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***Disadvantageous  
semicollusion:  
Large customer  
competition***

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# Semicollusion

- When you cooperate on some dimensions (price/quantity), compete along others (capacity/R&D – or as here secret large customer contracts) one usually assumes that this latter competition is good for welfare.
- This is not always the case, this kind of competition with cooperation on one variable, competition on another can actually be worse to society and firms than pure monopoly



# Large customer competition

- In several markets large corporate customers take advantage of their buyer power to make particular agreements with sellers on behalf of their employees
- This results in price discrimination towards those with agreements and those without
- Sellers are often willing to accept quite high rebates since contracts most often are secret
- In certain cases the result is pricing patterns that even can be detrimental to welfare since the prices facing the different customer groups are non optimal
  - In Sweden harsh large customer competition in the late 90ies in the gasoline market led to a coordinated need for rebate adjustments and cartellized behaviour
  - In Norway, the large customer competition led to prices above monopoly prices for those travelling without agreements, marginal cost prices for corporate customers



# A cartel teaser on Sweden – Rebate collusion in gasoline 1999

- Swedish gasoline retailers have to a large extent offered rebate cards to attract large customers (post, police, taxi etc.)
- The rebate is organized as a fixed (SEK) reduction in the standard station price.
- Apparently the gasoline companies are able to maintain a high standard station price (coordination on public price), but compete fiercely in (secret) rebates.
- The rebates have escalated over time, until all profits are given away
- The retailers need a rebate reduction after a certain amount of time. Apparently this happened in 1995 and 1999.
  
- BUT: If you choose to reduce your rebates alone, the others will be tempted to keep or only partly reducing their rebates to steal market shares from you.
  
- RESULT: A need for coordination – cartel!



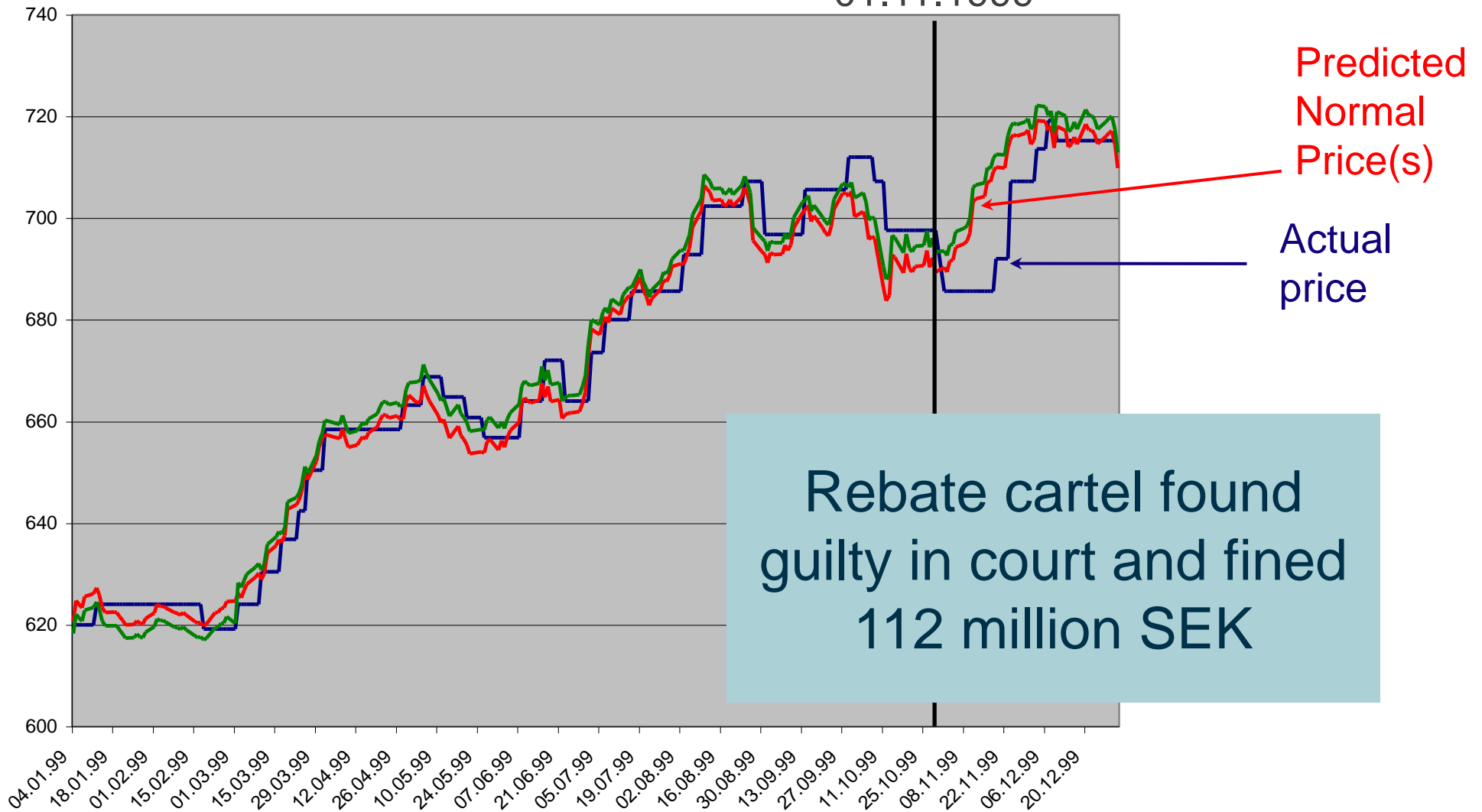
# What happened in Sweden?

