AUSTRALIA

MONASH UNIVERSITY

UNCERTAINTY, INSURANCE AND THE DIVISION OF LABOR

Monchi Lio

Economics Department, National Taiwan University
Visiting Scholar, Monash University

Seminar Paper No. 10/96

FOR LIMITED DISTRIBUTION ONLY

DEPARTMENT OF ECONOMICS

SEMINAR PAPERS

Uncertainty, Insurance and the Division of Labor

Monchi Lio
Department of Economics
National Taiwan University

May 26, 1996
The first draft

Abstract : This paper provides a general equilibrium model to explore the relationships between transaction risks, transportation costs and division of labor. It is shown that insurance against transaction risks will change the extent of the market, the level of specialization, productivity and the level of division of labor.

1. Introduction

Arrow (1965) pointed out that the existence of insurance is one of the basic need for developing the theory of uncertainty. Risk-averse individuals can be better off by paying a fixed premium to the insurance organization which assumes the risk. Arrow also points out the mere trading of risks is only part of the story of insurance. Another important part is that the possibility of shifting risks by insurance permits individuals to engage in risky activities which they would not otherwise undertake. The example gave by Arrow is that insurance can enhance the productivity by encouraging risky research projects. In this paper we will explain how insurance can increase the productivity by encouraging risk-averse individuals to undertake risky transaction activities.

In Section 2 we will develop a general equilibrium model specifying the relations between transaction risks and the division of labor. It is assumed that the production exhibits increasing returns and economies of specialization. The level of division of labor is determined by the tradeoff between economies of specialization and transaction costs which consist of transportation costs and risks. We will prove that the insurance against transaction risks can enhance the level of specialization and the productivity by increasing the extent of the market and the level of division of labor.

2. Uncertainty and division of labor: a general equilibrium approach

Consider an economy with M ex ante identical risk-averse consumer-producers and m consumer goods. Each consumer good can either be purchased in the market or self-provided. For the ith type of consumer good, denoted as good i, the self-provided amount is x_i, and the amount sold and purchased in the market are x_i^s and x_i^d, respectively. In purchasing good i, a fraction $1-k_i$ of any shipment of purchase disappears in transportation, and the amount an individual obtains from the purchase is $k_i x_i^d$. The total amount consumed of good i is $x_i + k_i x_i^d$.

We assume that, in trading good i, there are two possible outcomes for the transportation efficiency coefficient k_i: a high level, denoted as k_H, and a low level, denoted as k_L, of transportation efficiency, where $1 \geq k_H > k_L \geq 0$; the probabilities for k_H and k_L are θ and $1-\theta$, rsepectively, where $\theta \in (0,1)$. Therefore, there exists uncertainty in the treading activities. Each individual is assumed to have an identical Cobb-Douglas utility function, given by

$$(1) \qquad u = \prod_{i=1}^{m}(x_i + k_i x_i^d)^{1/\rho}, \qquad \rho > 1, \qquad k_i \in (k_H, k_L)$$

The system of production is specified as

$$(2) \qquad x_i + x_i^s = l_i - \alpha, \quad \alpha \in (0,1), \quad i = 1,2,\ldots,m$$

$$\sum_{i=1}^{m} l_i = 1, \qquad l_i \in [0,1)$$

where $x_i + x_i^s$ is the output level of good i; l_i, representing the individual's level of specialization in producing good i, is the labor allocated at producing good i; parameter α is a fixed learning or training cost, representing the degree of economies of specialization. This system of production functions and endowment constraints displays economies of specialization since the labor productivity increases with an individual's level of specialization.

The budget constraint (trade balance) is given by

$$(3) \qquad \sum_{i=1}^{m}(p_i x_i^s) = \sum_{i=1}^{m}(p_i x_i^d)$$

where p_i is the price of good i.

As in Yang and Shi (1992), a Walrasian regime or a multilateral bargaining game is assumed. The following lemma has been established by Yang and Shi (1992) and Wen (1994).

Lemma 1

According to the Kuhn-Tucker conditions, for an individual's optimum decision, an individual sells at most one good and does not buy and sell or self-provide the same good.

