MD). P_{D} is the price of a diagnosis of mental disorder. We also invoke the notation (1), (2) and (3) to indicate the three periods we

discussed above, i.e. the 'Pre-*DSM-III*' period, the 'Post-*DSM-III*' period, and the 'Post-*DSM-III* with the Culture of Medicalisation' period.

In the Pre-*DSM-III* period, we may write:

$$Q^1_{\text{ALL MD}} = Q^1_{\text{SMD}} + Q^1_{\text{OMD}} \tag{1}$$

For the Post-*DSM-III* period, we have the following equation:

$$Q^2_{\text{ALL MD}} = Q^2_{\text{SMD}} + Q^2_{\text{OMD}} \tag{2}$$

And in the third period (Post-*DSM-III* Innovation with the Culture of Medicalisation), we have:

$$Q^3_{\text{ALL MD}} = Q^3_{\text{SMD}} + Q^3_{\text{OMD}} \tag{3}$$

Now it is clear from Figure 1 that

$$Q^1_{\text{ALL MD}} < Q^2_{\text{ALL MD}} < Q^3_{\text{ALL MD}} \tag{4}$$

This means that the per capita prevalence of all mental disorders has risen sequentially during the three periods considered here. In fact, this inequality arises from a prior inequality, *viz.*

$$Q^1_{\text{OMD}} < Q^2_{\text{OMD}} < Q^3_{\text{OMD}} \tag{5}$$

Expression (5) makes it clear that the increase in the per capita prevalence of mental disorders has occurred in the OMD category. Recall that we are assuming that serious mental disorders are constant in all three periods, i.e.

$$Q^1_{\text{SMD}} = Q^2_{\text{SMD}} = Q^3_{\text{SMD}} \tag{6}$$

Note that these quantities are determined by medical criteria as revealed by an epidemiological survey instrument, such as the Composite International Diagnostic Interview, the *CIDI*. The bald statement of Equation (6) indicates the starkness of this assumption. The core mental disorders have not been subject to the epidemiological equivalent of grade inflation.[4] Expression (5) indicates that grade inflation in the mental health sector has been confined to Other Mental Disorders.

Some comparative statics: economic effects

We now consider the forces of demand and supply for mental health diagnoses. It will now become clear why we depicted prevalence measures in price–quantity space in Figure 1, although the P_D variable was completely passive in that discussion of

prevalence. It is very important to realise that the quantity of diagnoses here not only incorporates true positives, but also false positives. Our previous discussion of per capita prevalence is the background to our economic discussion. For convenience, we reproduce the per capita prevalence lines in the discussion below.

Consider Figure 2, which is also in three parts, signifying the same passage of time in the twentieth century arising from the two events considered previously: Figure 2(a) refers to the period prior to the *DSM-III*; Figure 2(b) depicts the period subject to the effect of the introduction of the *DSM-III* innovation; and the remoulding of attitudes to mental illness in Western culture is then added and indicated in Figure 2(c). It is important to recognise that Figure 2 relates only to diagnoses of mental illness. We are not concerned here with the markets for therapeutic mental health services.

In all three parts of Figure 2, the SMD prevalence per capita is depicted with a vertical dashed line, $\text{Preval}^{\text{SMD}}$. Sometimes, people subject to various psychotic conditions do not demand a diagnosis or seek treatment because of the nature of the illness. For such conditions, there is no demand curve, i.e. the demand curve for such people coincides with the *Y* axis. In Figure 2(a), (b) and (c), as before, $\text{Preval}^{\text{SMD}}$ is constant through time. This is a simple assumption made for the convenience of this analysis, but $\text{Preval}^{\text{SMD}}$ is an (unknown) empirical matter. For example, it is likely that the level of serious addictive disorders was higher in the latter half of the twentieth century than in the first half. There will be a demand curve for diagnoses of SMD (not shown here): our interest lies elsewhere.

Let us turn to conditions other than the serious mental illnesses. Diagnoses of OMD per capita are depicted in Figure 2 as being subject to the forces of demand and supply, which can, of course, be shown in price–quantity space. In parts (a), (b) and (c) of Figure 2, $D_{\text{D OMD}}$ is the demand for OMD diagnoses per capita, and $S_{\text{D OMD}}$ is

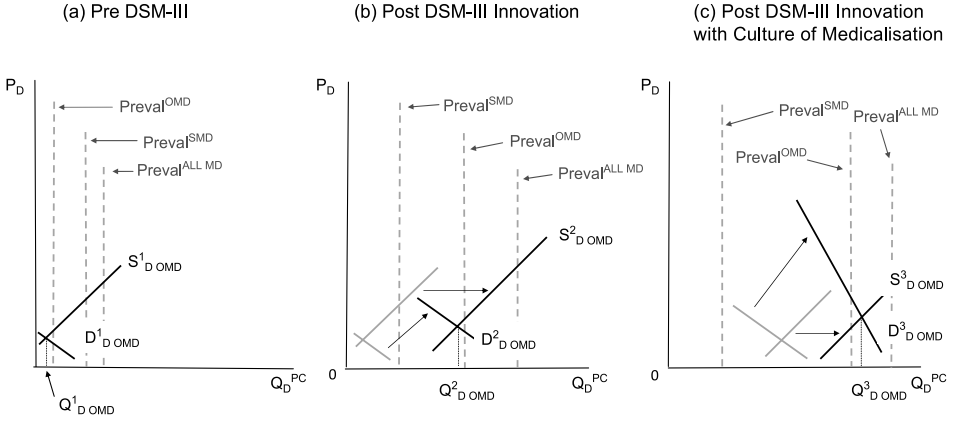

Figure 2. A stylisation of the markets for per capita diagnoses of mental disorders in three periods of the twentieth century

