AUSTRALIA

MONASH UNIVERSITY

THE EFFECT OF PREVENTIVE CARE ON THE DEMAND FOR HEALTH SERVICES IN A DEVELOPING COUNTRY

Kerry Anne McGeary
Donald S. Kenkel
and
Joseph V. Terza
(Penn. State)

Seminar Paper No. 4/96

DEPARTMENT OF ECONOMICS

SEMINAR PAPERS

1. Introduction

A Goal of the World Health Organization has been "Health For All" (HFA) by the year 2000. In order to assess the feasibility of this noble pursuit, policy makers in developing countries must have models of the demand for medical services that yield reliable demand forecasts under a variety of proposed policy scenarios. Of particular importance in this regard is the ability to identify particular policy instruments that offer potential for controlling the inevitably substantial overall cost of HFA. For example, researchers have investigated the efficacy of imposing of user fees as a means of both controlling burgeoning demand and financing the provision such services (see Gertler et al., 1987; Dor et al.,1987; Dor et al.,1993).

Another policy measure that may serve to control overall health care costs is the promotion of preventive care. Many observers argue that preventive services are an inexpensive way to improve general health, leading to lower utilization of more expensive curative services. The claim that "prevention is cheaper than cure" has come under attack in the context of U.S. medicine (Russell 1986). But in the U.S., most adult preventive medical care consists of services for earlier detection of chronic conditions such as cancer and heart disease. The situation is much different in developing countries. The World Bank (1993) estimates that communicable and largely preventable illnesses account for 71 percent of the burden of disease in Sub-Saharan Africa and 42 percent in Latin America, compared to only 10 percent in established market economies like the U.S.. The World Bank concludes that re-directing health care resources to public health and essential clinical services "could dramatically reduce the burden of disease without increasing expenditures." If the health improvements are large enough, preventive care may actually reduce expenditures by decreasing the demand for curative health services.

Despite the policy significance of the issue, we could find no published research dealing with the effect of preventive medicine on the demand for health services in the context of developing countries. Moreover, we found that extant econometric specifications of the demand for medical services are not designed to deal with potential endogeneity bias due to the inclusion of the preventive care variable among the demand determinants. The endogeneity of preventive care may arise from unobservable characteristics that are correlated with preventive care and the demand for medical services. In a developing country some respondents may be much more oriented towards modern medical care, and simultaneously demand relatively more medical services and, on average, are more likely to practice preventive care. Similarly, due to uneven geographic distribution of clinics, respondents in certain areas may have much better access to both preventive and curative medical care. Lacking attitude and detailed availability measures, the conventional ordinary least squares regression estimate of the effect of preventive care on the demand for medical services is likely to be biased. The positive correlation between prevention and cure caused by unobserved attitude or access differences could mask or even swamp any utilization-reducing effect of preventive care.

In the present paper, we estimate the exogenous influence of preventive care on the demand for health services in Peru via an econometric specification that accounts for the potential endogeneity of that variable. In addition, our econometric model accommodates two "non-classical" aspects of the dependent variable, which in our model is measured as the number of medical consultations by the respondent in a four-week period. First, this value is restricted to be nonnegative. Secondly, its sampled values include a nontrivial number of zero responses. Such endogeneity-corrected estimates of the effect of preventive care on medical demand can be

used by policy makers to assess the efficacy of policies aimed at promoting preventive care.

The paper is organized as follows. In the next section we offer a model of the demand for health services in Peru, and detail the estimation method that will be implemented. Section 3 describes the Peruvian data set and summarizes the results. We find that, when modeled correctly the investment in preventive care will decrease the demand for health care services in the future. The final section summarizes and concludes.