Taking Lemma 1 into account and signifying the utility of a person selling good i by u_i, the decision problem for an individual selling good i is given by

$$\text{(4)} \qquad \text{Max: } Eu_i = E\{[x_i \prod_{r\in R}(k_r x_r^d)\prod_{j\in J}(x_j)]^{1/\rho}\}$$

$$\text{s.t. } x_i + x_i^s = l_i - \alpha, \quad x_j = l_j - \alpha, \quad \forall j \in J \qquad \text{(production function)}$$

$$l_i + \sum_{j\in J} l_j = 1 \qquad \text{(endowment constraint)}$$

$$p_i x_i^s = \sum_{r\in R}(p_r x_r^d) \qquad \text{(budget constraint)}$$

where R, consisting of $n-1$ elements, is the set of goods the individual buys in the market; J, consisting of $m-n$ elements, is the set of goods the individual self-provides. n is the number of goods traded by the individual.

Assume that the individuals in this economy can purchase insurance against the uncertainty involved in transaction. For transporting good r, an individual can purchase insurance that will pay him $c_r x_r^d$ in the event of low transportation efficiency, i.e., if the amount of $k_L x_r^d$ is received. The premium he has to pay for $c_r x_r^d$ of insurance coverage is $\pi_r x_r^d$. By the symmetry assumption in this model, we can obtain $\pi_r = \pi$ and $c_r = c$ for all $r \in R$, and the expected utility for a person selling good i can be rewritten as follows

$$\text{(5)} \qquad Eu_i = W^{1/\rho}[\theta^{n-1}(k_H-\pi)^{(n-1)/\rho} + C_1^{n-1}\theta^{n-2}(1-\theta)(k_H-\pi)^{(n-2)/\rho}(k_L-\pi+c)^{1/\rho}$$
$$+\ldots+C_{n-1}^{n-1}(1-\theta)^{n-1}(k_L-\pi+c)^{(n-1)/\rho}]$$
$$= W^{1/\rho}[\theta(k_H-\pi)^{1/\rho} + (1-\theta)(k_L-\pi+c)^{1/\rho}]^{n-1}$$

where $W = x_i(x_r^d)^{n-1}(x_j)^{m-n}$. Following Kreps [1990, Ch.3], we describe an insurance contract as follows

(6) $\beta = \theta\pi/[(1-\theta)(c-\pi)]$

where β, characterizing the insurance contract, is no less than unity. The expected payout $(1-\theta)c$ equals the premium π if $\beta = 1$; the expected payout is less than the premium if $\beta > 1$. The insurance contract can be said to be *actuarially fair* if $\beta = 1$ and be *actuarially unfair* if $\beta > 1$. Given two insurance contracts β_a and β_b, we say that contract β_a is *more unfair* than β_b if $\beta_a > \beta_b$.[1] Given an insurance contract β, inserting (6) into (5) and solving for the optimum problem with respect to π, we can obtain the optimum premium and outcomes, given by

(7) $$\pi = (1-\theta)(k_H - \beta^{\rho/(\rho-1)}k_L)/(1-\theta+\beta^{1/(\rho-1)}\theta),$$
$$k_H - \pi = \beta^{1/(\rho-1)}[\theta k_H + \beta(1-\theta)k_L]/(1-\theta+\beta^{1/(\rho-1)}\theta) = \beta^{\rho/(\rho-1)}(k_L + c - \pi)$$

Note that the insurance contract β must satisfy $(k_H/k_L)^{(\rho-1)/\rho} \geq \beta \geq 1$, since $\pi \geq 0$ and $d\pi/d\beta < 0$. People will purchase no insurance as $\pi = 0$, $\beta \geq (k_H/k_L)^{(\rho-1)/\rho}$, purchase partial insurance as $\pi > 0$, $(k_H/k_L)^{(\rho-1)/\rho} > \beta > 1$, and purchase full insurance as $\pi = (1-\theta)(k_H - k_L)$, $\beta = 1$. The decision problem for the individual selling good i then becomes

(8) $$\text{Max:} \quad Eu_i = [x_i(x_r^d)^{n-1}(x_j)^{m-n}]^{1/\rho}[\Omega(\beta,\theta,k_H,k_L)]^{(n-1)/\rho},$$
$$\Omega(\beta,\theta,k_H,k_L) = \beta^{-1}(1-\theta+\beta^{1/(\rho-1)}\theta)^{\rho-1}[\theta k_H + \beta(1-\theta)k_L]$$
$$\text{s.t.} \quad x_i + x_i^s = l_i - \alpha, \quad x_j = l_j - \alpha, \quad \forall j \in J;$$
$$l_i + \sum_{j\in J} l_j = 1, \quad p_i x_i^s = \sum_{r\in R}(p_r x_r^d)$$

The first-order conditions of this decision problem yield the optimum values of l_i, l_j, x_i, x_i^s, x_j, x_r^d and n as functions of relative prices of all trade goods. The optimum

