# WORKING PAPERS IN ECONOMICS

TELEVISION ADVERTISING REGULATION
AND PROGRAMME QUALITY

by

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ABSTRACT

In many countries, including Australia and the United Kingdom, there are regulations that limit the amount of advertising content per hour of television broadcasts. This paper examines the effect this regulation has on programme quality and viewer welfare. It is shown that regulation reduces programme quality and that its effect on viewer welfare is ambiguous. In some circumstances, fostering competition can both reduce the number of advertisements per unit of time and increase programme quality. This unambiguously increases viewer welfare. Therefore, depending on the parameters of the model, fostering competition may be preferable to regulating the amount of advertisements per unit of time.

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## 1. Introduction

The well known public good characteristics of over the air broadcasts of television programmes place privately owned television stations in the position of relying on advertising as there major (and often sole) source of revenue. In many countries, including Australia and the United Kingdom, there are regulations that control the amount of non-programme content per hour.[1] Australia provides a particularly interesting case for in September 1987 television advertising was deregulated to allow stations more flexibility in their scheduling of non-programme material with the aim of reducing the rate of interruption to programmes. The result of this deregulation was an increase in the amount of non-programme content. In response to this increase, the Australian Broadcasting Tribunal (ABT) introduced "guided self-regulation" in December 1990 under which television stations would voluntarily limit the amount of non-programme content per hour. Various consumer groups were unhappy with the result of this self-regulation and in March 1992 the ABT re-introduced regulations limiting the amount of non-programme content per hour.[2]

In re-introducing regulation in March 1992 the ABT said little about the affect limiting the amount of non-programme material may have on programme quality other than to mention that it believed there would be no detrimental effect on the quality of Australian produced programmes [Australian Broadrasting Tribunal (1992), p 17]. The aim of this paper is to formally investigate the link between regulations limiting the amount of non-programme content per hour and programme quality.[3] To the author's knowledge there has

[1] Non-programme content includes programme promotions as well as advertisements.

[2] These regulations limited the amount of non-programme material to 13 minutes per hour during prime time and 15 minutes per hour at other times. A history of these events as well as the decision of the ABT can be found in Australian Broadcasting Tribunal (1992). In the United Kingdom non-programme material is resticted to an average of 6 minutes per hour over the day with a maximum of 7 minutes in any hour [Locksley (1988) p 114].

[3] Programme quality is hard to quantify. In this paper a programme has higher quality than another if *ceteris paribus* it attracts more viewers. The same definition of quality has been applied elsewhere [Owen *et al* (1971) p 96]. The ABT appears to be increasingly using programme cost as a proxy for programme quality though it does recognise that cost is not necessarily equated with quality [Bureau of Transport and Communications Economics (1991) p 109].



been no previous work in this area. Noll *et al* (1973) and Owen *et al* (1974) develop informal models of television broadcasting, but are mainly concerned with programme choice not the link between advertising and programme quality.

The model is outlined in Section 2. It is assumed that there are two television stations each choosing the number of advertisements per unit of time and programme quality to maximise profit. Increases in programme quality increase the number of viewers and the price a station can charge per advertisement. Increases in the number of advertisements *per* unit of time decrease the number of viewers and decrease the price a station can charge per advertisement. The only source of revenue for the television station is assumed to be advertising revenue. Joint profit maximizing and Nash equilibrium solutions for the number of advertisements and programme quality are derived and in Section 3 it is shown that the relationships between the joint profit maximizing solutions for these variables and the Nash equilibrium solutions for these variables are ambiguous. This ambiguity results in the welfare ranking of viewers of the joint profit maximizing outcome and the Nash equilibrium also being ambiguous.

Section 4 examines the effect of regulations limiting the amount of non programme content per unit of time under joint profit maximization. It is found that such regulation reduces the marginal benefit of programme quality which in turn reduces programme quality. The effect on viewer welfare is ambiguous for although there are less advertisements, programme quality is also reduced. A similar result is obtained in Section 5 where regulation limiting the amount of non programme content in the Nash equilibrium also reduces programme quality. The results of these two sections suggest that a regulatory authority that is trying to increase welfare via regulation of the amount of non-programme content might need to also regulate programme quality or at a minimum take the effect of programme quality into consideration.

