Digital pricing and algorithms

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Dr. Mike Walker
Chief Economic Adviser
Competition and Markets Authority

Outline

- **Background**

- **Facilitating existing offences**

- **Tacit collusion**

- **Personalised pricing**

- **Tentative conclusions**

Background

- **Nothing new or necessarily high tech about the use of algorithms**

- **Frequently good for economic efficiency and consumers**
  - Pricing risk, capacity optimisation, repricing perishable goods
  - Camelcamelcamel; kayak; picwell; flipper

- **Can be useful for regulators**
  - Bid-rigging tools in Korea and the UK
  - Looking for suspicious trading activity in financial data

Background

And the Weak Suffer What They Must?: Europe, Austerity and the Threat to Global Stability

http://uk.camelcamelcamel.com/product/1784704113

£5.72

£3.66

Facilitating existing offences
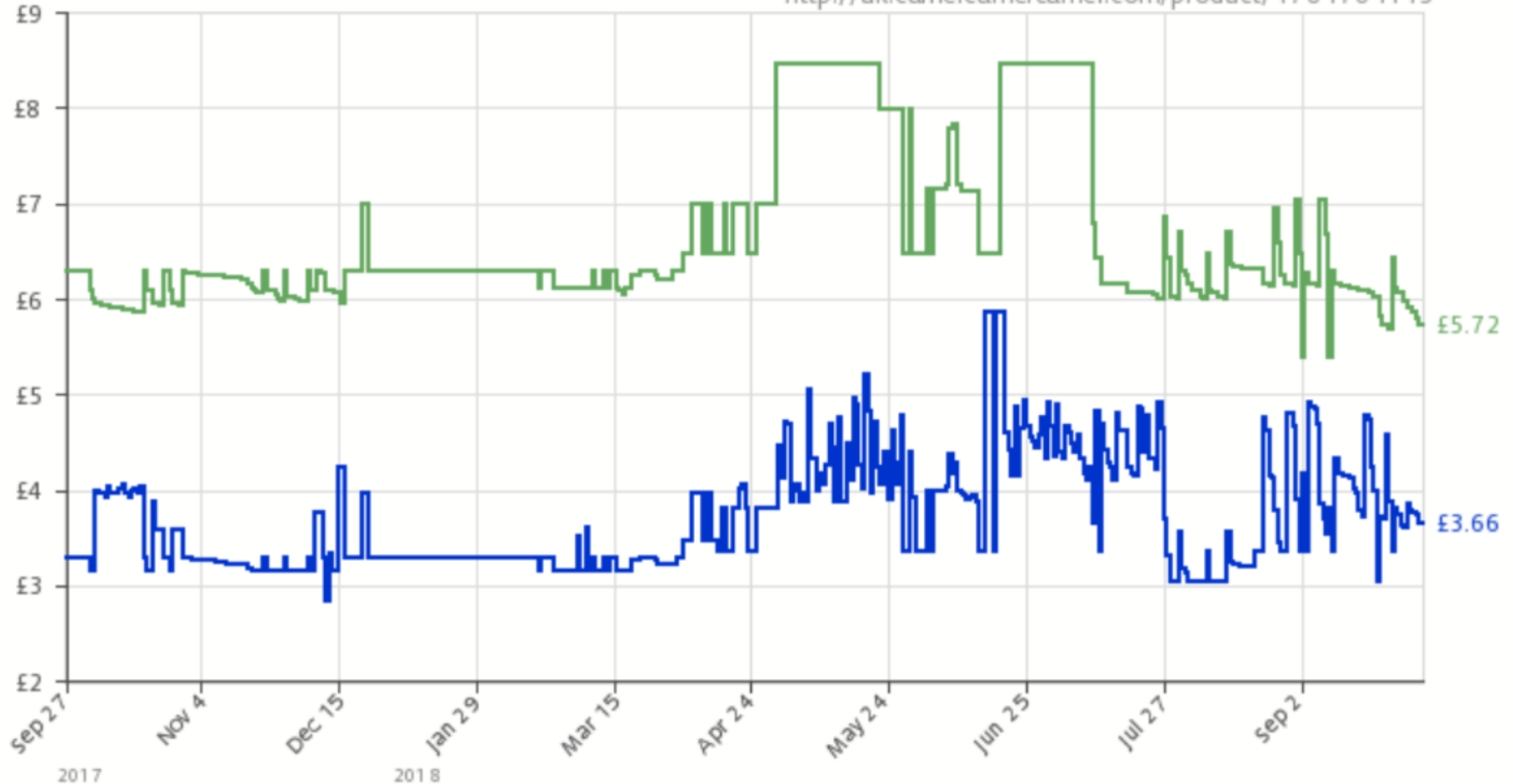
- **Standard competition law offences can be facilitated by pricing algorithms**

- **GB eye/Trod case in the UK**

  - Cartel agreement between two firms

  - Manually keeping prices aligned failed

  - Used algorithmic repricing software

    - "Our repricing software is now live on Amazon and seems to be working fine, please let us know if you see any anomalies." (15:31, 14 April 2011, Trod)