2. A Model of the Demand for Health Services in a Developing Country

The main purpose of this research is to assess the impact of preventive health care on the demand for medical services in a developing country. As in Grossman (1972) and Rosenzweig and Schultz (1983), we assume that the demand for medical care is derived from the more basic demand for good health. Medical care is an input into a household production function describing the technological (biological) relationship between inputs and the output of good health. Solving the consumer's maximization problem shows the demand for medical care as a function of the consumer's income, prices, and parameters of the utility function and the household production function. Another determinant of curative care demand is preventive medical care in a previous period which improves current health, and thus acts a demand-shifter for curative care.

Put differently, the prior purchase of preventive care can substitute for curative care in the production of good health. A more standard approach to determine if two goods are substitutes and complements would be to estimate the cross-price elasticity of demand. For example, Kenkel (1994) finds that in the U.S. insurance coverage that lowers the price of

curative care increases the demand for preventive medical services. The preventive services under consideration were designed for the early detection of cancer, so the implication that these services complement rather than substitute for curative care is sensible. In this study we lack measures of the prices of preventive care and curative care. So we take an alternative approach and attempt to estimate whether or not the prior use of preventive care shifts the demand for curative care.

Empirically, we examine the demand for curative services (y) measured as the number of medical consultations by the individual in the last four weeks for treatment of a specific illness or injury. Whether or not the individual practiced preventive care is coded as a binary variable (d) based on responses to the following survey question: "In the past twelve months have you had any consultations for preventive reasons like check-ups or vaccinations?" (d = 1 if yes; d = 0 if no).

Our model of the demand for curative medical services is unconventional for three reasons. First, the demand quantity y is a nonnegative integer value. Secondly, in our data y = 0 for a nontrivial proportion of the sample. Thirdly, the preventive care dummy variable is potentially endogenous because unobservable influences on the individual's demand for curative care may also have an effect on whether or not the individual engages in preventive care. The econometric model that we implement is designed to deal with all three of these "non-classical" aspects of the demand for curative care.

2.1 The Econometric Model

In order to simultaneously deal with all three of the aforementioned characteristics we

follow Terza (1995) and model the demand for curative care as

$$y = \exp\{x\beta + \varepsilon\} + \eta \tag{1}$$

where x is the $1xK_1$ vector of observable demand determinants (including the preventive care dummy), β is the K_1x1 vector of parameters to be estimated, ε and η are unobservable random error terms. The preventive care dummy variable (d) is modeled as

$$d = \begin{array}{ll} 1 & \text{is observed iff} \quad z\alpha + \nu > 0 \\ 0 & \text{otherwise} \end{array} \tag{2}$$

where z is a $1xK_2$ vector of observable exogenous variables that bear on the individual's decision to practice preventive care, α is a K_2x1 vector of parameters to be estimated, ν is the unobservable random error term, and $[\varepsilon, \nu \mid w]$ is bivariate normally distributed with mean vector zero and covariance matrix

$$\Sigma = \begin{bmatrix} \sigma & \sigma\rho \\ \sigma\rho & 1 \end{bmatrix}.$$

Note that w is comprised of the elements of x and z, not including d. Terza (1995) shows that

$$E[y \mid w, d] = \delta(\beta^*)\psi(\theta, \alpha) \tag{3}$$

where

$$\delta(\beta^*) = \exp\{x\beta^*\}$$

$$\psi(\theta,\alpha) = d\frac{\Phi(\theta+\tau)}{\Phi(\tau)} + (1-d)\frac{1-\Phi(\theta+\tau)}{1-\Phi(\tau)}$$

β^* is the same as β except for its first element (the constant term) which is shifted by $\sigma^2/2$, $\theta = \sigma\rho$, $\Phi(\cdot)$ denotes the standard normal cdf, and $\tau = z\alpha$.

The term $\psi(\theta, \alpha)$ in equation (3) is similar in nature to the nonzero conditional error expectation in equation (7) of Heckman (1978). As in Heckman's more conventional endogenous dummy variable model, ignoring the "correction" term in the conditional mean function (in the present case $\psi(\theta, \alpha)$) leads to a kind of omitted variable bias in the nonlinear least squares estimation of β^*.