Notes: See Figure 1. $\text{Preval}^{\text{SMD}}$ is the per capita prevalence of 'serious mental disorders', and is constant in the three time periods.

The per capita prevalence lines in (a), (b) and (c) are the same per capita prevalence lines indicated in Figure 1. $D^1_{\text{D OMD}}$ is the demand curve for per capita diagnoses of other mental disorders in period 1. $S^1_{\text{D OMD}}$ is the demand curve for per capita diagnoses of other mental disorders in period 1, and so on.

the supply of OMD diagnoses per capita, whilst $Q_{\text{D OMD}}$ is the quantity of OMD diagnoses per capita produced and consumed (in each time period).

As indicated in the previous section, the prevalence rates are a given here, and are indicated on the *X* axis of Figure 1. In Figure 2, we are considering the markets that produce the various quantities of diagnoses. Note that the equilibrium quantities arising from the market for OMD diagnosis are depicted through the passage of time as not coinciding with $\text{Preval}^{\text{OMD}}$. The reason is that unmet need is depicted in Figure 2(a) with $Q^1_{\text{D OMD}}$ to the left of $\text{Preval}^{\text{OMD}}$, and likewise in Figure 2(b). Met non-need is shown in Figure 2(c) where $Q^3_{\text{D OMD}}$ is located to the right of $\text{Preval}^{\text{OMD}}$.

In Figure 2(a), $D^1_{\text{D OMD}}$ and $S^1_{\text{D OMD}}$ are relatively close to the origin, and are suggestive of a past era when mental illnesses did not present frequently, were not diagnosed in any great detail, and treatment services were relatively rare. Thus, the level of quantity diagnosed $Q^1_{\text{D OMD}}$ is drawn in such a way as to suggest that the quantity of OMD diagnosed was less than the prevalence of SMD. This is also an empirical matter, but one on which we have no data.

Figure 2(b) presents the era after the post *DSM-III* innovation. $D^2_{\text{D OMD}}$ is shown to have been subject to a relatively small increase as mental illness became more widely understood and recognised. $S^2_{\text{D OMD}}$ is depicted as having increased considerably. The expanded *DSM* has resulted in an increase in the supply of diagnoses of mental health problems, but not necessarily disorders.

Figure 2(c) presents the age of depression, the era of medicalising our normal sorrows (see $D^3_{\text{D OMD}}$). In this era, there is an overall demand-side, population-wide trend towards regarding everyday problems as needing medical help. In Figure 2(c) the publication of *DSM-IV* has occurred, the number of diagnostic categories has expanded further and thus $S^3_{\text{D OMD}}$ has increased once again. $D^3_{\text{D OMD}}$ is subject to a large increase because of Western cultural habits. Consequently, the level of $Q^3_{\text{D OMD}}$ increases markedly. The three-period temporal process we have described here can be neatly summarised as follows:

$$Q^1_{\text{D OMD}} < Q^2_{\text{D OMD}} < Q^3_{\text{D OMD}} \tag{7}$$

Note that we have put no emphasis on the relative prices of these mental health services. Our focus has been on the effect of the *DSM* innovation on the quantity of mental health services.

The 'real' quantity of underlying mental disorder, i.e. mental health need vis-à-vis perception of mental illness, is an empirical matter on which no data exist. It may also be noted that the differences in views of mental illness are reminiscent of those which have occurred in macroeconomics in the past over the 'real' economic factors *versus* the 'nominal' economic factors underlying inflation.

Note that Figure 2 does not depict the totality of the market for mental health services. We have made a distinction here between services to determine a diagnosis, and therapy-type services which are consequential to diagnosis, as well as the distinction between serious and other mental disorders. Thus, the total demand for mental health services has four components: diagnosis and therapy for SMD, and diagnosis and therapy for OMD. Figure 2 shows only one of these four cases, *viz.* the demand for diagnoses of OMD in the three periods we have distinguished. The total or aggregate

effect of the processes we have described here would be indicated by expressions such as (7) for diagnosis for SMD, therapy for OMD, and therapy for SMD. In other words, four expressions are needed in order to capture all the forces at work here. One suspects that the major growth in mental health services is associated with therapy for OMDs.

