

# THE ANALYSIS: EVALUATING THE POTENTIAL PRICE RISE IN PARTIAL ACQUISITIONS OF OWNERSHIP AND CONTROL

## Appendix – derivations

Helder Vasconcelos

The basic GUPPI for FlyMe after a full merger of FlyMe and EasyAir: multiply the DR from FlyMe to EasyAir (50%) with the per-ticket profit of EasyAir (£50) and divide by the ticket price of FlyMe (£200). The result is 12.5%.

The basic GUPPI for EasyAir multiplies the DR from EasyAir to FlyMe (40%) with the profit margin of FlyMe (£100) and divides by the price of EasyAir (£200). The result is 20%.

If FlyMe acquires 50% of the shares of EasyAir and gets 60% of control, then the weight that EasyAir assigns to FlyMe's profit is 1.2, which is greater than the weight 1 that EasyAir puts on its own profit. This is because FlyMe's owner has more control relative to ownership in EasyAir than EasyAir's other owner. The GUPPI of EasyAir after the partial acquisition is  $(1.2 - 0) \cdot 100 \cdot 40\%/200 = 24\%$  (the general formula for this calculation is provided below). The weight that FlyMe puts on EasyAir's profits after the partial acquisition is 0.5, and the GUPPI for FlyMe is therefore  $(0.5 - 0) \cdot 50 \cdot 50\%/200 = 6.25\%$ .

Suppose the owner of FlyMe divests its ownership in EasyAir from 50% to 25% and its control from 60% to 10%. Then in the GUPPI of FlyMe, the weight on the profit of EasyAir before divestment is 0.5. This is the weight after the partial acquisition calculated above. After divestment, the weight on the profit of EasyAir is 0.25.

Control does not matter for the weight the acquiring or divesting firm puts on the profit of the target. If the prices, marginal costs and diversion ratios in the tables in the main text are those before the divestment, then the GUPPI of FlyMe is  $(0.25 - 0.5) \cdot 50 \cdot 50\%/200 = -3.125\%$ . The negative GUPPI indicates downward price pressure, which is unsurprising after a divestment.

The weight that EasyAir puts on the profit of FlyMe before divestment is 1.2, as found above for the partial acquisition. The weight after divestment is  $\frac{1}{7} \approx 0.14$ . The GUPPI of EasyAir is  $(0.14 - 1.2) \cdot 100 \cdot 40\%/200 = -21.2\%$ , again assuming that the prices, costs and diversion ratios are those before the divestment.

Positive GUPPI after divestment is possible. Suppose the owner of FlyMe initially has full ownership and control of EasyAir, then divests to 50% of ownership and 60% of control. For this partial divestment, the GUPPI of EasyAir is  $(1.2 - 1) \cdot 100 \cdot 40\%/200 = 4\%$ , positive.

The GUPPI formula for partial acquisitions accounts for the basic GUPPI for full mergers (explained above), as well as the:

**Ownership weights.**  $\phi_{kg}^u$  denotes the share of the profit of firm g, which owner k ultimately obtains through the network of cross- and common ownerships.

**Control weights.**  $\gamma_{kj}^u$  denotes the extent to which owner k ultimately influences the decisions of firm j through the network of cross- and common ownerships.

The GUPPI formula to calculate the motive of firm  $j$  to change price after the network of ownerships changes is

$$GUPPI_j = \sum_{g \neq j} (\tilde{w}_{jg} - w_{jg}) \cdot \frac{(P_g - MC_g) \cdot DR_{jg}}{P_j}$$

The intuition for the GUPPI is that if firm  $j$  raises price, then some customers who leave start buying from competing firms. The fraction of leavers who go to each competitor  $g$  is  $DR_{jg}$ . The profit increase of competitor  $g$  is  $P_g - MC_g$  per customer. The share that firm  $j$  gets of this profit increase is  $\tilde{w}_{jg}$  after the acquisition and  $w_{jg}$  before. The change in the motive of firm  $j$  to raise price is the sum of those additional profits sent to all competitors  $g$  which accrue back to the owners who ultimately control  $j$ . The change may be negative – a decrease in price – for example, after a divestment.

The share  $\tilde{w}_{jg}$  that firm  $j$  gets of the profit increase of firm  $g$  is calculated in the following steps:

1. The weight that the profits of firm  $g$  carry in the decisions of firm  $j$  through a common owner  $k$  is  $\gamma_{kj}^u \cdot \phi_{kg}^u$ . The terms multiplied are the ability and the incentive to influence firm  $j$  to the benefit of firm  $g$ . The ability of owner  $k$  to influence firm  $j$  to increase the profit of another firm equals  $k$ 's ultimate control over  $j$ . The incentive to influence a firm to increase the profit of  $g$  is proportional to the owner's ultimate share in these profits.
2. The total weight that firm  $j$  puts on the profits of firm  $g$  is the sum of the weights coming through all the owners:  $\sum \gamma_{kj}^u \cdot \phi_{kg}^u$ .
3. Dividing this by the weight  $\sum \gamma_{kj}^u \cdot \phi_{kj}^u$  that firm  $j$  assigns to its own profit (through the ownership network) makes the weights before and after the acquisition comparable.
4. The weight that firm  $j$  puts on the profits of  $g$  relative to its own profits is  $w_{jg} = \frac{\sum \gamma_{kj}^u \cdot \phi_{kg}^u}{\sum \gamma_{kj}^u \cdot \phi_{kj}^u}$  before the acquisition and  $\tilde{w}_{jg} = \frac{\sum \tilde{\gamma}_{kj}^u \cdot \tilde{\phi}_{kg}^u}{\sum \tilde{\gamma}_{kj}^u \cdot \tilde{\phi}_{kj}^u}$  after. The tilde on top denotes the ownership and control weights after the acquisition. The acquisition changes the network of partial ownerships.
5. The incentive for firm  $j$  to change price in response to a change in the network of ownerships sums the incentives coming through all other firms  $g \neq j$ . Each of these incentives is the basic GUPPI multiplied by the change  $\tilde{w}_{jg} - w_{jg}$  in the weight that firm  $j$  puts on the profit of  $g$  relative to its own profit. The weight change  $\tilde{w}_{jg} - w_{jg}$  is caused by an acquisition or divestment, both of which may be partial or full.

The GUPPI for a partial acquisition or divestment of a revenue share is

$$GUPPI_{j,Rev} = \sum_{g \neq j} (\tilde{w}_{jg} - w_{jg}) \cdot \frac{P_g \cdot DR_{jg}}{P_j}$$