Dow/DuPont: Another step towards a proper assessment concept of innovation effects of mergers

Wolfgang Kerber
Philipps-Universität Marburg

Conference Competition Policy and Innovation

Tilburg Law and Economics Center (TILEC)
Brussels, 29 November 2018

1. Introduction (1)

How to deal with innovation in competition law? (e.g. merger reviews)

Four opinions:

(1) focussing on price competition, innovation is for IP law

(2) innovation is important but we know so little: let's be very cautious

(3) we can apply our current assessment framework also to innovation

(4) we have to develop an own assessment framework for innovation

My thesis:

+ Dow/DuPont is another step towards an own assessment framework for innovation effects of mergers

+ but there is still a long way to go …

1. Introduction (2)

Philipps Universität Marburg

Structure of presentation:

1. Introduction
2. Towards an innovation-specific assessment concept in competition law
3. Dow/DuPont merger case: Overview
4. Dow/DuPont: Critical analysis in regard to the assessment concept
5. Perspectives

2. Towards an innovation-specific assessment concept in competition law (1)

Current static assessment framework:

- Market definition:
  - \+ Product market: current products of incumbent firms (SSNIP test)
- Analysis of the effects of a merger:
  - \+ non-coordinated, coordinated, efficiency effects
  - \+ comparison of price/quantity (Nash) equilibria before/after merger: increase of price (= consumer harm)?
  - \+ static concept of competition concept (ideal: perfect competition => static efficiency)
  - => static assessment concept that works well for price competition

2. Towards an innovation-specific assessment concept in competition law (2)

Innovation-specific assessment concept in competition law (1):

- Broad "common sense" consensus about competition:
  + competition is a dynamic rivalrous process / "competitive process"
- Innovation processes are very complex dynamic phenomena:

  high uncertainty and unpredictability, role of entrepreneurs, heterogeneity of firms (diversity), trial-and-error / experimental processes, learning etc

=> Dynamic innovation competition does not fit well into this static assessment framework (Evans/Hylton 2009; Sidak/Teece 2009; Kerber 2018)

2. Towards an innovation-specific assessment concept in competition law (3)

Innovation-specific assessment concept in competition law (2):

- Kern/Dewenter/Kerber (2016): empirical study of US merger cases in regard to the use of innovation-specific assessment criteria

- two kinds of innovation competition:
  + level 1: competition between identifiable R&D projects
  + level 2: competition between firms with innovation capabilities (new)

- **"market definition"** / identification of relevant innovation competitors
  + using "innovation / R&D markets" instead of product markets
  + already well-established (pharma mergers)
  + see also US Guidelines Licensing IP 2017

2. Towards an innovation-specific assessment concept in competition law (4)

Innovation-specific assessment concept in competition law (3):

A**nalysis of the effects of a merger**:

- Schumpeter vs. Arrow / inverted U-shape discussion
- theoretical industrial economics: => innovation incentives
- my position: theoretically too narrow / does not grasp sufficiently the complexity of dynamic innovation processes
- recommendation: using a plurality of approaches
  - \+ innovation economics / research (e.g. industrial dynamics)
  - \+ evolutionary approaches to innovation and competition (Schumpeterian competition, Hayek's competition as a discovery procedure, evolutionary models)
  - \+ approaches in management / business studies, e.g.
    - > strategic management theory
    - > resource-based view of the firm / "dynamic capabilities"

=> rich literature whose insights have not been used enough in competition law !

3. Dow/DuPont merger case: Overview (1)

Philipps Universität Marburg

Dow/DuPont case

- two US-based chemical companies
- March 2017: clearance decision of merger subject to conditions
- competition concerns in agriculture and material science business
  + main focus on crop protection (herbicides, insecticides, ...)
- remedy: divestiture of major parts of DuPont's pesticide business (includ. its global R&D organisation)

- innovation in crop protection industry:
  + development of active ingredients (AIs) as the result of a long and expensive R&D process leading to formulated products

  ...

3. Dow/DuPont merger case: Overview (2)

Philipps Universität Marburg

Four types of competition

Price competition I: Elimination of competition between existing products with non-coordinated effects on price competition

Price competition II: Loss of potential competition betw. existing products and pipeline products (AIs w. high probability of market entry)

Innovation competition I: Overlapping lines of research /early pipeline products: Discontinuation, delay or redirection of overlapping lines of research in **specific innovation spaces**

Innovation competition II: R&D efforts and output of the industry: Structural reduction of incentives and ability to innovate leading to less innovation in the **industry**

3. Dow/DuPont merger case: Overview (3)

Philipps Universität Marburg

Identification of relevant innovation competitors ("market definition")

Innovation competition II: (industry level)

- analysis of firms in "crop protection industry" (innovation activities + capabilities): deep analysis of patents and active ingredients (AIs)
- result: 5 firms with integrated R&D => post-merger: 4 firms (high barriers to entry)
- additionally: Dow and DuPont are important and close innovation competitors

Innovation competition I: (innovation space level)

- analysis of lines of research / early pipeline products in regard to specific innovation spaces (herbicides, …, etc.)
- both firms are important innovators in certain innovation spaces (often also less than five firms pre-merger)

3. Dow/DuPont merger case: Overview (4)

Philipps Universität Marburg

Effects of the merger on innovation:

- methods: + internal documents about plans pre-merger and post-merger
  + economic theory about unilateral effects on innovation incentives

Innovation competition I:

- reduced incentives would lead to reduction of innovation efforts in a large number of innovation spaces: discontinuation, diversion etc.

