

Book reviews

Uncertainty, Production, Choice, and Agency: The State-Contingent Approach, by Robert G. Chambers and John Quiggin. Published by Cambridge University Press, Cambridge, UK, 2000, pp. xvi + 373, ISBN 0 521 62244 1 (hbk), 0 521 78523 5 (pbk), \$AUD135 (hbk), \$AUD49.95 (pbk).

A ready overview of this elegant work comes from the (presumably the authors') opening front material (reproduced on the back cover). 'This book demonstrates that the state-contingent approach provides the best way to think about all problems in the economics of uncertainty, including problems of consumer choice, the theory of the firm and principal-agent relationships. The authors demonstrate that dual methods apply under uncertainty and that the dual representations can be developed for stochastic technologies. Moreover, proper exploitation of the properties of alternative primal and dual representations of preferences allows analysts to generalise and extend the results of the existing literature on preferences under uncertainty, thus making expected utility theory largely superfluous for many decisions. These insights open the way for developments in the basic theory of production under uncertainty, the theory of hedging behaviour, the analysis of agency problems and the theory of production insurance'. This may not be especially modest but it is something of an understatement of the tremendous scope of achievement in this signal contribution to the literature.

The work consists of two parts. Part 1 is 'Theory', with chapters on: (i) States of Nature, including choice under uncertainty; (ii) State-Contingent Production (a core chapter of the book, with its axiomatic approach to stochastic production); (iii) Risk Aversion, Preferences, and Probability (which sets out a novel representation of risky choice over state-contingent outcomes that encompasses mean-variance, expected utility, and generalised expected utility as special cases, and leads to a new axiomatic development of subjective probability); (iv) Indirect and Dual Representations of Stochastic Technologies (the economic-analytical heart of the book); and (v) The Theory of State-Contingent Production (a synthesis of the preceding chapters to yield a behavioural theory for individuals facing production and price uncertainty, and a death knell for expected-utility theory). The authors' approach is thus to make consistent use of the concept of states of nature in order to gain insight into choices among actions having different consequences in different states of nature. Production decisions are viewed as

choices between bundles of state-contingent goods, rather than choices among probability distributions defined over possible outcomes.

Part 2 is 'Applications', with five chapters applying the theory of Part 1 to diverse but instructive themes, including: (i) Production with Futures and Forward Markets (particularly for the case when both production and prices are uncertain); (ii) Production Insurance (with a fresh and quite general approach to designing and analysing the properties of insurance contracts); (iii) Production and Nonpoint-Source Pollution Regulation (a novel analysis of how mechanisms that mitigate risk can affect pollution incentives, building on the authors' earlier work on agricultural pollution); (iv) The Moral-Hazard Problem (an intriguing introduction to principal-agent problems, with—in this unusual departure from agricultural metaphors—emphasis on design of punishment schemes for different types of crime); (v) Endogenous Reservation Utility: Agency and Exploitation (which further extends the authors' analysis of principal-agent and asymmetric-information problems and actually constitutes a major extension of the considerable literature on peasant share-farming contracts, and slavery, but also much more).

The introductory material in each chapter is extremely readable, as is the short Epilogue, and the especially helpful introduction, for which the authors acknowledge the inspiration of Marc Nerlove. In fact, the English text throughout is friendly indeed and even rather homely, with its allusions to, say, 'burnt toast', 'free lunches', 'size doesn't matter' and 'public execution of parking violators'. Further comfort to this Journal's audience is offered by the generally pervasive agricultural and rural illustrations; the welcoming blends of first, second and third person; general use of the female personal pronoun; and sparse typographical errors. It is the dense mathematical material that will cause challenge if not real difficulty for many readers of this Journal (including the present reviewer).