- The companies had secret meetings where they coordinated a joint rebate reduction.
- The Swedish competition authorities was able to prove that these meetings had taken place.
- The rebates are pretty complicated with different cancellation periods and content. Hard to cancel without coordination
- November 1. 1999 all companies reduced all rebates by 0.15 SEK. At the same time the standard station prices on all Swedish stations were reduced with 0.15 SEK.
- The companies claim: The rebate customers should not loose, the other customers should gain
- BUT: Was this the whole truth?

# And did the plan work out?



Rebate reduction  
01.11.1999



# Back to airlines: The talk builds on the paper:

*«Disadvantageous semicollusion: Price competition in the Norwegian airline industry», Frode Steen and Lars Sørgaard*

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- Tailor make a model to the Norwegian airline market incorporating the large customer competition: Form theoretical conjectures
- Formulate econometric price models and utilize detailed route specific data to test the model predictions on Norwegian airline data
- Establish that the large customer competition indeed led to ‘screwed up’ prices and after large revenue losses for the firms; to merger.



# The Norwegian airline industry

Monopolized market,  
Routes shared  
between **Brathens**(BU)  
and **SAS**

Fully deregulated but still  
duopoly:  
BU and SAS

After harsh  
capacity competition  
Color air  
bankrupt

BU and SAS merge:  
Monopoly, BU failing firm  
large customer competition  
terminated



Partly deregulated:  
Norwegian airlines  
allowed to compete.  
Duopoly: BU and SAS

New far bigger  
main airport (OSL)  
opens, new small  
entrant: **Color air**

New entrant: **Norwegian**,  
prices reduced and  
competitive market



BU and SAS start competing on large customers but kept gross business prices high