In Section 6, entry is examined as an alternative to advertising regulation, but once again the effects on programme quality are in general ambiguous as are the effects on viewer welfare. Some concluding remarks are made in Section 7.

## 2. The Model

It is initially assumed that there are two television stations in operation indexed by $i = 1,2$. Assumptions regarding each station's inverse demand curve follow. Let $a_i$ denote the number of fixed length advertisements per unit of time and $Q_i$ denote the quality of programming per unit of time. For simplicity, it is assumed that both stations are identical so it is possible to concentrate on station 1 and invoke symmetry for station 2.

The number of viewers of station 1 is given by $q_1(a_1, a_2, Q_1, Q_2)$. It is assumed that viewers' utility functions are decreasing functions of the number of advertisements, so if station 1 schedules more advertisements per unit of time, it loses viewers some of which switch to station 2.[4] If station 2 schedules more advertisements per unit of time, station 1 gains viewers from station 2. Finally if both stations schedule more advertisements, both lose viewers; viewers shift to a substitute product such as home video. These assumptions are summarised in the following set of inequalities

$$\frac{\partial q_1}{\partial a_1} < 0, \qquad \frac{\partial q_1}{\partial a_1} + \frac{\partial q_2}{\partial a_1} < 0, \qquad \frac{\partial q_1}{\partial a_2} > 0, \qquad \textit{and} \qquad \frac{\partial q_1}{\partial a_1} + \frac{\partial q_1}{\partial a_2} < 0. \tag{2.1}$$

It is assumed that viewers' utility functions are increasing functions of programme quality so, if station 1 increases programme quality, it gains viewers some of which switch from station 2. If station 2 increases programme quality, station 1 loses viewers to station 2. Finally if both stations increase programme quality, both gain viewers. That is, people who were not previously viewing television become viewers; they substitute out of, say, home video. These assumptions are summarised in the following set of inequalities

$$\frac{\partial q_1}{\partial Q_1} > 0, \qquad \frac{\partial q_1}{\partial Q_1} + \frac{\partial q_2}{\partial Q_1} > 0, \qquad \frac{\partial q_1}{\partial Q_2} < 0, \qquad \textit{and} \qquad \frac{\partial q_1}{\partial Q_1} + \frac{\partial q_1}{\partial Q_2} > 0. \tag{2.2}$$

[4] This assumption is supported by evidence that viewers watching video recorded television material use the fast forward mechanism to bypass advertisements [Australian Broadcasting Tribunal (1989)].



It is assumed that the inverse demand curve of station 1 is $p_1(q_1(a_1, a_2, Q_1, Q_2), a_1)$, where $\frac{\partial p_1}{\partial q_1} > 0$ and $\frac{\partial p_1}{\partial a_1} < 0$. That is, the more viewers a station has, the higher the price it can charge for advertisements and the more advertisements a station schedules the smaller is the impact of each and so the lower is the price it can charge for advertisements [Noll *et al* (1973) p 34]. The inverse demand curve can be collapsed to $p_1(a_1, a_2, Q_1, Q_2)$, where given the preceding assumptions,

$$\frac{\partial p_1}{\partial a_1} < 0, \quad \frac{\partial p_1}{\partial a_2} > 0, \quad \frac{\partial p_1}{\partial a_1} + \frac{\partial p_2}{\partial a_1} < 0, \tag{2.3}$$

and

$$\frac{\partial p_1}{\partial Q_1} > 0, \quad \frac{\partial p_1}{\partial Q_2} < 0, \quad \frac{\partial p_1}{\partial Q_1} + \frac{\partial p_2}{\partial Q_1} > 0. \tag{2.4}$$

It is assumed that the only source of revenue to privately owned television stations is advertising and that each station chooses $a_i$ and $Q_i$ to maximize profit.