I vividly recall discussions with John Quiggin in the mid-1980s when we were planning his leading in a possible second edition of Anderson *et al.* (1977). John was adamant that the only decent way to do it was a complete rewrite using the Arrow-Debreu state-contingent approach. For various reasons, that enterprise never eventuated; but fortunately John stuck to his guns and this new book did, and the world is richer for it. Among its points of departure were a couple of the authors' joint articles published in the late 1990s, Bob Chambers' admirable exposition of dual methods in his book on (non-stochastic) production analysis (Chambers 1988), along with his collaborations with Rolf Färe (cf. Färe 1988), and John Quiggin's fine book on his generalisation of expected utility theory that grew partly out of his highly original PhD (at the University of New England) work (Quiggin 1993).

Some of the authors' friends (such as the uncited Richard Just, Rulon Pope, the late John Dillon, Brian Hardaker and the present reviewer) and other

uncited pioneers such as Magnússon (1969) come in for strong criticism for their (now clearly revealed by the authors) folly of resorting to some variant of a 'stochastic production function' approach in analysis of uncertainty issues, especially in agricultural production problems. Mercifully, the authors are kind enough not to chronicle the guilty parties' 'complex and confusing' analyses.

There is presumably a trade-off between tempting Nobel (Economics) Prize assessors and reaching a wide range of readers who might describe themselves as applied economists of one stripe or another. My guess is that Chambers and Quiggin will be rather more successful with the former (and deservedly so) than the latter. They naturally recognise this 'problem' with statements such as 'the going may be tough at times, especially for those readers not familiar with the modern set-theoretic approach to production problems', and they offer useful although not notably easily executed advice for further reading to assist entry to the present work. It is definitely not a casual read but one that many will find rewarding, even if they do not pay the full toll. For those working on the economics of risk, such as futures and insurance markets, it is a must.

Comments from three distinguished economists are used by way of promotional items in the material on the cover of the paperback version. These include, drawing on all three: '... this path-breaking book', '... unifies the economics of uncertainty in the same way that Paul Samuelson's *Foundations of Economic Analysis* unified the economics of certainty', and '...no serious student, researcher, or policy analysts in this area can afford to miss it'. All three observations are cogent, so I would be remiss in doing other than recommend that Journal readers join me in treasuring this book in their library. It is to be hoped, however, that the authors follow the Samuelson 'model' and consider also producing a more accessible, popular version of their approach to reach a wider cross-section of the profession.

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Economic Analysis for International Trade Negotiations: The WTO and Agricultural Trade, by James D. Gaisford and William A. Kerr. Published by Edward Elgar, Cheltenham, UK, 2001, pp. xi + 196, ISBN 1 84064 535 0, US\$75.

Any book which clarifies the key issues surrounding agricultural trade and the attempts to liberalise this through the GATT/WTO has to be welcome. This book aims to provide an analysis against which international trade negotiations can be assessed. It has five chapters, with Chapter 1 raising the issues; Chapter 2 outlining a basic partial equilibrium model; Chapters 3 and 4 examining issues arising from previous negotiations and potential issues affecting new negotiations under GATT/WTO; and the last, short chapter summarising these issues and looking forward, under the title 'Trade in the 21st Century'.

Chapter 2 presents a thorough diagrammatic analysis of a partial equilibrium model of trade. This includes an analysis of the impact of tariffs on welfare. The chapter starts by reviewing the short and long run implications of agricultural policy, as well as of capitalisation (i.e., the increase in the value of fixed assets arising from policy payments), using the partial equilibrium model. It continues with a case study of EU agricultural policy. Finally, the chapter presents a set of equations for a simple partial equilibrium model for policy analysis. While I have no objection to the use of partial equilibrium analysis (as that is what I do myself!), nevertheless, a drawback of the book, in my view, is the lack of a better theoretical explanation of what general equilibrium analysis offers. I would have liked to see more recognition of the extensive work done using Computable General Equilibrium (CGE) models than the one paper referenced in the book. In fact, throughout the book references to other studies were often scarce. For example, much work on impacts of the Uruguay Round and of other changes in policy was overlooked. Although this does reduce the book's potential value as a textbook somewhat, the chapter is generally accessible and well written. It is a good reference for a second or third year course in partial equilibrium trade policy analysis.