It is also relevant to note that there is no one-to-one relationship between data on prevalence and data of a service utilisation kind. This is because prevalence data are of a stock kind, and service utilisation data are of a flow kind. Multiple mental health services are typically provided to a person with a mental disorder, pre- and post-*DSM-III*.

Conclusion

An important innovation in mental health (the innovator being the American psychiatrist, Robert Spitzer) was the behaviour-based invention implemented in *DSM-III*. This approach first became operational when the *DSM-III* was published in 1980. The new approach to nosology involved a substantial break with the previous *DSM-II* classification, which had been heavily imbued with Freudian concepts and theories of the mind.

More or less concurrently with the innovation of the *DSM-III*, many Western countries also experienced a major cultural shift in the place of psychology in the medicalisation of everyday trials and tribulations, the loss of sadness, etc. This is observed in various attitudes to common emotional problems of everyday life arising from unemployment, a death in the family, etc. It is also manifested in the use of psychologists and psychiatrists to help people excel in sport and executive performance. Arguably, it is found in the modern tendency to medicalise, or to make psychological, the misbehaviour of children and adolescents.

The three-period temporal analysis undertaken here is concerned with trends in both psychiatric nosology and popular conceptions of the scope of mental disorders. It demonstrates that a clear separation is likely to have occurred between the underlying epidemiological phenomenon of mental disorders and service utilisation through the passage of time. Nothing can be said in this temporal framework about the precise magnitudes of the separation of epidemiological and service utilisation phenomena. This is because the relevant data do not exist or have not been collected. However, we hypothesise the direction of change through time. Prior cross-sectional studies suggest that the magnitudes are not trivial in the study periods of these exercises.

The above analysis is placed firmly in an economic framework in order to illustrate the implications of the innovations in psychiatric nosology and the scope of psychiatry (and other such 'brain-mind' professions). By carefully examining the stylised quantities in price–quantity space, it has been possible, via the lens of economics, to draw attention to the increasing distance through time between the quantity of serious mental disorders and the quantity of all mental disorders. The flow-on effects for service utilisation are also shown.

Moreover, this study illustrates how the combination of this innovation with social forces has had the effect of decreasing through time the proportion of all mental disorders that are 'serious'. The per capita quantity of other mental disorders has proportionately increased. This result has implications for the very scarce mental health budgets of consumers and governments.

In the absence of data, comparative statics is a useful exercise. Conventional price–quantity space focuses attention on the quantity outcome, and has enabled us to consider the adverse impact of the two concurrent forces on the false positive rate in

the diagnosis of mental illnesses in the West. The approach also directs attention towards efficacious diagnostic practice in this sector.

Diagnostic efficacy is relevant to treatment, but it is also relevant to resource allocation in the mental health sector. Our analysis highlights the vital place of innovation in diagnostic practices. It also highlights the place of appropriate economic incentives in the financing of this activity in the mental health sector. As pointed out previously, there is evidence that the mental health sector is subject to a number of quite distinct economic problems. Two problems that particularly concern us are the simultaneous existence of the related phenomena, unmet need (people with mental disorders who, for whatever reason, do not consume mental health services), and met non-need (people without a mental disorder who consume mental health services). These two phenomena, which have been identified and quantified by cross-sectional epidemiological surveys in several countries, are indicative of resource misallocation (Doessel, Williams and Whiteford, 2010).

It is sometimes said that if one wants to understand the present, one must understand the past as well. In a sense, this paper is an attempt to understand the prior events that have led to the situation detected by the cross-sectional epidemiological studies that document unmet need and met non-need. The two processes analysed – an innovation in psychiatric nosology and the folklore-ish innovation in the current cultural disposition that tends towards pathologising feelings relating to adversity – have led to the current misallocation of resources associated with met non-need. Hence, our analysis emphasises the critical role of innovation in the diagnostic practices of the mental health sector.

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Notes

1. Not every psychiatrist or school of psychiatry has embraced the *DSM-III* and its successors, or has regarded them as an innovation. There are pockets of psychiatry (the Freudians and the Jungians) where the *DSM* has little application (see, for example, Frances *et al.*, 1993).
2. There are a few other *schema*, but they are not of relevance here. These other manuals include Chinese and Latin American systems of classification of mental disorders. Also, psychoanalysts have their own manual, the *Psychodynamic Diagnostic Manual*. There is also a manual for use in primary care (i.e. general practice or family practice), the *ICD-10-PHC*.
3. These 10 headings are: Organic, including symptomatic, mental disorders; Mental and behavioural disorders due to use of psychoactive substances; Schizophrenia, schizotypal and delusional disorders; Mood (affective) disorders; Neurotic, stress-related and somatoform disorders; Behavioural syndromes associated with physiological disturbances and physical factors; Disorders of personality and behaviour in adult persons; Mental retardation; Disorders of psychological development; Behavioural and emotional disorders with onset usually occurring in childhood and adolescence; and a group of 'Unspecified mental disorders'.

4. This term refers to that pernicious educational virus that has devastated academic standards in Australian (and other) universities in the last 10–15 years (Sadler, 2009).

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