# Disadvantageous semicollusion: Large customer competition in the Norwegian airline industry

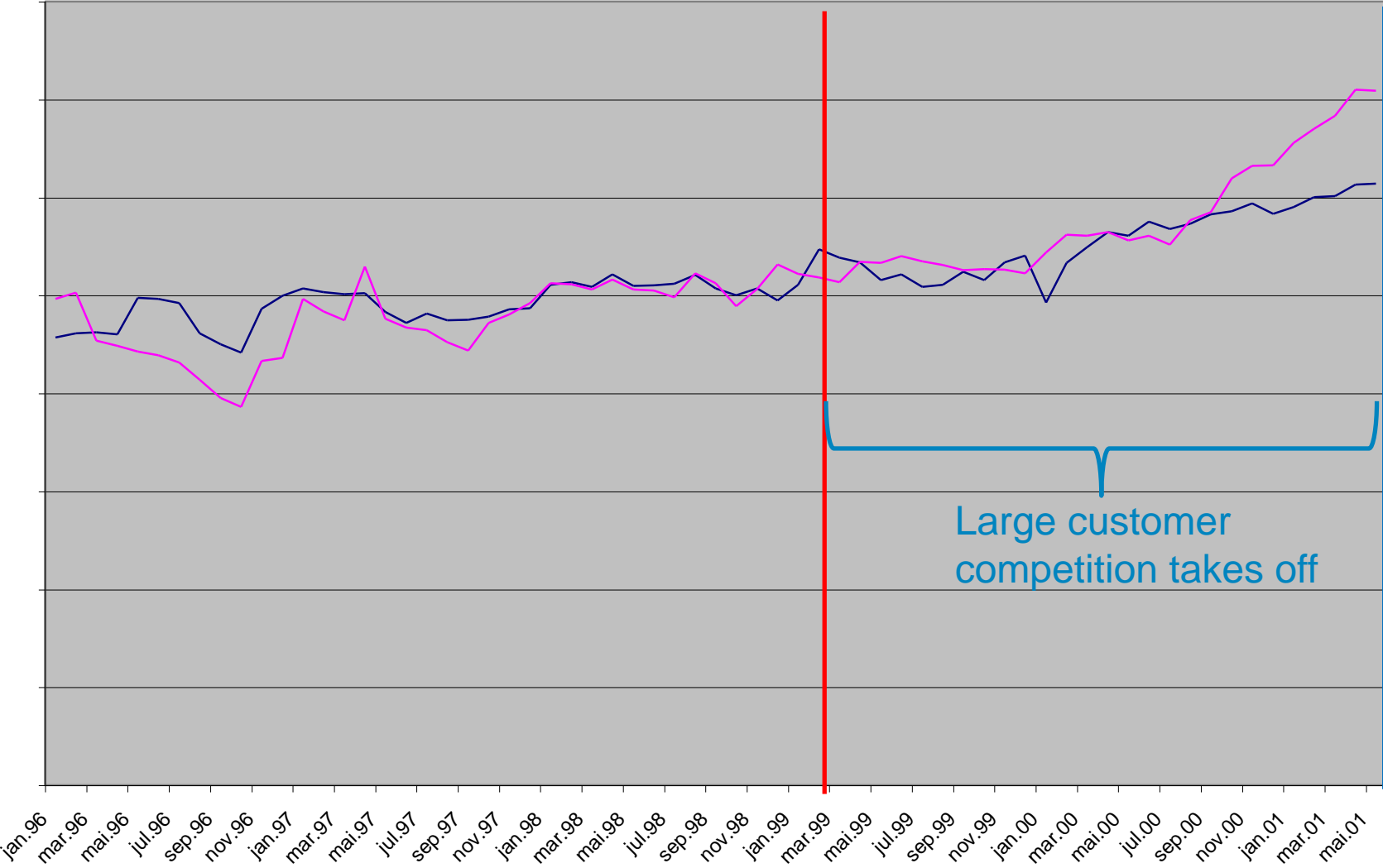
- New main airport increased the number of available slots substantially – SAS and Braathens increased capacity and obtained parallel domestic networks.
- This made it possible for both of them to offer attractive contracts to large corporate customers, customers that had employees travelling on several of the domestic routes.
- Both airlines offered discounts to large customers, and the discount was deducted from the gross price that all (business) passengers had to pay.
- Features in this industry promoted collusion on gross prices,
  - Meet competition clauses, transparent prices
  - AND the two airlines were allowed to consult each other when they set future gross prices.
- We therefore simultaneously observed legal collusion on gross prices, and harsh competition for large corporate customers.