Chapter 3, entitled 'Unfinished Business', starts with an extension of the theoretical analysis of tariffs, quotas and tariff rate quotas which had begun in the previous chapter. It is a long chapter. At 60 pages it accounts for approximately one third of the book. This analysis is perhaps not as good as in the previous chapter, and it contains a few errors in content. For example, it is argued (on page 70) that a monopoly domestic seller can raise price with impunity if there is an import quota, but this is clearly not the case. Although these oversights are not major, they do reduce the value of the book for

students. Furthermore, the analysis of tariff rate quotas is unusual, particularly in figure 2.3, and difficult to follow in places.

Chapter 3 continues with sections on: (i) valuable trading rights and their control; (ii) improving access by adjusting tariff rate quotas; (iii) controlling export subsidies at the WTO; (iv) food security for less developed countries; (v) limiting the actions of State trading agencies; (vi) controlling levels of domestic support; (vii) capitalisation as it affects negotiations; (viii) negotiating positions of the major players; and (ix) the position of central European countries. These sections are generally well written and interesting. However, the sections on the EU made no mention of Agenda 2000. Nor did they consider the longer term implications of changes in EU policy objectives, particularly in respect of the replacement of agricultural policy with a rural policy which has radically different objectives. The chapter also contains a relatively long section on EU enlargement. This was a little surprising given the short section on the US (which notably made no reference to problems some countries have with US policy). More importantly, the section on enlargement of the EU did not refer to any of the available studies examining and simulating the potential impact of this enlargement on trade.

The fourth chapter assesses the 'new challenges' to trade negotiations, including: (i) health sanitary and phyto-sanitary rules; (ii) technical barriers to trade; (iii) intellectual property issues; (iv) biotechnology; (v) anti-dumping; (vi) regional trade associations; and (vii) accession by Russia and China to the WTO. Although a wide range of topics are covered, it is a shame that some issues arising over last few years that are likely to influence future trade negotiations, such as the rise in importance of labour and environmental issues, were barely mentioned. Finally, Chapter 5 summarises the issues covered in the book and looks at trade in the 21st century. This is a brief chapter, really just summing up.

It may seem strange that I have left the first chapter until last. This is because in some ways it is the weakest, and I do not wish my comments on it to distract from my assessment of the main chapters. The chapter tends, in a number of instances, to contradict the rest of the book. Nevertheless, many of the concerns I had with the material in this chapter were allayed later in the book; a few examples of which follow. The authors start by raising issues regarding the future shortage of food in the world, especially in developing countries. While I certainly wouldn't dispute this, they don't deal with these issues, certainly not as a main theme, as the start implies. Moreover, the chapter goes on to discuss the increase in international trade being mainly in the form of high value products, a comment that is not really in line with the discussion in the first paragraph emphasising food shortages and developing countries.

Chapter 1 then tells the story of the GATT and the WTO. Although this is useful, certain comments are difficult to understand. For example, in the section relating to non-discrimination, the authors state that 'if a country wishes to ignore WTO commitments, say by raising tariffs, then it must raise them to all members'. However, if a country is willing to break one rule by raising tariffs, why wouldn't it proceed to break a second rule by discriminating between countries when deciding whether to raise tariffs? Moreover, I am sceptical regarding the argument presented that firms desire strong rules for trade, given that trade protection is often lobbied for by at least some firms (a fact recognised in Chapter 2). In addition, I suspect that the change to tariffication under the Uruguay Round was not, as this chapter suggests, because tariffs are least distorting (again, the book recognizes this later on) but because they are transparent and, by enabling comparisons across countries, provide a basis for further tariff reductions.

Overall, the book is welcome for bringing together and discussing much of the history and current issues surrounding the WTO and agriculture. Many of the arguments presented are particularly relevant to Australia and New Zealand. It is accessible compared with many other books addressing similar subject matter, and would be of value for a policy analyst who wishes to obtain a quick grasp of issues and theory behind some policy mechanisms. The book would also be useful as a supplementary text for a level two or three course in International Trade.