Terza (1995) has developed a two-stage estimator for regression models like (1). In the first stage of the estimator, simple probit analysis is used to obtain a consistent estimate of α. In the second stage of the estimator, consistent estimates of β^* and θ are obtained by applying the nonlinear least squares method to

$$y = \delta(\beta^*)\psi(\theta,\hat{\alpha}) + e \qquad (4)$$

where $\hat{\alpha}$ denotes the first stage probit estimate of α, and e is the regression error term. This two-stage estimator is asymptotically normal and the details of the inferential statistics are given in Appendix B of Terza (1995). In the following section we complete the specification of the model by detailing the exogenous determinants of both curative and preventive care.

2.2 The Exogenous Variables (x and z)

Determinants of the demand for curative and preventive care can be classified as

pertaining to: the individual or the household. An explanation of all the variables that were used in estimation is provided in Table 1. The descriptive statistics for all these variables are listed in Table 2. Further details of the variable classifications and their predicted signs are provided below.

Individual Demographic Variables

Demographic variables such as age (AGE), education (YREDU), sex (MALE) and income (SALARY) enter the models in a simple linear fashion. We square the age variable to account for nonlinearities in age (AGESQD). AGE captures the effect of depreciation in health stock due to age on the demand for preventive and curative care, Grossman (1972). AGESQD captures how this effect on the demand for preventive care changes with increases in age. According to Grossman (1972), education may positively effect both preventive care and the number of consultations since better educated individuals will make more informed choices about health inputs-- preventive care, and the curative care required for any given illness or injury. Finally, MALE will account for differential on the demand for curative care and preventive care attributable to gender. SALARY captures the effect of income. Since preventive and curative care are normal goods, individuals with higher incomes will demand more of each type of care.

Individual Health and Health Care Variables

Various individual characteristics may influence curative and/or preventive care demand. For instance, the number of days not restricted from normal activity during the last 28 days (DAYWELL) measures individual health status. Grossman (1972) finds that good health lessens the need for curative care. However, health status measured over the past 28 days is not a likely

determinant of the demand for preventive care over the past year. Therefore, DAYWELL is excluded from the preventive care demand equation. Nevertheless, the health *care* variables will influence both demands. A dummy variable indicating the presence of family insurance (INSUR), should increase the probability of seeking both curative and preventive care. Another dummy variable indicating membership in IPSS, the social security system of Peru which offers services free of charge to IPSS members, should have the same influences on curative and preventive care that insurance does. Finally, in order to control for the opportunity costs of health care we include a dummy variable indicating whether the respondent's employer offers paid sickleave (SICKLEAV). Intuitively, respondents that face lower opportunity costs as well as out-of-pocket costs will demand more of both types of care.

Household Variables

An individual's demand for preventive and curative care from an outside source will be influenced by the household's ability to provide these services. Total household expenditures (THHEXP) is a measure of the household's economic well being. We suspect that more affluent households will be in a better financial position to seek outside health care for each individual member. Another variable that will influence the individual's need for outside health care is the composition of the household (ADULTS). Individuals that are members of households with a large number of adults demand less preventive and curative care because health care may be provided by another adult within the household. A similar argument can be made regarding the size of the household (HHSIZE). In this case, the health care services could be produced by another individual in the household. Another characteristic of the household that will influence the demand for both types of care is cultural bias. Cultural biases such as tribal affiliation are

accounted for through the use of a regional dummy (RURAL).

3. Data and Estimation Results

The data are from a Living Standards Survey (PLSS) conducted in Peru in 1986. The PLSS is a multipurpose survey in which the Statistical Institute of Peru ("Instituto Nacional de Estadística e Informática del Peru (INEI)") collected the data using the World Bank's Living Standards Measurement Survey methodology. This methodology is known for its rapid collection of data as well as its high quality. The data are available at the household or individual level, and 5985 households were surveyed. The interviewers collected detailed information on health-care utilization from all individual household members who reported illness or injury in the past four weeks. The health related information includes the number of consultations, the choice of health care provider, and the practice of preventive care. For the purposes of this paper we have restricted our focus to adults. Therefore, the sample size used in estimation has a total of 1166 respondents.