    - "[We] have now activated the Amazon repricing software and it is working perfectly. Trod should be happy with the outcome as we are now the same price as them on 99% of listings." (16:34, 14 April, GB eye)

Tacit collusion

- **Strategic interdependence does not imply a collusive outcome *per se***

- **But the theory of harm around pricing algorithms and tacit collusion is clear**
  - Similar to best price guarantees and MFNs

- **Algorithms may help firms**
  - Find soft competitive equilibrium
  - Monitor each other
  - Punish each other

- **Increased transparency and speed of response potentially key**
  - Machine learning very powerful

Tacit collusion

- **But lots of reasons for tacit collusion to fail**

- **Standard reasons:**
  - entry, buyer power, mavericks

- **Dynamic environment, multiple and changing equilibria**

- **Competition in algorithms, not just between algorithms**
  - Firms choice of algorithm, or algorithm strategy, not set in stone

- **Mutually inconsistent algorithms**

The Making of a Fly

- **In April 2011 an academic book about flies was priced at more than $23m.**

- **This was the result of incompatible algorithmic pricing:**

    - Two sellers

    - Profnath: sold at 99.8% of Bordeebook's price

    - Bordeebook priced at 27% above Profnath's price

- **Human intervention was required to bring the prices back down**
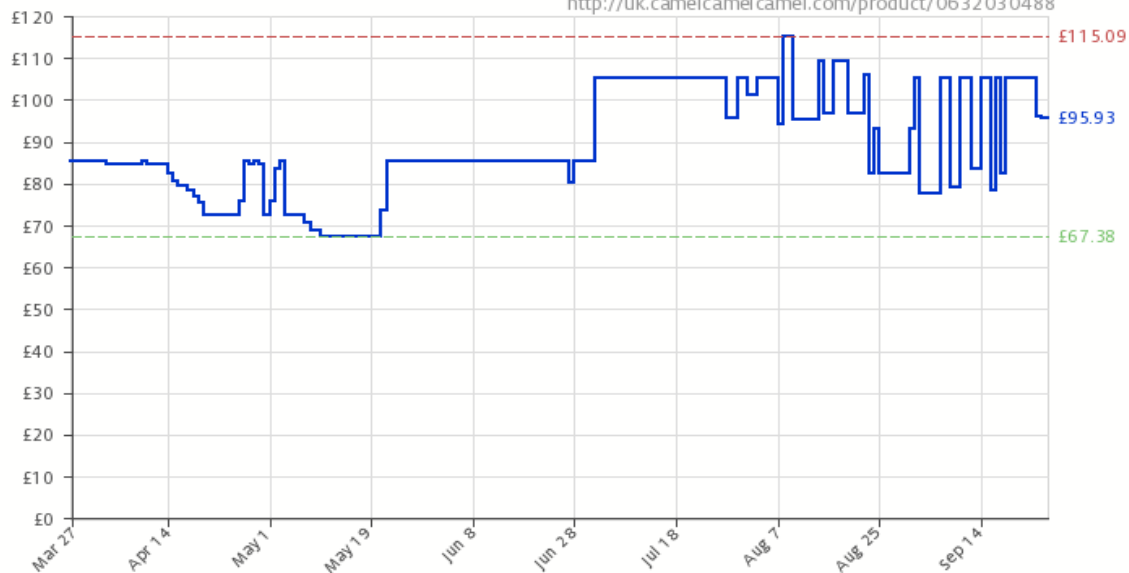
    - $106 and $135
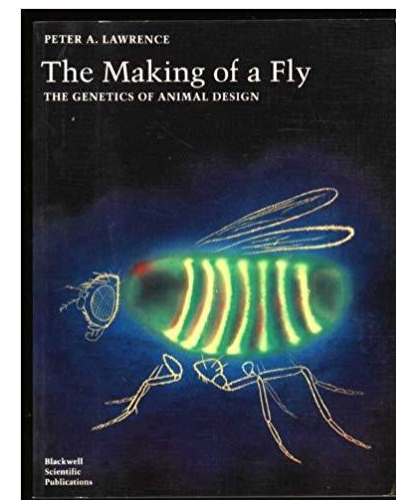
The Making of a Fly
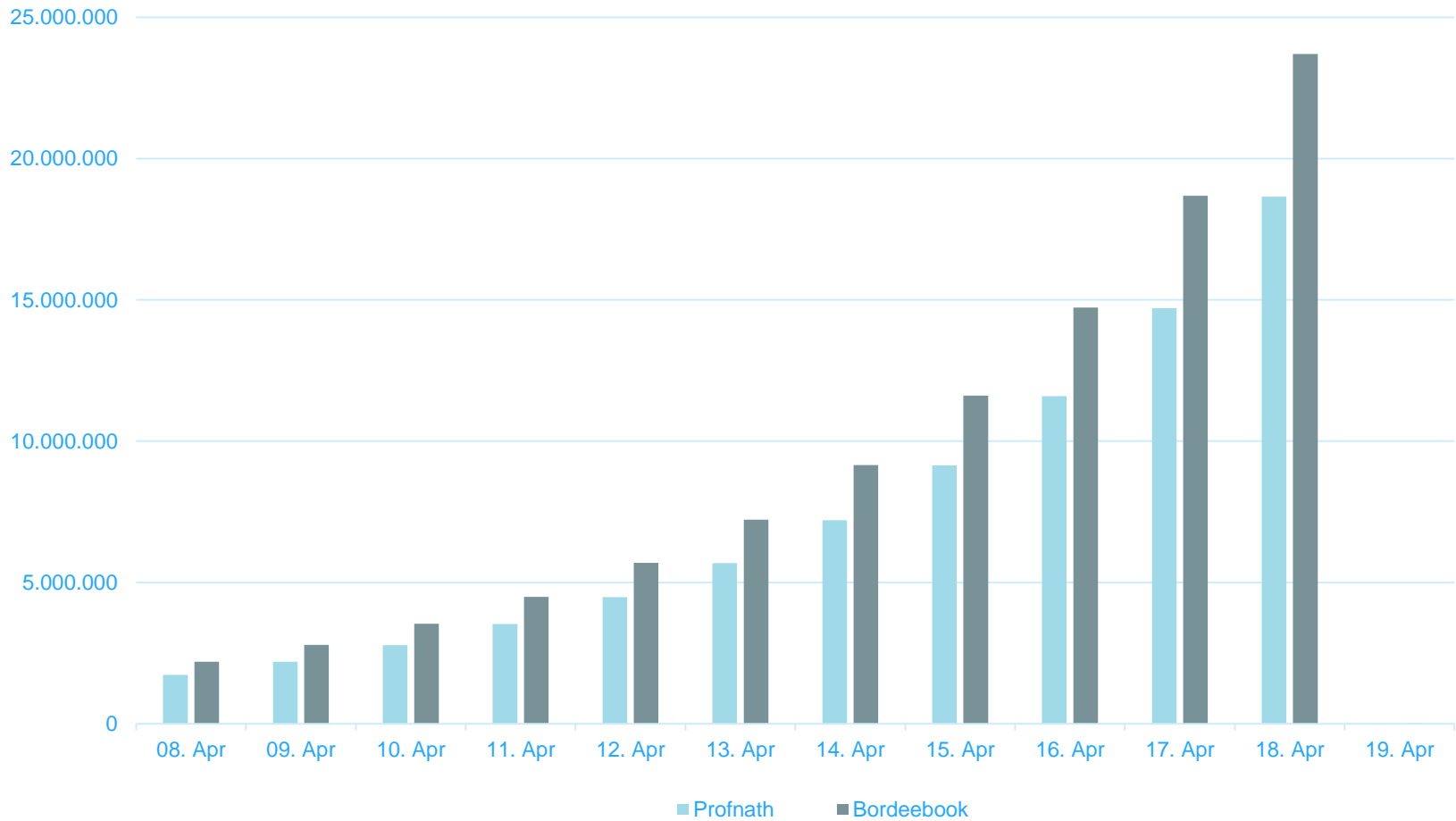
The Making of a Fly