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Agricultural Science Policy: Changing Global Agendas, edited by Julian M. Alston, Philip G. Pardey and Michael J. Taylor. Published by Johns Hopkins University Press, Baltimore, in cooperation with the International Food Policy Research Institute, Washington DC, 2001, pp. xv + 285, ISBN 0 8018 6603 0 (hbk), 0 8018 6604 9 (pbk), US\$51.95 (hbk), US\$21.95 (pbk).

The chapters in this volume are considerably revised versions of papers originally presented at an international conference, entitled *Global Agricultural Science Policy for the Twenty-First Century*, held in Melbourne in August, 1996. Despite the title, all but one of the authors are economists, which may surprise the agricultural scientists. The 12 chapters are presented in five parts. This succeeds in imposing order: the disparate chapters fit fairly well into the categories chosen, which is frequently not the case with conference volumes. The first provides some background; the second covers productivity measurement; the third concentrates on sustainability and

natural resources; the fourth is on research for genetic improvement; the last summarises the book.

The brief introductory chapter, by the editors, presents some background data on R&D expenditures, points out key policy developments and provides an overview of the book. This is followed by an equally brief overview of the changing agenda for agricultural research, by Ismail Serageldin who was then chairman of the Consultative Group for International Agricultural Research (CGIAR). Poverty reduction, food security and sustainability objectives need to be met in a world of declining budgets and increasing intellectual property rights, so the emphasis is on the allocation of scarce R&D resources. The issues raised include the roles of the public and private sectors, favoured versus less-favoured areas, traditional versus exotic crops and yield growth versus environmental concerns. This paper suffers from the long publication lag, since several papers have been published in this area, by the International Food Policy Research Institute (IFPRI) for example, that do provide answers.

Part two begins with a critical review by Zvi Griliches, entitled 'Issues in agricultural productivity measurement', which concentrates on the econometric issues. It is an insightful account of developments made by non-agricultural economists in dealing with R&D and technology in production functions. It is perhaps none the worse for this, since agricultural economists can learn from this literature. However, there is little evidence of any feedback loop; the massive amount of work by agricultural economists gets scant mention. This is corrected in the next chapter, where Barbara Craig and Phil Pardey present state-level multi-factor productivity (MFP) results for United States agriculture which parallels the work of Eldon Ball and colleagues at the United States Department of Agriculture who have also produced state level MFP estimates. So much for the allocation of scarce resources, in a world where we have no meaningful MFP estimates for most of the African countries. The limited information that we do have is well reviewed by Prabhu Pingali and Paul Heisey, in the concluding chapter of Part two. They present land and labour productivity figures for cereal crops in the developing countries. These and the MFP results are well interpreted in this longer and more practical chapter that comments on future prospects.

Part three is entitled 'Research, productivity, and natural resources', and it begins with Wilfred Beckerman's 'sceptical view of sustainable development'. Sceptical it is, as he dismisses the notion of sustainable development as 'intellectually incoherent' and a 'step backward into vague and confused rhetoric' that is 'founded on sloppy thinking'. Whereas his conference presentation was long on wit and short on serious content, the factor proportions have now been adjusted, resulting in a paper that practitioners in this area would do well to read. The inter-generational equity approach and the empirical evidence certainly give cause to question the current

fashion for sustainability. However, I would hope that the work in this area has improved in the long lag between the Melbourne conference and publication.

The next chapter in this section, by James Wilen and Frances Homans, is on productivity measurement in the specific context of open access fisheries that are regulated. This is an interesting problem, as productivity gains may be at the expense of resource depletion that will eventually cause the fish stocks to crash. The regulators may deliberately restrict productivity growth to prevent this, while other agencies may be striving to promote it. Individual fishermen are caught in a prisoner's dilemma. If they do not adopt innovations and others do, they lose immediately. However, when all adopt, all lose eventually due to stock depletion. This paper combines serious analysis with useful insights into an interesting problem.

Part three concludes with Peter Lindert's lengthy and extensive investigation of the long run relationship between soil degradation, development and agricultural research, in China and Indonesia. The conclusions are convincing, interesting and more optimistic than might be expected. Fertiliser appears to have compensated for the decline in nitrogen and organic matter, while development has a positive effect due to improved property rights and as a result of accounting for feedbacks of nutrients from improved diets. It is encouraging to find an economist with this much knowledge of the scientific aspects of an important problem like this.