The first column of Table 3 provides the results from the first stage probit estimation of the respondent's demand for preventive care. Our results indicate that the higher educated individuals will demand more preventive care. Also, there is evidence that the probability of demanding preventive care increases with the ability to pay (SALARY). Additionally, we find support for the claim that higher THHEXP has a positive influence on the individual's probability of seeking outside preventive care. The signs and significance levels for the estimated coefficients of the health care and health variables seem to support our previous expectations. However, households that opt for family insurance are more likely to practice

preventive care. Another result that is interesting from the employer's stand point is that offering paid sickleave seems to increase the likelihood that individuals will practice preventive care, yielding a healthier and possibly a more productive work force. The coefficient on the rural dummy is positive indicating that rural residents have an increased probability of practicing preventive care. This result is of interest to policy makers. It implies that in areas where modern medicine is the less prevalent form of health care, preventive care is still practiced thus reducing the spread of communicable diseases.

The second column in Table 3 reports the estimation results for the demand for curative care where the endogeneity of preventive care is ignored. This stage of the analysis concentrates on the exogenous effect of preventive care on curative care, the effect is estimated via nonlinear least squares. As we suspected the coefficient on PREVENT is positive. We believe this anomalous result is due to the positive correlation between PREVENT and the unobservable influences on curative care (i.e., the endogeneity of preventive care).

In the third column of Table 3 we report the estimates corrected for endogeneity. They were obtained using the two-stage method developed by Terza (1995). Note that the preventive care coefficient is negative indicating that those who invested in preventive care will demand less curative care. The parameter THETA is the product of σ (the standard deviation of ε) and the correlation coefficient (ρ). The estimated value of THETA and its significance imply rejection of the null hypothesis that $\rho = 0$ (i.e., rejection of the exogeneity of preventive care). Note, signs for the coefficient estimates of SALARY, DAYWELL, INSUR, ADULTS, and SICKLEAV are consistent with our previous expectations and they are significant determinants of both types of health care.

4. Summary and Conclusions

The results indicate that the promotion of preventive care may be an effective means of reducing the demand for curative health care. Rather than imposing user fees which have the potential to be regressive in nature, health policy makers could target preventive care awareness and possibly health education. In this paper we have proposed a method that treats the use of preventive care as endogenous. The two-stage nonlinear least squares method that we implemented provides evidence of the negative influence of the use of preventive care on the demand for curative care. Without accommodating the endogeneity in the model, the coefficient estimates for the curative care variables (most notably the effect of preventive care on curative care) will be biased.

Table 1
SUMMARY OF THE DATA

Exogenous Variables	
Individual Demographic Variables	
age in years	AGE
education in years	YREDU
sex	MALE
monthly income in soles	INCOME
Individual Health and Health Care Variables	
health status-# days well in the past 28	DAYWELL
existence of family insurance dummy	INSU
membership in IPSS dummy	IPSS
paid sickleave	SICKLEAV
Household Variables	
total monthly household expenditures in soles	THHEXP
household size-# of members	HHSIZE
household composition-# of adults	ADULTS
regional dummy	RURAL
Endogenous Variables	
curative care demand-# consultations in past 28 days	NUMCONS
preventive care dummy-yes or no in the past 12 months	PREVENT