### 2.1. Joint Profit Maximization

In this section it is assumed that the two stations act to maximize joint profit. The joint profit maxizing problem is given by

$$\max_{a_1, a_2, Q_1, Q_2} \{\Pi = a_1 \cdot p_1(\cdot) - c(Q_1) + a_2 \cdot p_2(\cdot) - c(Q_2)\}, \tag{2.5}$$

where $c(Q_i)$ is the cost of scheduling a programme of quality $Q_i$. It is assumed that higher quality programmes are more expensive for the station to purchase so that $c'(Q_i) > 0$. Assuming an interior solution, the first order conditions for a maximum are given by

$$\frac{\partial \Pi}{\partial a_1} = a_1 \cdot \frac{\partial p_1}{\partial a_1}(\cdot) + p_1(\cdot) + a_2 \cdot \frac{\partial p_2}{\partial a_1}(\cdot) = 0, \tag{2.6}$$

$$\frac{\partial \Pi}{\partial a_2} = a_2 \cdot \frac{\partial p_2}{\partial a_2}(\cdot) + p_2(\cdot) + a_1 \cdot \frac{\partial p_1}{\partial a_2}(\cdot) = 0, \tag{2.7}$$

$$\frac{\partial \Pi}{\partial Q_1} = a_1 \cdot \frac{\partial p_1}{\partial Q_1}(\cdot) - c'(Q_1) + a_2 \cdot \frac{\partial p_2}{\partial Q_1}(\cdot) = 0, \tag{2.8}$$

and

$$\frac{\partial \Pi}{\partial Q_2} = a_2 \cdot \frac{\partial p_2}{\partial Q_2}(\cdot) - c'(Q_2) + a_1 \cdot \frac{\partial p_1}{\partial Q_2}(\cdot) = 0. \tag{2.9}$$

The second order conditions for a unique maximum are assumed to be satisfied. Condition (2.6) states that $a_1$ is chosen so that its marginal revenue (inclusive of the affect $a_1$ has on station 1's and station 2's revenue) equals zero and (2.7) is a similar condition for $a_2$. Condition (2.8) states that $Q_1$ is chosen so that its marginal revenue (inclusive of the affect $Q_1$ has on station 1 and station 2's revenue) equals its marginal cost and (2.9) is a similar condition for $Q_2$. Let the values of the choice variables that satisfy these four conditions be denoted by $a^J$ and $Q^J$, where the subscripts have been dropped because of the symmetry of the problem.

### 2.2. Duopoly – Nash Equilibrium

In this section it is assumed that the market structure is duopoly. The equilibrium concept assumed is Nash equilibrium.

The profit maxizing problem of station 1 is given by

$$\max_{a_1, Q_1} \quad \{\Pi_1 = a_1 \cdot p_1(a_1, a_2, Q_1, Q_2) - c(Q_1)\}. \tag{2.10}$$

Assuming an interior solution, the first order conditions for a maximum are given by

$$\frac{\partial \Pi_1}{\partial a_1} = a_1 \cdot \frac{\partial p_1}{\partial a_1}(\cdot) + p_1(\cdot) = 0 \tag{2.11}$$

and

$$\frac{\partial \Pi_1}{\partial Q_1} = a_1 \cdot \frac{\partial p_1}{\partial Q_1}(\cdot) - c'(Q_1) = 0. \tag{2.12}$$

The second order conditions for a unique maximum are assumed to hold. Condition (2.11) states that $a_1$ is chosen so that its marginal revenue equals zero and condition (2.12) states that $Q_1$ is chosen so that its marginal revenue equals its marginal cost.

A similar set of first order conditions can be derived for station 2. These four conditions are then solved simultaneously for the Nash equilibrium values of the choice variables



which are denoted by $a^N$ and $Q^N$, where the subscripts have been dropped because of the symmetry of the problem. It is assumed that the stability conditions are satisfied.