# Business fares on a duopoly route prior to merger: 1996 to 2001

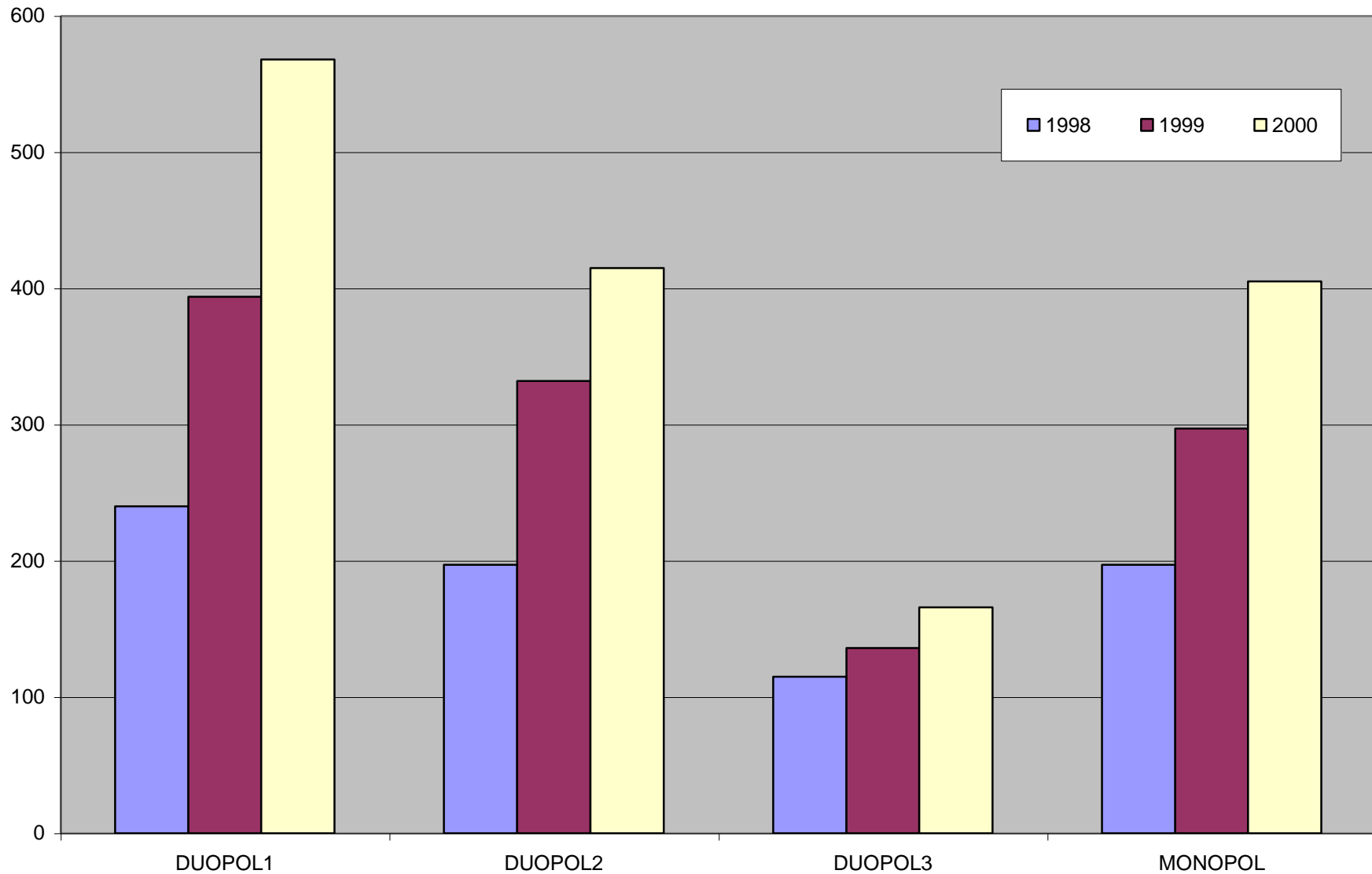


New airport  
Gardermoen opens

Merger plans  
launched



# Development in large customer contracts on four routes





# Theory (I)

- Tailor-make a model that captures the main elements concerning the competitive situation in the Norwegian airline industry in that period.
  - Firms collude on gross prices.
  - Firms compete on large corporate customers,
  - The large customer discount is subtracted from the gross price, will therefore affect prices.
- Show that an increase in the number of large corporate customer-contracts travellers and an increase in the discount in these contracts will have an upward pricing pressure on the gross price.