Table 2
DESCRIPTIVE STATISTICS FOR THE PLSS DATA SET 1986

VARIABLE	MEAN	STD. DEV.
EXOGENOUS		
INDIVIDUAL DEMOGRAPHIC VARIABLES		
AGE	35.4638	2.3611
AGESQD	1.4059	1.0080
YREDU	9.7925	4.0312
MALE	0.6895	0.4629
SALARY	0.1519	0.2497
INDIVIDUAL HEALTH AND HEALTH CARE VARIABLES		
DAYWELL	19.3250	8.1868
INSUR	0.1312	0.3378
IPSS	0.5592	0.4967
SICKLEAV	0.5720	0.4950
HOUSEHOLD VARIABLES		
THHEXP	0.3132	0.3431
ADULTS	3.7153	1.9255
HHSIZE	6.1844	2.9014
RURAL	0.5798	0.4938
ENDOGENOUS		
NUMCONS	0.8894	1.4675
PREVENT	0.2436	0.4294

Table 3
FIRST AND SECOND STAGE RESULTS
ENDOGENOUS DUMMY = PREVENT

VARIABLE	1st. STAGE PROBIT	2nd.STAGE UNCORRECTED NLS	2nd. STAGE CORRECTED NLS
CONSTANT	-0.8587 (-1.9700)	-0.3292 (-0.7059)	0.9200 (1.1015)
PREVENT	——	0.2168 (1.6153)	-3.4276 (-2.4362)
THETA	——	——	2.0747 (3.0402)
INDIVIDUAL DEMOGRAPHIC VARIABLES			
AGE	-0.0277 (-1.3114)	0.0081 (1.3415)	0.0131 (1.4964)
AGESQD	0.3717 (1.4644)	—— ——	—— ——
YREDU	0.0128 (1.0136)	0.1938 (1.2721)	0.0377 (1.5969)
MALE	-0.2307 (-2.5008)	0.0394 (0.3083)	-0.2089 (-1.1487)
SALARY	0.2845 (1.4469)	0.1968 (4.9893)	0.3699 (4.8774)
HEALTH AND HEALTH CARE VARIABLES			
DAYWELL	——	-0.0398 (-7.6956)	-0.0402 (-7.6993)
INSUR	0.2892 (2.3302)	0.2817 (1.2621)	0.6187 (2.0773)
IPSS	-0.0194 (-0.1409)	-0.0541 (-0.2758)	-0.0874 (-0.3384)
SICKLEAV	0.5478 (3.8657)	0.1825 (0.7972)	0.8792 (2.5837)
HOUSEHOLD VARIABLES			
THHEXP	0.2769 (2.2314)	-0.4772 (-1.7522)	-0.2235 (-0.6949)
ADULTS	0.0109 (0.3142)	0.1045 (1.7068)	0.1460 (1.8374)
HHSIZE	-0.0115 (-0.4956)	-0.01482 (-0.5268)	-0.0446 (-1.0542)
RURAL	0.2651 (2.9706)	-0.0008 (-0.0070)	0.3384 (1.5210)

References

Dor, A., Gertler, P., and Van der Gaag, J. (1987): Non-Price Rationing and the Choice of Medical Care Providers in Rural Cote D'Ivoire, Journal of Health Economics, 6, 291-304.

Dor, A., and van der Gaag, J. (1993): Quantity Rationing and the Demand of Adults for Medical Care in Rural Cote d'Ivoire, Health Economics Research in Developing Countries, Mills, A., and Lee, K., Oxford: Oxford University Press, 193-213.

Gertler, P., Locay, L., and Sanderson, W. (1987): Are User Fees Regressive? The Welfare Implications of Health Care Financing Proposals in Peru, Journal of Econometrics, 36, 67-88.

Grossman, Michael, (1972): "On The Concept of Health Capital and the Demand for Health", Journal of the Political Economy, 80, 223-5.

Kenkel, D.S. (1994): The Demand for Preventive Medical Care, Applied Economics, 26, 313-25.

Rosenzweig, M.R., and Schultz, T.P. (1983): Estimating a Household Production Function: Heterogeneity, the Demand for Health Inputs, and Their Effects on Birth Weight, Journal of Political Economy, 91, 723-745.