## 3. Comparison of Joint Profit Maximization and Nash Equilibrium

In maximizing joint profit the affect of $a_1$ on station 2's profit is considered as is the affect of $a_2$ on station 1's profit. Increases in $a_1$ increase station 2's profit. This is captured by the term $a_2 \cdot \frac{\partial p_2}{\partial a_1}(\cdot)$ in (2.6). Increases in $a_2$ increase station 1's profit. This is captured by the term $a_1 \cdot \frac{\partial p_1}{\partial a_2}(\cdot)$ in (2.7). These external effects are ignored in the Nash equilibrium which suggests that $a^N < a^J$. Similar reasoning applies to programme quality. Increases in $Q_1$ decrease station 2's profit. This is captured by the term $a_2 \cdot \frac{\partial p_2}{\partial Q_1}(\cdot)$ in (2.8). Increases in $Q_2$ decrease station 1's profit. This is captured by the term $a_1 \cdot \frac{\partial p_1}{\partial Q_2}(\cdot)$ in (2.9). Once again these external effects are ignored in the Nash equilibrium which suggest that $Q^N > Q^J$.

However, both of these suggestions ignore the interaction between advertising and programme quality. From (2.8) and (2.9) it is clear that increases in advertising make increases in programe quality more profitable. From (2.6) and (2.7) it is clear that decreases in programme quality, through their affect on price, make increases in advertising less profitable. When these effects are combined with the abovementioned external effects ambiguity arises. This is summarised in the following proposition.

**Proposition 1:** *Even if all the partial derivatives in (2.6) to (2.9) are independent of $a_1, a_2, Q_1$, and $Q_2$, the relationship between $a^N$ and $a^J$ and $Q^N$ and $Q^J$ is in general ambiguous.*

**Example:** Let $P_i = v - wa_i + xa_j + yQ_i - zQ_j$;  $i \neq j$;  $i = 1, 2$;  $j = 1, 2$ and let $C_i = \frac{1}{2} \cdot Q_i^2$;  $i = 1, 2$, where $w > x$ and $y > z$.

*Case 1:* Let $v = 100, w = 1, x = \cdot 5, y = 1, z = \cdot 5$, then $a^N = 100 < a^J = 133 \cdot 33$ and $Q^N = 100 > Q^J = 66 \cdot 66$.

*Case 2:* Let the parameters be the same as in Case 1 except $z = \cdot 25$, then $a^N = 133 \cdot 33 < a^J = 228 \cdot 57$ and $Q^N = 133 \cdot 33 < Q^J = 171 \cdot 42$.

Although $a^N < a^J$ in both cases, the relationship between $Q^N$ and $Q^J$ differs in each case.[5]

As viewer utility is decreasing in the number of advertisements per unit of time but increasing in programme quality it is impossible, without knowledge of the parameters of the model, to unambiguously rank the joint profit maximizing solution and the Nash equilibrium in terms of viewer welfare.

## 4. Advertisement Regulation – Joint Profit Maximisation

As mentioned earlier, in Australia and the United Kingdom the number of advertisements scheduled per unit of time is regulated. In this section the effects of such regulation on programme quality will be analysed assuming the two television stations act to maximize joint profit. Let the regulated number of advertisements per unit of time be given by $\bar{a}$, where $\bar{a} < a^J$ and let the quality of programming associated with this regulation be given by $\bar{Q}$.

**Proposition 2:** *If $\frac{\partial p_1}{\partial Q_1}(\cdot), \frac{\partial p_2}{\partial Q_1}(\cdot), \frac{\partial p_2}{\partial Q_2}(\cdot)$, and $\frac{\partial p_1}{\partial Q_2}(\cdot)$ are independent of $a_1$ and $a_2$, then regulation of the number of advertisements per unit of time below the joint profit maximising level reduces programme quality, that is $Q < Q^J$. The effect on viewer welfare is ambiguous even though the number of advertisements is less under regulation.*

**Proof:** In section 2 it was established that $\frac{\partial p_1}{\partial Q_1} > -\frac{\partial p_2}{\partial Q_1}$. By symmetry, both $a_1$ and $a_2$ are reduced to $\bar{a}$ by regulation, so at $Q^J$, $\frac{\partial \Pi}{\partial Q_1} < 0$. A similar argument shows that $\frac{\partial \Pi}{\partial Q_2} < 0$ at $Q^J$. Therefore, $Q < Q^J$. As viewer utility is decreasing in $a$ but increasing in $Q$ the effect of advertising regulation on viewer welfare is ambiguous. **(Q.E.D.)**

[5] Given this particular parameterization it can be shown that $a^N < a^J$ for all parameters values for which the maximization problems have positive solutions.



