

# Price concentration analysis in merger cases with differentiated products

By:

Walter Beckert\*

(Birkbeck College, IFS, and Competition Commission, UK)

And

Nicola Mazzarotto\*

(Competition Commission, UK)

\*The views expressed in this paper are the authors' own and do not necessarily reflect those of the Competition Commission or of any of its members.

# Plan of the talk:

1. Price-concentration studies: context and motivation
2. The Econometric model
3. An illustration: Cinemas in the UK
4. Policy implications

# 1. Price-concentration studies: context and motivation

- Generally useful (and used) for market definition and competitive assessment;

But:

- Are they useful in differentiated products industries?
- How best to choose between competing models?
- How to deal with the simultaneity bias?

## 2. General Econometric Model – Economic model

Circular city - Salop (1979)

Standard assumptions with:

$\mu(\mathbf{z})$ : mass of consumers, or market size, as function of covariates  $\mathbf{z}$ .

$f(p, tx, \mathbf{w})$ : consumer's generalized cost as function of price  $p$  (price), "travel costs"  $t$  with respect to distance  $x$ , and other cost-relevant factors  $\mathbf{w}$ .

## 2. General Econometric Model – Observable and Unobservable Covariates

Partition  $\mathbf{w}=(\mathbf{v}, ?)$ ,  $\mathbf{z}=(\mathbf{u}, ?)$ , where  $\mathbf{v}$ ,  $\mathbf{u}$  are observed, and  $?$ ,  $?$  are unobserved.

Assume unobserved covariates uncorrelated to observed covariates and cost parameters.

This yields econometric model involving two simultaneous structural equations:

Pricing:  $p^* = p(c, t, n, \mathbf{v}, ?)$

Number of firms:  $n^* = n(p, c, f, \mathbf{u}, ?)$ ,

?  $n(p)$  is endogenous in  $p$  (?).

? Elements of  $\mathbf{u}$  ( $\mathbf{v}$ ) that are not part of  $\mathbf{v}$  ( $\mathbf{u}$ ) can act as instruments for  $n(p)$  in  $p$  (?).

Estimation: (Non-) Linear IV/2SLS.

### 3. An illustration: Cinemas in the UK

Data:

Unit of observation: multiplex cinema (outside London);  
adult admission prices, number of multiplexes/fascias in  
10-min/20-min isochrones around cinemas, local  
deprivation and population

Linear specification of price equation  $p$ :

$$\ln(p) = a + \beta n + ?$$

Deprivation index and population affect market size, but not  
consumers' cost; i.e. they are elements of  $\mathbf{u}$ , but not of  $\mathbf{v}$   
and, hence, can act as instruments for  $n$ .

# Estimation Results: Number of multiplexes in 10min isochrones

OLS, ignoring endogeneity

Variable	Coeff.	SE	t-stat	Prob
<i>Const.</i>	$a=1.758$	0.010	171.79	0.00
<i>n</i>	$\beta=-0.032$	0.011	-2.93	0.0039

2SLS, using deprivation and population as instruments

Variable	Coeff.	SE	t-stat	Prob
<i>Const.</i>	$a=1.802$	0.017	105.41	0.00
<i>n</i>	$\beta=-0.111$	0.025	-4.43	0.00

# Estimation Results: Number of multiplexes in 20min isochrones

OLS, ignoring endogeneity

Variable	Coeff.	SE	t-stat	Prob
<i>Const.</i>	$a=1.762$	0.011	153.64	0.00
<i>n</i>	$\beta=-0.009$	0.003	-2.81	0.01

2SLS, using deprivation and population as instruments

Variable	Coeff.	SE	t-stat	Prob
<i>Const.</i>	$a=1.824$	0.021	85.59	0.00
<i>n</i>	$\beta=-0.033$	0.007	-4.47	0.00



### 3. Outcome Analysis:

#### Methodological:

Proper economic model for data generating process is critical.

Ignoring endogeneity of number of firms biases estimation results (by approx. factor of 3).

#### Empirical:

10-minute drive time around a multiplex appears to be relevant antitrust market.

Dual analysis, consistent with model, confirms qualitative estimation results.

### 3. Alternative Model Specification

Pricing based on local deprivation.

Econometric model specification:

$$\ln(p) = a + \beta n + \gamma di + \epsilon$$

Note:

- (i) Model is not nested in generalized cost minimization paradigm for consumer choices.
- (ii) Model is tacit about potential endogeneity of  $n$ .
- (iii) Population is only (possible) instrument for  $n$ .

# Estimation Results: Number of multiplexes in 10min isochrones

OLS, ignoring (potential) endogeneity

Variable	Coeff.	SE	t-stat	Prob
Const.	$a=1.876$	0.019	98.02	0.00
n	$\beta=-0.001$	0.0104	-0.09	0.93
di	$\gamma=-0.006$	0.001	-7.064	0.00

IV, using population as instrument

Variable	Coeff.	SE	t-stat	Prob
Const.	$a=1.882$	0.021	90.95	0.00
n	$\beta=0.061$	0.0318	0.51	0.61
di	$\gamma=-0.006$	0.001	-4.94	0.00

## 4. Policy implications

- Price-concentration analysis useful in an important class of industries;
- Simultaneity can be a serious issue that needs addressing in the empirical analysis
- Choices regarding specification (including the choice of instrumental variables) should be founded on the structural model and linked to all available evidence;