Russell, Louise (1986): Is Prevention Better than Cure? (Washington, DC: Brookings Institution).

Terza, Joseph (1995): Estimating Count Data Models with Endogenous Switching and Sample Selection, Working Paper-Department of Economics, The Pennsylvania State University.

The World Development Report: 1993, The World Bank, Washington, DC, 1993.

MONASH UNIVERSITY, DEPARTMENT OF ECONOMICS, SEMINAR PAPERS

4/96 Kerry Anne McGeary, The Effect of Preventive Care on the Demand for Health Services in a Developing Country
3/96 Robert Rice, The Urban Informal Sector: Theory, Characteristics, and Growth from 1980 to 1990 with a Special Emphasis on Indonesia
2/96 Jürg Niehans, Adam Smith and the Welfare Cost of Optimism
1/96 Yew-Kwang Ng, The Paradox of Interpersonal Cardinal Utility: A Proposed Solution

26/95 J. Boymal, The Economics of Alcohol Addiction
25/95 N. Haralambopoulos, The Monetary Transmission Mechanism
24/95 X. Yang and S. Ng, Specialisation and Division of Labour: A Survey
23/95 Wenli Cheng and Yew-Kwang Ng, Intra-Firm Branch Competition for a Monopolist
22/95 Joel M Guttman, Rational Actors, Tit-for-Tat Types, and the Evolution of Cooperation
21/95 Stephen King & Rohan Pitchford, Economic Theories of Privatisation and Corporatisation
20/95 Anne O. Krueger, Free Trade Agreements Versus Customs Unions.
19/95 Andrew Comber, Estimates of the Elasticity of Substitution between Imported and Domestically Produced Goods in New Zealand.
18/95 Peter Hartley and Chris Jones, Asset Demands of Heterogeneous Consumers with Uninsurable Idiosyncratic Risk.
17/95 Yew-Kwang Ng, Non-Neutrality of Money Under Non-Perfect Competition: Why Do Economists Fail to See the Possibility?
16/95 Yew-Kwang Ng, Relative-Income and Diamond Effects: A Case for Burden-Free Taxes and Higher Public Expenditures.
15/95 Wen Mei, Per Capita Resource, Division of Labor, and Productivity.
14/95 Deborah A. Cobb-Clark, Clinton R. Shiells & B. Lindsay Lowell, Immigration Reform: The Effects of Employer Sanctions and Legalization on Wages.
13/95 Murray C. Kemp & Hans-Werner Sinn, A Simple Model of Privately Profitable But Socially Harmful Speculation.
12/95 Harold O. Fried, Suthathip Yaisawarng, Hospital Mergers and Efficiency.
11/95 Yew-Kwang Ng, From Separability to Unweighted Sum: A Case for Utilitarianism.
10/95 Gerald T. Garvey, Michael S. McCorry, Peter L. Swan, Stock Market Liquidity and Optimal Management Compensation: Theory and Evidence
9/95 Siang Ng, Specialisation, Trade, and Growth
8/95 X Yang, Economies of Specialization and Downward Sloping Supply Curves: An Infra-Marginal Analysis
7/95 Viv Hall, Economic Growth Performance and New Zealand's Economic Reforms
6/95 Farzana Naqvi, Social Welfare Effects of Taxes on Energy Products in Pakistan: A Computable General Equilibrium Approach
5/95 Mei Wen, An Analytical Framework of Producer-Consumers, Economies of Specialization and Transaction Costs
4/95 Marc Lavoie, Interest Rates in Post-Keynesian Models of Growth and Distribution
3/95 Marcus Berliant and Miguel Gouveia, On the Political Economy of Income Taxation
2/95 Russell Smyth, Estimating the Deterrent Effect of Punishment using New South Wales Local Court Data
1/95 Rod Maddock, The Access Regime and Evaluation of the Hilmer Report