## Theory (II)

- Firms do their best in compensating for the corporate discounts by increasing the gross price and thereby increase the net prices paid by the discounted customers.
- The size of the discount will depend on the quality differences between the two airlines.
- **The unintended effect:**  
The remaining non-discounted consumers have to pay the higher gross price that now *is even higher than the monopoly price* (follows also from the model).



## Empirical analysis

- The predictions are tested applying a very detailed data set on large customer prices and quantities from SAS for five Norwegian city-pair routes for the period 1998-2001.
- We estimate price models for leisure and business customer segments across routes and time and control for cost and demand factors as well as route specific heterogeneity.
- Quality is measured as relative flight frequency for the two companies across the different routes



# The routes and some descriptives

**Table 2** The analyzed routes: Average daily departures and passengers

City-pair	n	Departures SAS	Departures Braathens	Passengers SAS	Business (C-class) Passengers	Large Customer Share in C-class
Oslo-Bergen (OSLBGO)	24	27.5	21.0	2245	1140	0.54
Oslo-Stavanger (OSLSVG)	41	19.4	23.4	1262	634	0.59
Oslo-Trondheim (OSLTRD)	41	21.8	26.0	1641	784	0.59
Oslo-Bodø (OSLBOO)	41	10.9	6.0	830	251	0.43
Oslo-Kristiansand (OSLKRS)	30	7.1	14.7	337	136	0.50
All routes	177	17.0	18.2	1226	564	0.53

NOTE: monthly data for the period 1998:01-2001:05, except for OSLBGO (1998:01-1999:12) and OSLKRS (1998:12-2001:05). The daily averages are computed as the monthly averages divided by 30.

## Two observations:

1. Variation across routes: Large routes, small routes, business routes, leisure routes...
2. Roughly 50% are business customers, and of those, 50%+ are large corporate customers



# Development in passengers over time

**Table 3** Changes in PAX from the 'early' period to the 'late' period across city-pairs.

	OSLGBO	OSLSTV	OSLTRD	OSLBOO	OSLKRS	All five routes
Increase in total monthly PAX SAS	-14.9 %	4.8 %	38.0 %	-7.7 %	7.6 %	3.2 %
Increase in total monthly PAX SAS' large customers	4.3 %	1.8 %	46.8 %	-3.7 %	35.1 %	14.9 %
Increase in Large-customers share in C-class	26.0 %	4.2 %	13.6 %	17.9 %	14.6 %	16.9 %