The regulation of advertising reduces the marginal benefit of programme quality which in turn reduces programme quality below $Q^J$. A regulatory authority which is trying to increase viewer welfare via restrictions on the number of advertisements per unit of time might also need to consider regulating programme quality. However, the implementation of quality regulation would be extremely difficult as quality is a nebulous concept and is hard to quantify. Alternatively, the authority might act to increase competition between the two stations if the parameters are such that the Nash equilibrium involves less advertising and higher programme quality than joint profit maximization, for in this case viewer welfare is unambiguously increased. Even this may not be enough for the regulatory authority because the number of advertisements associated with the Nash equilibrium may be viewed as excessive. The implications of this are now examined.

## 5. Advertisement Regulation – Nash Equilibrium

Let the regulated number of advertisements per unit of time be given by $\hat{a}$, where $\hat{a} < a^N$ and let the programme quality associated with this regulation be given by $\hat{Q}$.

**Proposition 3:** *If $\frac{\partial p_1}{\partial Q_1}(\cdot)$ and $\frac{\partial p_2}{\partial Q_2}(\cdot)$ are independent of $a_1$ and $a_2$, then regulation of the number of advertisements per unit of time below the Nash equilibrium level reduces programme quality, that is $\hat{Q} < Q^N$. The effect on viewer welfare is ambiguous even though the number of advertisements is less under regulation.*

**Proof:** Regulation reduces $a^N$ to $\hat{a}$, so at $Q^N$, $\frac{\partial \Pi_1}{\partial Q_1} < 0$. A similar argument shows that $\frac{\partial \Pi_2}{\partial Q_2} < 0$ at $Q^N$. Therefore, $\hat{Q} < Q^N$. As viewer utility is decreasing in $a$ but increasing in $Q$ the effect of advertising regulation on viewer welfare is ambiguous. **(Q.E.D.)**

As was the case under joint profit maximization, regulation of advertising reduces the marginal benefit of programme quality which in turn reduces programme quality below $Q^N$. Once again, a regulatory authority which is trying to increase viewer welfare by restricting the number of advertisements per unit of time might also need to consider regulating programme quality, though as mentioned above this is likely to be extremely difficult in practice. A more fruitful approach might be to encourage competition through entry as it was established in Case 1 of the example in Section 3 that the Nash equilibrium can result in less advertisements per unit of time, higher programme quality, and higher viewer welfare than joint profit maximization.

## 6. Entry and Viewer Welfare – Nash Equilibrium

The question addressed in this section is whether increases in the number of television stations operating in the market increases viewer welfare. Before answering this question the impact of an additonal station on existing stations' inverse demand curves must be ascertained. A third station increases competition, so in the Nash equilibrium it would be expected that the price of advertising would fall. Also it would normally be expected that the responsiveness of price to changes in advertising and programme quality would increase.

With three stations the first order conditions of station 1 are similar to (2.11) and (2.12) except the bracketed term is now given by $(a_1, a_2, a_3, Q_1, Q_2, Q_3)$. The effect of the lower price and the increased responsiveness of price to advertising is, *ceteris paribus*, to decrease marginal profit with respect to advertising. This suggests that the number of advertisements per unit of time is lower when there are more stations. The effect of the increased responsiveness of price to quality is, *ceteris paribus*, to increase marginal profit with respect to quality. This suggests that programme quality is greater when there are more stations.