30/94 Barry A. Goss and S. Gulay Avsar, Price Determination in the Australian (Non-Storble) Line Cattle Market
29/94 D.K. Fausten & Robert D. Brooks, The Balancing Item in Australian Balance of Payments Accounts: An Impressionistic View.
28/94 Sugata Marjit & Hamid Beladi, A Game Theoretic Analysis of South-South Cooperation.
27/94 Sugata Marjit, Transferring Personalised Knowledge or Guru's Dilemma.
26/94 Richard H. Snape, Globalisation and Internationalisation of the Australian Economy: Trade and Trade Policy.
25/94 Eric O'N Fisher, Crowding Out in a Model of Endogenous Growth.
24/94 Yew-Kwang Ng, Ranking Utility Streams of Infinite Length: the Immunity of Utilitarianism from some Recent Attacks.
23/94 Krueger, Anne O & Roderick Duncan, The Political Economy of Controls: Complexity.
22/94 Xiangkang Yin, A Micro-Macroeconomic Analysis of the Chinese Economy with Imperfect Competition.
21/94 Brendon Riches, Price Wars and Petroleum: A 'structure Conduct' Analysis.
20/94 Xiaokai Yang, An Equilibrium Model of Hierarchy.
19/94 Ronald W. Jones & Tapan Mitra, Share Ribs and Income Distribution.
18/94 Dagobert Brito & Peter Hartley, In Defence of Contributory Negligence.
17/94 Michihiro Ohyama and Ronald W. Jones, Technology Choice, Overtaking and Comparative Advantage.
16/94 Xiaokai Yang, Two Notes on New Growth Models.
15/94 Xiaokai Yang, The Nature of Capital, Investment, and Saving.
14/94 Walter Y. Oi, Towards a Theory of the Retail Firm.
13/94 Matthew W. Peter & George Verikios, Quantifying the Effect of Immigration on Economic Welfare in Australia.
12/94 Xiaokai Yang, A Theory of the Socialist Economic System and the Differences Between the Economic Reforms in China and Russia.
11/94 Xiaokai Yang, Learning Through the Division of Labour and Interrelationship between Trade and Productivity Progress.

10/94 Sugata Marjit & Heling Shi, Non-Cooperative, Cooperative and Delegative R & D
9/94 Richard H. Snape, Which Regional Trade Agreement?
8/94 Richard H. Snape, Trade and Multilateral Trade Agreements: Effects on the Global Environment
7/94 Barry A. Goss & Jane M. Fry, Expectations and Forecasting in the US Dollar/British Pound Market.
6/94 Ronald W. Jones & Sugata Marjit, Labour-Market Aspects of Enclave-Led Growth.
5/94 David Henderson, Economic Liberalism: Australia in an International Setting.
4/94 Reinhard Tietz, Simplification and Complexity: The Dilemma of Economic Theory.
3/94 Ian Wills & Jane Harris, Government Versus Private Quality Assurance for Australian Food Exports.
2/94 Yew-Kwang, Ng & Jianguo Wang, A Case for Cardinal Utility and Non-Arbitrary Choice of Commodity Units.
1/94 Yew-Kwang, Ng, Why Does the Real Economy Adjust Sluggishly? Interfirm Macroeconomic Externality and Continuum of Quasi-Equilibria.