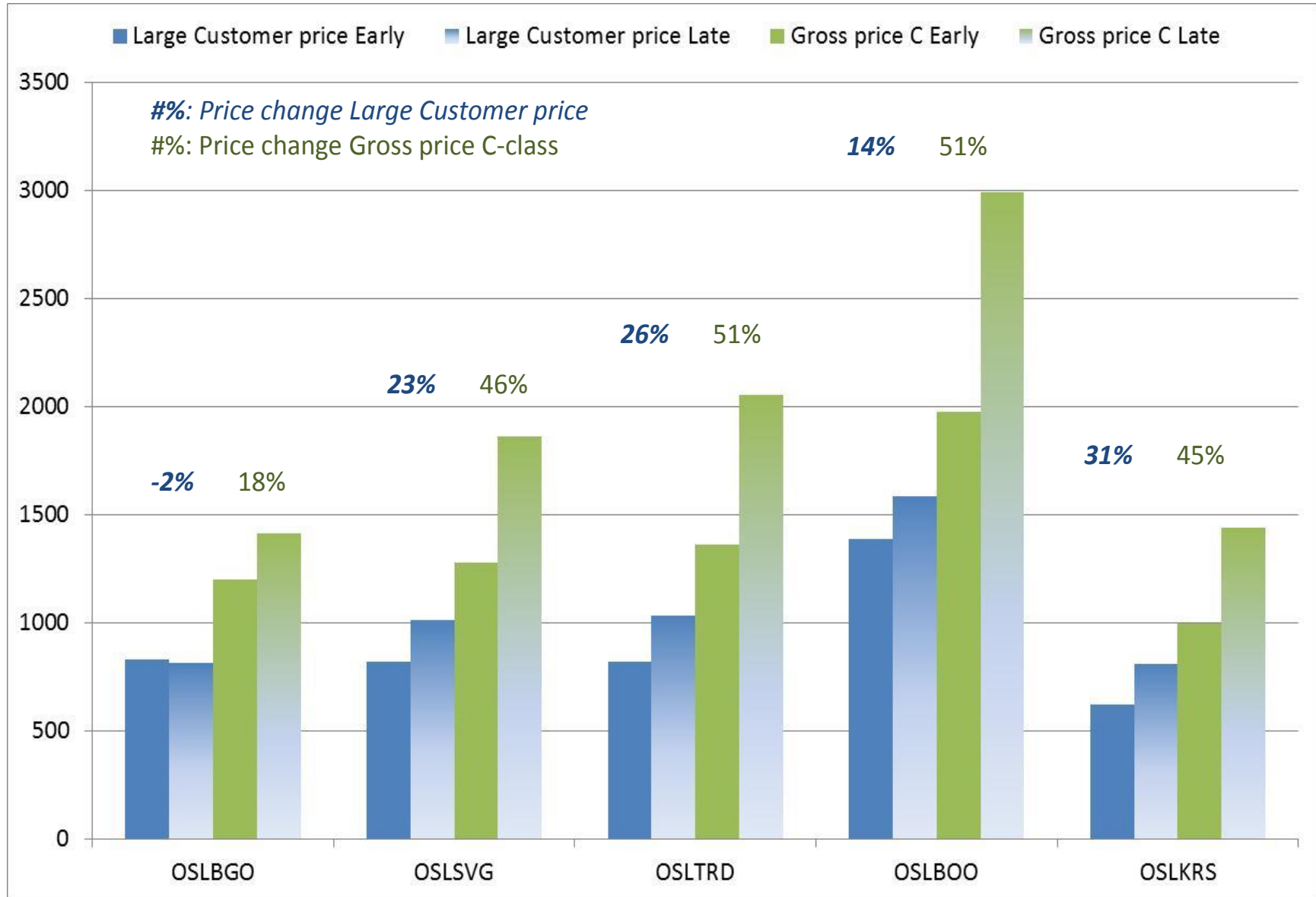
- **Large increase in:**

- The number of large corporate customers
- The number of large corporate customers travelling in business (C)-class





# Development in prices over time





# An econometric price model

- We construct a generic price model for the development of both leisure (M) prices and business prices (C):

AR(1) Process

**Cost shifters:**  
Wage costs (WAGE)  
Taxes/Fees (TAX)

**Demand shifters:**  
Public tax income to the route region (INCTAX)  
Public expenditures in the route regions (EXP)

General price increase

$$P_{i,t}^j = \gamma P_{i,t-1}^j + \beta_1 WAGE_{i,t} + \beta_2 TAX_{i,t} + \beta_3 EXP_{i,t} + \beta_4 INCTAX_{i,t} + \beta_5 CPI_t$$

$$+ \beta_6 GAR_t + \beta_7 COL_{i,t} + \sum_{s=2}^{12} \lambda_s M_t^s + \sum_{i=1}^4 \phi_i CityPair_i + cons + \varepsilon_{i,t}^j$$

**Controls:**  
Opening of new main airport Gardermoen (GAR)  
Low cost competition from Color Air on some routes (COL)  
Seasonal effects – Monthly dummies (M)  
Unobserved heterogeneity in each city-pair (CityPair)



# An econometric price model – including also the large corporate customer effects

$$\begin{aligned}
 P_{i,t}^j = & \gamma P_{i,t-1}^j + \beta_1 WAGE_{i,t} + \beta_2 TAX_{i,t} + \beta_3 EXP_{i,t} + \beta_4 INCTAX_{i,t} + \beta_5 CPI_t \\
 & + \beta_6 GAR_t + \beta_6 COL_{i,t} + cons + \sum_{s=2}^{12} \lambda_s M_t^s + \sum_{i=1}^4 \phi_i CityPair_i \\
 & + \underbrace{\theta_{RFL} RFL_{i,t} + \theta_S S_{i,t} + \theta_R R_{i,t}}_{\text{large customer, and quality variables:}} + \underbrace{\theta_{SxRFL} S_{i,t} \cdot RFL_{i,t} + \theta_{RxRFL} R_{i,t} \cdot RFL_{i,t}}_{\text{Interactions between quality and large customer variables:}} + \varepsilon_{i,t}^j
 \end{aligned}$$