[1] It is easy to see that, given a level of premium, the difference between the premium and expected payout increases with β.

x_i^s and x_r^d represent individual's demand and supply functions, respectively. Inserting the optimum values of decision variables into the expected utility function produces an indirect expected utility function. The $n-1$ expected utility equation conditions for $n-1$ types of individuals selling different goods determine $n-1$ relative prices of n traded goods. The $n-1$ market clearing conditions determine $n-1$ relative numbers of individuals selling n traded goods

$$(9) \qquad p_i/p_s = 1, \qquad M_i/M_s = 1, \qquad \forall i,s = 1,\ldots,n$$

where M_i is the number of individuals selling good i, and M_s the number of individuals selling good s. The other market clearing condition is not independent of (9) due to Walras' law. Inserting the equilibrium relative prices into the first-order conditions for the maximization problem yields the equilibrium values for all decision variables, given by

$$(10) \qquad l_i = [n+\alpha(n^2-mn+m-n)]/m, \qquad l_j = [1+\alpha(n-1)]/m,$$
$$x_i = x_r^d = x_j = [1-\alpha(1+m-n)]/m,$$
$$n = (1-1/\alpha)+m\{1-1/\ln[\Omega(\beta,\theta,k_H,k_L)]\},$$
$$Eu = \{[1-\alpha(1+m-n)]/m\}^{m/\rho}[\Omega(\beta,\theta,k_H,k_L)]^{(n-1)/\rho}$$

where n, representing the level of division of labor, is the number of traded goods in the equilibrium. The comparative statics of this equilibrium are given by (11) and (12)

$$(11) \qquad dn/d\theta > 0, \qquad dn/dk_s > 0, \qquad dl_i/d\theta > 0, \qquad dl_i/dk_s > 0$$
$$d[M(1-1/n)x_r^d]/d\theta > 0, \qquad d[M(1-1/n)x_r^d]/dk_s > 0,$$
$$dEu/d\theta > 0, \qquad dEu/dk_s > 0, \qquad s = K,H$$

$$(12) \qquad dn/d\beta < 0, \qquad dl_i/d\beta < 0, \qquad d[M(1-1/n)x_r^d]/d\beta < 0,$$
$$dEu/d\beta < 0 \quad \text{iff} \quad (k_H/k_L)^{(\rho-1)/\rho} > \beta$$

where $M(1-1/n)x_r^d$ is the aggregate demand of good i and represents the extent of the market. Note that there will be no insurance contract if $\beta \geq (k_H/k_L)^{(\rho-1)/\rho}$. From (11) and (12) we can derive the following proposition.

Proposition 1

(1) The level of division of labor, the level of specialization, the extent of the market, productivity and percapita expected real income increase as transportation efficiency is improved or the probability for high transportation losses declines.

(2) If there is an insurance contract in the equilibrium, the level of division of labor, the level of specialization, the extent of the market, productivity and percapita expected real income will be less if the insurance contract is more unfair.

Insurance and division of labor

In the following two subsections we will discuss the interaction between insurance, risk aversion and division of labor. By applying the approach used above, we can obtain the equilibrium value of the number of traded goods when there is no insurance contract available, denoted as n_A, given by

$$(13) \qquad n_A = (1-1/\alpha) + m\{1 - 1/\{\rho \ln[\theta k_H^{1/\rho} + (1-\theta)k_L^{1/\rho}]\}\}$$

Note that $\Omega(\beta = (k_H/k_L)^{(\rho-1)/\rho}) = [\theta k_H^{1/\rho} + (1-\theta)k_L^{1/\rho}]^\rho$ and $n(\beta = (k_H/k_L)^{(\rho-1)/\rho}) = n_A$, where $n(\beta)$ is the equilibrium value of the number of traded goods when the insurance contract is β. We say that an insurance contract is *feasible* if $(k_H/k_L)^{(\rho-1)/\rho} > \beta$, and the following proposition can thus be established.

Proposition 2

An feasible insurance contract, either actuarially fair or unfair, will increase the level of division of labor, the level of specialization, the extent of the market, productivity and percapita expected real income.