12/93 Yew-Kwang, Ng, Towards Welfare Biology: Evolutionary Economics of Animal Consciousness and Suffering.
11/93 Yew-Kwang Ng, The Necessity, Feasibility and Adequacy of Cost-Benefit Analysis Where Life or Other "Non-Economic" Factors are Concerned.
10/93 John Freebairn, Microeconomic Reform: Progress and Effectiveness.
9/93 K. Abayasiri-Silva & G.M. Richards, Non-Neutrality of Money in Imperfectly Competitive Macroeconomic Models.
8/93 Xiaokai Yang, Economic Organisms and Application of Topology and Graph Theory in Economics.
7/93 Dietrich K. Fausten & Sugata Marjit, The Persistence of International Real Interest Differentials in the Presence of Perfect Financial Arbitrage.
6/93 Barry A. Goss & S. Gulay Avsar, A Simultaneous, Rational Expectations Model of the Australian Dollar/U.S. Dollar Market.
5/93 Xiaokai Yang & Robert Rice, An Equilibrium Model Endogenizing the Emergence of a Dual Structure Between the Urban and Rural Sectors.
4/93 Xiaokai Yang, An Expanded Dixit-Stiglitz Model Based on the Tradeoff Between Economies of Scale and Transaction Costs.
3/93 Sugata Marjit, On the Participation of Local Capital in a Foreign Enclave - a General Equilibrium Analysis **(published December 1993)**
2/93 Sugata Marjit & Hamid Beladi, Foreign Capital Accumulation and Welfare in a Small Economy: Does Employment Matter?
1/93 Dietrich K. Fausten, Exploratory Estimates of the Influence of Economic Activity on German Portfolio Investment Abroad.

17/92 Blair R. Comley, The Australian Film Industry as an Infant Industry.
16/92 Yew-Kwang Ng, Complex Niches Favour Rational Species.
15/92 Yew-Kwang Ng, Population Dynamics and Animal Welfare.
14/92 Yew-Kwang Ng, Happiness Surveys: Ways to Improve Accuracy and Comparability.
13/92 Richard H. Snape, How Should Australia Respond to NAFTA?
12/92 Richard H. Snape, Background and Economics of GATT's Article XXIV.
11/92 Richard Snape, Economic Aspects of APEC.
10/92 Richard Snape, Bilateral Initiatives: Should Australia Join?
9/92 Xiaokai Yang, The Pricing Mechanism that Coordinates the Division of Labor.
8/92 Xiaokai Yang & Jeff Borland, Specialization and Money as a Medium of Exchange.
7/92 He-ling Shi & Xiaokai Yang, A Theory of Industrialization.
6/92 Xiaokai Yang & Jeff Borland, Specialization, Product Development, Evolution of the Institution of the Firm, and Economic Growth.
5/92 Ian Wills, Implementing Sustainable Development: Systems and Signalling Problems.
4/92 Ian Wills, Pollution Taxes Versus Marketable Permits: A Policy Maker's Guide.
3/92 Ian Wills, Do Our Prime Farmlands Need Saving?
2/92 Dietrich K. Fausten, Financial Integration and Net International Capital Movements.
1/92 John Freebairn, An Overview of the Coalition's Tax Package.

12/91 G.A. Meagher, The International Comparison Project as a Source of Private Consumption Data for a Global Input/Output Model.
11/91 G.A. Meagher, Applied General Equilibrium Modelling and Social Policy: A Study of Fiscal Incidence.
10/91 Dietrich K. Fausten, The Ambiguous Source of International Real Interest Differentials in Integrated Financial Markets.
9/91 Richard H. Snape, Discrimination, Regionalism, and GATT.
8/91 Richard H. Snape, The Environment: International Trade and GATT.
7/91 Yew-Kwang Ng & Jianguo Wang, Relative Income, Aspiration, Environmental Quality, Individual and Political Myopia: Why May the Rat-Race for Material Growth be Welfare-Reducing?
6/91 Yew-Kwang Ng, Polish and Publish: The Economics of Simultaneous Submission.
5/91 Yew-Kwang Ng & He-Ling Shi, Work Quality and Optimal Pay Structure: Piece vs. Hourly Rates in Employee Remuneration.
4/91 Barry A. Goss, S. Gulay Avsar & Siang Choo Chan, Price Determination in the U.S. Oats Market: Rational vs. Adaptive Expectations.
3/91 Yew-Kwang Ng & Harry R. Clarke (LaTrobe University), Population Growth and the Benefits from Optimally Priced Externalities.
2/91 Dietrich K. Fausten, International Capital Movements: Financial Arbitrage and Resource Transfers.