The Making of a Fly: The Genetics of Animal Design

http://uk.camelcamelcamel.com/product/0632030488

Price type	Lowest	Highest
■ 3rd party new	£67.38 (May 20, 2018)	£115.09 (Aug 9, 2018)

| Amazon - Not in Stock | 3rd Party New - £95.93 | 3rd Party Used - £14.92 |

3rd Party New Price History

Type	Price	When
Current	£95.93	Sep 26, 2018
Highest *	£500,000.00	Aug 17, 2011
Lowest *	£40.00	May 22, 2011
Average +	£90.20	-

* since Apr 23, 2011.
+ of the last 50 price changes

Last 5 price changes

Date	Price
Sep 26, 2018 11:09 PM	£95.93
Sep 25, 2018 12:40 PM	£96.23
Sep 20, 2018 12:28 AM	£105.40
Sep 18, 2018 09:31 AM	£82.69
Sep 17, 2018 08:35 PM	£105.40

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Tacit collusion

- **Jury out on the likelihood of algorithmic pricing leading to tacit collusion**

- **But can't ignore the possibility**

- **Possible policy responses:**

  - Audit the underlying algorithms: what is the objective function?

  - Object to "black box" algorithms?

  - Introduce some inefficiency to slow down reaction times?

Personalised pricing

- **Inconsistent with concerns over tacit collusion**

- **Price discrimination can be welfare enhancing:**

  - Focus on who the losers are

- **Little evidence of it happening in practice**

  - OFT 2013; CMA 2018; EU 2018

  - Do personalised rankings matter?

- **Expect market solutions**

  - Intermediaries, collective buying, anonymous buying

Conclusions

- **Tacit collusion concerns due to algorithmic pricing cannot be assumed or dismissed *per se***

- **Not clear what the policy response should be, but ignoring the issue is definitely a bad one**

- **Personalised pricing less of a concern**

- **Scope for algorithms to facilitate traditional competition concerns**

Dr. Mike Walker

Competition and Markets Authority

Victoria House

Southampton Row

London WC1B 4AD

44 (0)7799 893790

mike.walker@cma.gsi.gov.uk