Proof If the insurance contract is actuarially fair, i.e., $\beta = 1$, people will take full insurance; and the equilibrium value of the number of traded goods, denoted as n_F, is given by

$$(14) \qquad n_F = (1 - 1/\alpha) + m\{1 - 1/\ln[\theta k_H + (1-\theta)k_L]\}$$

It is straightforward to see that $n_F > n_A$. If the insurance contract is feasible but actuarially unfair, i.e., $(k_H/k_L)^{(\rho-1)/\rho} > \beta > 1$, people will choose partial insurance and the equilibrium value of the number of traded goods will be greater than n_A since $n(\beta)$ is a monotonous decreasing function of β and $n(\beta = 1) = n_F >$ $n(\beta = (k_H/k_L)^{(\rho-1)/\rho}) = n_A$. The remaining part of the proposition can then be established. *Q.E.D.*

Risk aversion and division of labor

For investigating the relationship between risk aversion and division of labor, first we establish the following lemma.

Lemma 2

Considering the uncertainty in the trading activities, an individual will be risk averse if $\rho > 1$ and his degree of risk aversion will increase with ρ.

Proof Having taken into account of Lemma 1, we can rewrite the utility function of an individual selling good i as

(15) $$u_i = (x_i \prod_{r \in R} x_r^d \prod_{j \in J} x_j)^{1/\rho} (\prod_{r \in R} k_r)^{1/\rho}$$

where $\prod_{r \in R} k_r$ can be viewed as a random variable with a binomial distribution as we have shown in (5). It is straightforward to see that u_i is a strictly concave function of $\prod_{r \in R} k_r$ if $\rho > 1$. By applying Arrow-Pratt measure of risk aversion, we can easily prove that the degree of risk aversion increased with ρ. *Q.E.D.*

Therefore, the parameter ρ can represent the degree of risk aversion. Considering there is no insurance contract available and differentiating n_A with respect to ρ, we can obtain $dn_A/d\rho < 0$; the proof for $dn_A/d\rho < 0$ is provided in Appendix 1. $dn_A/d\rho < 0$ implies that the level of division of labor will decrease with the degree of risk aversion if there is no insurance contract available. The effect of risk-aversion on the level of division of labor, if people can purchase insurance to against risks, is not clear; the level of division of labor will not be affected by the degree of risk-aversion if people can purchase full insurance. However, it is easy to see that people can accept a more unfair insurance contract if they are more risk-averse by simply noting that the upper bound of β, $(k_H/k_L)^{1-1/\rho}$, increased with ρ. We can then establish the following proposition.

Proposition 3

If the insurance is unavailable, the level of specialization and division of labor, the extent of the market and productivity will decrease with the degree of risk aversion. People can accept a more unfair insurance contract if they are more risk averse.

The determination of the equilibrium insurance contract

In this subsection we will discuss how the market sort out the insurance contract. First we assume the insurance industry is in perfect competition and there is a fixed management cost, denoted as δ, for the insurance company to pay per contract. In equilibrium, the perfect competition will force the expected profit of the insurance industry to zero, and the insurance contract will be determined by

$$\begin{aligned}(16)\qquad \delta &= (1-1/\beta)\theta\pi \\ &= \theta(1-\theta)(1-1/\beta)(k_H-\beta^{\rho/(\rho-1)}k_L)/(1-\theta+\beta^{1/(\rho-1)}\theta)\end{aligned}$$

where $\beta \in [1,(k_H/k_L)^{(\rho-1)/\rho})$. Define $f(\beta)=(k_H-\beta^{\rho/(\rho-1)}k_L)/(1-\theta+\beta^{1/(\rho-1)}\theta)$, $g(\beta)=1-1/\beta$, $h(\beta)=f(\beta)g(\beta)$ and we can rewrite (16) as

$$(17)\qquad h(\beta)=f(\beta)g(\beta)=\delta/[\theta(1-\theta)], \qquad df(\beta)/d\beta<0, \qquad dg(\beta)/d\beta>0$$

We can then establish the following proposition.

Proposition 4

There exists no insurance contract in the economy if the management cost is too high. For a given positive management cost, there exists at most one partial insurance contract in equilibrium if the insurance industry is in perfect competition. If there exist a partial insurance contract for a given positive management cost, the level of division of labor and specialization, the extent of the market, productivity and percapita real income will increase as the management cost in the insurance market decrease.

Proof To prove this proposition, it suffices to establish the following three claims.

Claim 1: No feasible insurance contract can produce non-negative expected profit if the management cost exceeds some threshold.

Claim 2: Given a positive management cost, only partial insurance contracts can produce non-negative expected profit; if there exist more than one insurance contract that satisfy the zero-profit condition, in equilibrium there exists only one insurance contract that will favor the insurance buyers most.

Claim 3: If there exists an equilibrium insurance contract for a given level of management cost, there exists an equilibrium insurance contract for any lower level of management cost; the equilibrium insurance contract with the lower level of management cost will be more fair than the contract with the higher level of management cost.