However, just as in Section 3, both of these suggestions ignore the interaction between advertising and programme quality. Decreases in the number of advertisements per unit of time make increases in programme quality less profitable while increases in programme quality make increases in the number of advertisements more profitable. Without writing down specific functional forms nothing can be unambiguously stated about the relationship between the number of television stations and programme quality or the relationship between the number of television stations and the number of advertisements per unit of time. As a result, the effect of more stations on viewer welfare is ambiguous.[6]



## 7. Conclusion

The effect of regulating the amount of advertisements per unit of time on viewer welfare is ambiguous because such regulation reduces programme quality regardless of whether television stations act to maximize joint profit or are in a Nash equilibrium. A better regulatory response may be to foster competition, in the case of joint profit maximization, or allow further entry in the case of a Nash equilibrium. However, these responses will not necessarily increase viewer welfare because the effect on programme quality is in general ambiguous, depending on the particular parameters of the model. Although this paper does not provide the definitive answer to the question of whether regulating the amount of advertisements per unit of time increases viewer welfare, it does provide a framework which can be used to answer this question. A framework which is at present missing in the literature.

[6] A third factor that can tilt the balance in favour of entry and more stations is the fact that additional stations increase the variety of programmes available to viewers. However, the abovementioned ambiguity is still present.

## REFERENCES


Australian Broadcasting Tribunal, "Review of Advertising Time on Television: First Information Paper," 1989.

Australian Broadcasting Tribunal, "Review of Advertising Time on Television: Decision and Reasons," IP/89/182, February 1992.

Bureau of Transport and Communications Economics, *Economic Aspects of Broadcasting Regulation*, (Canberra: Australian Government Publishing Service, 1991).

Locksley, G., *TV Broadcasting in Europe and The New Technologies*, Commission of the European Communities, 1988

Noll, R.G., Peck, M.J., and J.J. McGowan, *Economic Aspects of Television Regulation*, (Washington D.C.: The Brookings Institution, 1973).

Owen, B.M., Beebe, J.H., and W.G. Manning, *Television Economics*, (Lexington, Mass.: Lexington Books, 1974).




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| 30 | W.P.Hogan | Australian Economic Papers, *18*(33),December 1979 |
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| 41 | U.R.Kohli | Canadian Journal of Economics, *15*(2),May 1982 |
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| 45 | W.J.Merrilees | Canadian Journal of Economics, *15*(3),August 1982 |
| 46 | W.J.Merrilees | Journal of Industrial Economics, *31*,March 1983 |
| 49 | U.R.Kohli | Review of Economic Studies, *50*(160),January 1983 |
| 50 | P.Saunders | Economic Record, *57*(159), December 1981 |