The final, main part of the book is entitled 'Research for genetic improvement'. It begins with Derek Byerlee and Greg Traxler's investigation of the efficient design of agricultural research systems, when country size and R&D spillovers are taken into account. This chapter presents an excellent combination of knowledge, common sense, theorising, empirical estimation of the key relationships and policy inferences. It is essential reading for anyone with a serious interest in how public and private R&D at the national, regional and international levels is translated into research output. It presents a convincing case that size does matter and that spillovers are important and cannot be ignored in research evaluation.

This is followed by an evaluation by Robert Evenson and Brian Wright of the value of plant biodiversity for agriculture. This paper draws together materials from many sources to give a convincing account of the contribution of diversity to crop improvement and to show that evaluation is possible, although difficult. The value of genetic resources raises the thorny issue of the rapidly changing system of intellectual property rights, which is documented, before the implications are investigated. They argue that although the private sector is becoming more important with the advent of biotechnology, the public sector role in collection, maintenance and evaluation of genetic resources will continue. The possibility of private ownership of genetic

resources damaging the efforts of the public and international agencies in the developing world is not raised.

The concluding chapter in part four, by Richard Gray and Stavroula Malla, is an economic evaluation of the benefits from genetic modification of canola (oilseed rape) in Canada. It covers the rapid development of the industry and constructs a three region, four-sector market model to measure the benefits. The effect of selecting for quality is covered, using regression analysis. The evaluation of the benefits is extended to include the gains from health improvements as canola oil has replaced saturated fats. It is a good paper on an interesting case, which has since been explored in much greater detail by Phillips and Khachatourians (2001).

The final part of the book is a single, brief concluding chapter by Walter Armbruster and Peter Barry called 'Directions for agricultural research and development policy'. This title is misleading, as it is actually a six-page summary of the book, which should be read first, followed by less than a page that looks at directions.

In summary, this is a useful volume for anyone with an interest in the important subject of agricultural science policy. But it is a fast moving area, so it suffers from the 5-year lag between the conference and publication. In some of the areas covered there is now more recent research, such as the volume on canola, noted above. A visit to the IFPRI website is also worthwhile. For instance, on the returns to agricultural research, see Alston *et al.* (2000) and there is an issue of *Food Policy* (vol. 25, 2000) that is devoted to papers from a 1999 conference on 'Assessing the impact of agricultural research on poverty alleviation'.

References

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Dynamic Competition and Public Policy: Technology, Innovation, and Anti-trust Issues, edited by Jerry Ellig. Published by Cambridge University Press, Cambridge, UK, 2001, pp. x + 277, ISBN 0 521 78250 3, \$135.

The modern economy is inherently dynamic. Measuring market power is much more difficult when things change. Price and quantity are by no means the only characteristics of interest to consumers. Products are not simple unchanging commodities, and they are not produced by processes handed down through the generations. Their qualities are multifarious and evolving. Producers engage in experimentation, look for better ways to solve fundamental demands for services, and search for new products and services with which to serve those needs. Market performance is not merely whether the consumer gets a product at price equals cost, as elementary textbooks suggest, and as the Soviet planning system attempted to put into public policy. Market performance includes better satisfying consumer needs as time goes by. That is the essence of the capitalist system. Agricultural economists as much as any others are faced with evaluating market performance not merely on elementary textbook measures of static consumer and producer surplus, or their general equilibrium analogues, but on measures that must account for the gains from innovation.