For establishing claim 1, we only have to prove that $h(\beta)$ has an upper-bound . Since $0 < f(\beta) \le k_H - k_L$ and $0 \le g(\beta) < 1 - (k_L/k_H)^{(\rho-1)/\rho}$, it is easy to see that $0 \le h(\beta) < [1-(k_L/k_H)^{(\rho-1)/\rho}](k_H - k_L)$.

The first part of claim 2 is a restatement that the expected payout equals premium in full insurance, which leaves nothing to cover the positive management cost. The reason for the second part of claim 2 is easy to see: if there are more than one contract generating the same profit level, competition will force the insurance company to choose the contract that attracts buyers most; or he will lose all the buyers to other insurance companies. We can see that such a contract must exist since the insurance contract has a lower-bound, i.e., full insurance.

To prove claim 3, first we must prove that $h(\beta)$ is a continuous function of β; that holds since $f(\beta)$ and $g(\beta)$ are both continuous function of β. Assume that the equilibrium insurance contract is $\overline{\beta}$ when the management cost is $\overline{\delta}$. Given any $\delta \in [0, \overline{\delta})$, there exists at least one contract $\beta \in [1, \overline{\beta})$ that satisfies $h(\beta) = \delta/[\theta(1-\theta)]$ since $h(\beta = 1) = 0$ and $h(\beta)$ is a continuous function of β. Since there exists some contract $\beta \in [1, \overline{\beta})$ that satisfies $h(\beta) = \delta/[\theta(1-\theta)]$, we know that any contract $\beta > \overline{\beta}$ that also satisfies $h(\beta) = \delta/[\theta(1-\theta)]$ will not be the equilibrium insurance contract due to competition. By claim 2, we know that there exists only one equilibrium insurance contract that is less than $\overline{\beta}$. *Q.E.D.*

Appendix 1: ***Proof of*** $dn_A/d\rho < 0$.

From (13) we can derive that $dn_A/d\rho < 0$ if and only if

$$\text{(A1)} \qquad [\theta k_H^{1/\rho} + (1-\theta)k_L^{1/\rho}]\ln[\theta k_H^{1/\rho} + (1-\theta)k_L^{1/\rho}] < [\theta k_H^{1/\rho} \ln k_H^{1/\rho} + (1-\theta)k_L^{1/\rho} \ln k_L^{1/\rho}$$

Let $k_L = ak_H$, $a \in (0,1)$, and (A1) is satisfied if and only if

$$\text{(A2)} \qquad [\theta + (1-\theta)a^{1/\rho}]\ln[\theta + (1-\theta)a^{1/\rho}] - (1-\theta)a^{1/\rho}\ln a^{1/\rho} < 0$$

Denoting the left-hand side of (A2) as $\Psi(\theta,\rho,a)$, we can obtain $\lim_{a\to 1}\Psi = 0$ and $\lim_{a\to 0}\Psi = \theta\ln\theta < 0$. $dn_A/d\rho > 0$ is thus established since $\Psi(\theta,\rho,a)$ is an increasing function of a and $\Psi < 0$ for $a \in (0,1)$ *.Q.E.D.*

References

(1) Arrow, K. J. (1965): *Aspects of the Theory of Risk-bearing*, Helsinki.

(2) Kreps, D. M. (1990): *A course in microeconomic theory*, Harvester Wheatsheaf.

(3) Wen, M. (1994), "An Analytical Framework with Consumer-producers, Economies of Specialization, and Transaction Costs", Working Paper, Monash University.

(4) Yang, X. and Ng, Y-K. (1993): *Specialization and Economic Organization*, Amsterdam, North-Holland.

(5) Yang, X. and Shi, H. (1992), "Specialization and Product Diversity", *American Economic Review*, 82, 392-398.

MONASH UNIVERSITY, DEPARTMENT OF ECONOMICS, SEMINAR PAPERS

10/96 Monchi Lio, Uncertainty, Insurance and the Division of Labor.
9/96 Monchi Lio, Increasing Returns, Specialization, and the Theory of the Allocation of Time.
8/96 Wenli Cheng and Xiaokai Yang, An Infra-marginal Analysis of the Ricardian Model.
7/96 Sandra Denis, Workplace Health and Safety: Some Economic Implications.
6/96 Steve Dowrick and John Quiggin, True Measures of GDP and Convergence.
5/96 Michael Bradfield, Raising Prices when Demand is Falling: Who's Kinky Now, Business or Economics?
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.