| | | |
|---|---|---|
| 53 | J.Yates | AFSI, Commissioned Studies and Selected Papers, AGPS, IV 1982 |
| 54 | J.Yates | Economic Record, 58(161), June 1982 |
| 55 | G.Mills | Seventh Australian Transport Research Forum-Papers, Hobart, 1982 |
| 56 | V.B.Hall & P.Saunders | Economic Record, 60(168), March 1984 |
| 57 | P.Saunders | Economic Record, 59(166), September 1983 |
| 58 | F.Gill | Economie Appliquee, 37(3-4), 1984 |
| 59 | G.Mills & W.Coleman | Journal of Transport Economics and Policy, 16(3), September 1982 |
| 60 | J.Yates | Economic Papers, Special Edition, April 1983 |
| 61 | S.S.Joson | Australian Economic Papers, 24(44),June 1985 |
| 62 | R.T.Ross | Australian Quarterly, 56(3), Spring 1984 |
| 63 | W.J.Merrilees | Economic Record, 59(166), September 1983 |
| 65 | A.J.Phipps | Australian Economic Papers,22(41),December 1983 |
| 67 | V.B.Hall | Economics Letters, 12, 1983 |
| 69 | V.B.Hall | Energy Economics, 8(2), April 1986 |
| 70 | F.Gill | Australian Quarterly, 59(2), Winter 1987 |
| 71 | W.J.Merrilees | Australian Economic Papers,23(43),December 1984 |
| 73 | C.G.F.Simkin | Singapore Economic Review,29(1),April 1984 |
| 74 | J.Yates | Australian Quarterly, 56(2), Winter 1984 |
| 77 | V.B.Hall | Economics Letters, 20, 1986 |
| 78 | S.S.Joson | Journal of Policy Modeling, 8(2), Summer 1986 |
| 79 | R.T.Ross | Economic Record, 62(178), September 1986 |
| 81 | R.T.Ross | Australian Bulletin of Labour, 11(4), Sept.1985 |
| 82 | P.D.Groenewegen | History of Political Economy, 20(4),Winter 1988<br>Scottish Journal of Political Economy,37(1)1990 |
| 84 | E.M.A.Gross, W.P.Hogan & I.G.Sharpe | Australian Economic Papers, 27(50), June 1988 |
| 85 | F.Gill | Australian Bulletin of Labour, 16(4),Dec.1990 |
| 94 | W.P.Hogan | Company and Securities Law Journal, 6(1), February 1988 |
| 95 | J.Yates | Urban Studies, 26, 419-433, 1989 |
| 96 | B.W.Ross | The Economic and Social Review, 20(3),April 1989 |
| 97 | F.Gill | Australia's Greatest Asset: Human Resources in the Nineteenth and Twentieth Centuries, D.Pope(ed.), Federation Press, 1988 |
| 99 | R.T.Ross | Australian Bulletin of Labour, 15(1), December 1988 |
| 100 | L.Haddad | Hetsa Bulletin, (11), Winter 1989 |
| 101 | J.Piggott | Public Sector Economics - A Reader, P.Hare(ed.), Basil Blackwell, 1988 |
| 102 | J.Carlson & D.Findlay | Journal of Macroeconomics, 13(1), Winter 1991 |
| 102 | J.Carlson & D.Findlay | Journal of Economics and Business, 44(1), Feb.1992 |



| | | |
|---|---|---|
| 104 | P.D.Groenewegen | Decentralization, Local Government and Markets: Towards a Post-Welfare Agenda, R.J. Bennet (ed.) Oxford University Press, 6, 87-115, 1990 |
| 107 | B.W.Ross | Prometheus, 6(2), December 1988 |
| 108 | S.S.Joson | Rivista Di Diritto Valutario e Di Economia Internazionale, 35(2), June 1988 |
| 112 | P.Groenewegen | NeoClassical Economic Theory 1870 to 1930 K.Hennings & W.Samuels (eds.), 13-51, 1990 |
| 113 | V.B.Hall, T.P.Truong & V.A.Nguyen | Energy Economics, 12(4) October 1990 |
| 114 | V.B.Hall, T.P.Truong & V.A.Nguyen | Australian Economic Review, (87) 3'89 |
| 115 | F.Gill | Australian Journal of Social Issues, 25(2), May 1990 |
| 116 | G.Kingston | Economics Letters, 15 (1989) |
| 117 | V.B.Hall & D.R.Mills | Pacific and Asian Journal of Energy, 2(2), December 1988 |
| 118 | W.P.Hogan | Abacus, 25(2), September 1989. |
| 120 | P.Groenewegen | Flattening the Tax Rate Scale: Alternative Scenarios & Methodologies, (eds.) J.G. Head and R. Krever, 1, 3-31, 1990 |
| 122 | W.P.Hogan & I.G. Sharpe | Economic Analysis and Policy, 19(1), March 1989 |
| 123 | G.Mills | Journal of Transport Economics and Policy, 23, May 1989 |
| 126 | F.Gill | The Australian Quarterly, 61(4), 1989 |
| 128 | S.Lahiri & J.Sheen | The Economic Journal, 100(400), 1990 |
| 130 | J.Sheen | Journal of Economic Dynamics and Control, 16,1992 |
| 143 | C.J.Karfakis | Applied Economics, 23, 1991 |
| 144 | C.J.Karfakis & D.Moschos | Journal of Money, Credit, and Banking, 22,(3),1990 |
| 158 | W.P.Hogan | Economic Papers, 10,(1), March 1991 |
| 160 | C.J.Karfakis | Applied Financial Economics, 1,(3), Sept.1991 |