- RFL = relative number of flights = Departures SAS/Departures BU
- S = large customer share
- R = large customer rebate

Note that the large customer effects consist of direct and indirect effects, ie., an increase in R:

$$\partial p_{i,t}^j / \partial R = \theta_R + \theta_{RxRFL} RFL$$



## Results (i)

**Table 5** Short- and long-run elasticities C-class

	<i>S</i>	<i>R</i>	<i>RFL</i>
Short Run	0.102** (0.026)	0.364** (0.013)	0.041** (0.020)
Long Run	0.115** (0.029)	0.412** (0.016)	0.047** (0.022)
<i>N</i>	172	172	172

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$

- *Both an increase in the share of large customers (S) and the rebate they are given (R) increase prices in C- and M-class.*
- An increase in RFL – that is SAS increases their number of flights relative to their competitor BU, increases prices in the business segment.
  - The effect is significant but relatively modest though, suggesting that an increase in the index with 10% only allows SAS to increase C-price by 0.4-0.5%.



## Results (ii)

**Table 6** Short- and long-run elasticities M-class

	<i>S</i>	<i>R</i>	<i>RFL</i>
Short Run	0.069 <sup>**</sup> (0.019)	0.051 <sup>**</sup> (0.023)	0.053 (0.037)
Long Run	0.115 <sup>**</sup> (0.039)	0.086 <sup>**</sup> (0.038)	0.089 (0.064)
<i>N</i>	172	172	172

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$

- Some effect also in leisure gross prices since some contracts included rebates also here
- The effect is much more pronounced in the business class though.
  - *An increase in the rebate has a much larger effect in the C-segment where a 10% increase in the rebate increase C-price by more than 4%, M-price only by 0.86%*
- Quality measured as flight frequency has no significant effect in the leisure segment



# Welfare?

- Compared to a situation of pure price fixing (price fixing on all prices), the semicollusive outcome is detrimental to welfare.
- It leads to distortions in the price setting, and in particular to prices above monopoly prices for the non-contracted customers.
- Although this is true, it seems misguided to design the competition rules such that full collusion is attainable.
  - In this particular case it is likely that it would be more welfare enhancing to restrict the devices that allows price fixing. This is expected to lead to tougher price competition for all consumers, including those without any corporate contract.



## Lesson to learn

- Semicollusion seems to be present in many industries.
- One explanation could be that firms in varying degree can change choice variables. For choice variables that requires more time to change, collusions are harder to maintain.
- In this particular case the gross price can be changed very quickly while contracts with large corporate customer last for several years
- *It is a classical example of prisoners dilemma – the firms end up in a situation that is worse both for themselves and for their customers*



## An after thought...

- We do not know too much about how large customer contracts and how implied price discrimination affect welfare



# How to protect and *launch* competition in the future?

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Those who continue to fly will see...



## The theory model in short

- The firms maximize profits from two customer groups, facing demand  $C(\cdot)$ , and marginal costs  $MC$ , those with large customer rebates ( $S$ ) and those without ( $1-S$ ). The Large customers receives a rebate ( $R$ ) on the gross price ( $P$ ). The non-rebated customers have to pay the gross price.

$$\pi = (P - R - MC) \cdot C(P, R) \cdot S + (P - MC) \cdot C(P) \cdot [1 - S]$$

The first order condition:

$$\frac{P - MC}{P} = \frac{1}{|\varepsilon|} + \frac{S \cdot R}{P}$$

- As marginal cost is fixed, the price-cost margin is increasing in both  $S$  and  $R$ .
- Both higher  $R$  and  $S$  lead to an increased need for correcting the net price to those with discounts. This can be done by raising the gross price.