The extremely high level of both processor and retail concentration in the marketing of most food products in Australia may seem to be a sure sign that market power exists, but does it really? Without this high level of concentration, would consumers enjoy the rapid turnover of new product lines in supermarkets in which only a few lines survive to serve consumer needs over a longer period? Would lower retail concentration promote the diffusion of capital-intensive retail service innovation, or would it actually slow such diffusion? These are a few of the questions addressed by this collection of papers by eminent American economists, including Jay B. Barney, Franklin M. Fisher, Richard N. Langlois, Stan Leibowitz, Stephen Margolis, Daniel L. Rubinfeld and David Teece, among others. The book is the result of a workshop held by the Mercatus Center at George Mason University in December 1998. The seven contributed chapters are introduced by Jerry Ellig's excellent survey of the questions at issue.

Perfect contestability has long been held up as the exemplar of the market that yields the best results for consumers. But, as Ellig notes, Baumol has explained that perfect contestability eliminates the supernormal profits that provide the incentive to innovation. Exclusionary conduct has long been taken as a marker of market power, but an aggressive but efficient firm will do just what a wicked excluder tries to do. Aggressively expanding market share by shaving prices and providing improved qualities seems clearly a

good thing. But it may be a bad thing if the shaving of prices is temporary, lasting only until rivals are seen off, and entry by new rivals is constrained. But if the flux of entry and exit are both considerable, aggression favours the buyers.

The Microsoft case is considered in a number of contributions. The conclusions are not uniform. Franklin Fisher's paper suggests that bundling Internet Explorer with Windows constrains rival producers of web browser software, and that this ultimately will result in Microsoft enjoying market power in the markets for application software, to the detriment of software buyers. Two other papers reinforce his conclusion, for a number of different reasons. However, another paper, by Leibowitz and Margolis, suggests that lock-in effects are transitory in a rapidly changing technological environment. They argue that there may be more rival applications, such as browsers and other software, if the Windows operating system is forced to avoid leveraging its network monopoly power, but there will be no incentive for other firms to develop a rival to Windows itself. If applications not approved by Microsoft continue to be prevented from using the Windows operating system, this may make Windows more vulnerable to attack by frustrated rivals in the longer term. To what extent is Linux a response to the pre-Microsoft case for Windows? Will application program creators bother with Linux if they have unconstrained access to Windows?

The range of ideas of dynamic competition expounded here include Schumpeterian (creative destruction requires hopes of supernormal profit), evolutionary (markets select the most efficient, as firms are largely fixed in what they can do and how they can do it), Austrian (the unknowable future is open to the alert and creative innovator to seize opportunities), path dependence (increasing returns lead to lock-in and winner takes most), and resource-based (no firm can do exactly what another firm can do as the bundle of resources held is unique). None of the chapters is exclusively beholden to any of these labels. All of them illustrate the complexity and problems of making judgements about the extent and significance of market power. Competition policy, and the courts in particular, have to make their decisions on expectations about future economic behaviour and performance. What will market players do if a particular decision is made? What new market players may enter? What innovations may they bring forth?

The old welfare economics that underpin the simple judgements about collusion and resale price maintenance have little place in rapidly evolving markets. The search for criteria for the welfare economics of change is at an early stage of development. Some rules of thumb have been suggested, as in the chapter by Pleatsikas and Teece. These rules relate to the existence of diversity. If diverse technologies can be used, competition is more likely to be vigorous. If consumers and other buyers are willing to experiment,

opportunities for innovation will be open. If market shares are volatile, firms will be rewarded for their efforts to serve markets. If R&D spending is high, competition will likely be vigorous. If profit rates and margins are volatile, profits are more likely to be the result of competitive success rather than of entrenched market power. The converse of these indicia is that stability and an appearance of equilibrium may indicate a need to find out whether that stability has been imposed by one or another form of market power.

This volume, an easy read for the professional economist of any specialty, is an excellent review of the state of play of the dilemmas and questions being faced by antitrust and competition policy economics in the ever-changing world of the modern industrial and post-industrial economy. This is a world inhabited by producers and marketers of primary commodities just as much as by so-called 'new economy' services. An important message to be taken from this book is that farmers' concerns, expressed here in Australia as well as in the USA and Europe, about the marketing margin spread between farm gate and supermarket shelf cannot be confirmed or rejected by a simple textbook analysis. There is a pressing need for further theoretical development if public policy in this area is not to be left in a vacuum.

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