Innovation competition II:

- medium/long-term effect leading to lower innovation efforts of merged firms (plus not sufficiently strong countervailing reactions of innovation competitors)

  => lower innovation level than before merger

Efficiencies: no efficiencies accepted by the Commission

Remedies: divestiture of major parts of DuPont's pesticide business (includ. its global R&D organisation)

4. Dow/DuPont merger case: Critical analysis (1)

Philipps Universität Marburg

Identification of relevant competitors (1): general approach

- positive is deep analysis of the industry and its development, esp. in regard to the specific way how innovation works in that industry (includ. regulations)
- positive is deep analysis of the innovation activities and resources of the firms (innovation capability)
  - \+ esp. also the deep analysis of patents (with patent citations) as well as active ingredients (AIs) (=> output instead of input measure)
  - \+ patent shares / AI shares (instead of market shares)
  - => main investigation is about analysis of resources/capabilities of firms
- theoretical background:
  - \+ theory of the firm: bundle of resources (specialised assets)
  - \+ very close to resource-based view of the firm ("VRIN" resources: valuable, rare (not replicable), inimitable, non-substitutable)

4. Dow/DuPont merger case: Critical analysis (2)

Philipps Universität Marburg

Identification of relevant competitors (2): Specific questions

- Innovation competition I: What is an "innovation space"?
  - + line of research and early pipeline products in an innovation space
  - + necessary: clarification of the concept of an "innovation space"
    - > how do we define an "innovation space"?
    - > what are the methods for assessing what is part of an innovation space?
  - + How to apply this concept outside of tightly regulated innovation processes?
    - > how to define a line of research?

- Innovation competition II: What is an "industry"?
  - + analysis of firms in regard to being capable of innovating in an industry
  - + necessary: clarification of the concept of an "industry"
    - > how do we define an "industry"? (demand side or supply side or both?)
    - > what are the methods for assessing what is part of an industry?

4. Dow/DuPont merger case: Critical analysis (3)

Philipps Universität Marburg

Identification of relevant competitors (3): Specific questions

- How to assess what kinds of resources are necessary for innovation in regard to an industry (or an innovation space)?
  - + how to categorize and measure resources?
    - > IPRs, capabilities, knowhow, specialised assets, data, R&D staff etc.
  - + what methods can be applied for this assessment? (patents, …)
  - + necessary: developing clear concepts and methods
  - + perhaps literature in innovation research / management and resource-based view of the firm can help

4. Dow/DuPont merger case: Critical analysis (4)

Philipps Universität Marburg

Analysis of the innovation effects of mergers (1): general approach

- documents about plans pre- and post-merger might be helpful (but limited)
- economic theory about unilateral effects on innovation incentives: is not sufficient
  + problem: there might be many more effects of mergers on innovation
- examples of possible effects without using the channel "innovation incentives"
  + knowledge spillovers between firms with positive effects on innovation (cross-fertilization / cumulative innovation, e.g. innovation clusters)
  + evolutionary concepts of competition as trial and error-processes (Nelson/Winter models; Hayek's competition concept, etc.)
    => competition as a process of parallel experimentation with mutual learning
  + diversity:
    > more firms => more independent sources of innovation
    > heterogeneity of resources/capabilities of firms might have positive effect on probability of solving a new problem

    (see Farrell 2006: advantages of "econodiversity", Kerber 2011)

4. Dow/DuPont merger case: Critical analysis (5)

Philipps Universität Marburg

Analysis of the innovation effects of mergers (2): Innovation competition I

- Innovation competition between parallel R&D projects in innovation spaces
- mergers with parallel R&D projects => discontinuation of one of the projects
  => less innovation is an economically reasonable hypothesis

  But: this might need more theoretical and empirical analysis
- More research necessary about discontinuation of R&D projects post-merger
  - + esp. in early phases of innovation also much intra-firm parallel research, i.e. merger need not lead to discontinuation of parallel research
    (Sah/Stiglitz 1987: number of parallel R&D projects is independent from number of firms)
    => microeconomic analysis of parallel research (with low success probabilities)
  - + what do we know from empirical studies about restructuring of the R&D project portfolios post-merger, esp. in regard to "technological related-ness" and about discontinuation of R&D projects?
  - + more hypotheses why reduction of innovation post-merger
    (empirical studies: financial problems, capacity constraints of management)

4. Dow/DuPont merger case: Critical analysis (6)

Philipps Universität Marburg

Analysis of the innovation effects of mergers (3): Innovation competition II

- Innovation competition between firms on the industry level
- basic idea: reduction of number of firms with the resources for innovation leads to negative effects on innovation
  + US Lockheed/Northrop merger case: military aircraft technology (challenged by DoJ 1998 and abandoned): "… to maintain a number of firms with the capability of innovating to meet future national security challenges" (Robinson 1999)
- but also here very different theories why …
  + reduction of innovation incentives due to unilateral effects model is only one
  + more firms / more heterogeneity of innovation resources might be positive
- other determinants / aspects:
  + industry cycle theory (industrial dynamics): A merger in an early stage of the industry cycle might be less harmful than in a later stage (mature industry)
  + medium-/long-term effects: time horizon of the relevance of specific resources / capabilities

4. Dow/DuPont merger case: Critical analysis (7)

Philipps Universität Marburg

Efficiencies

- distinction between effects that are considered in competitive assessment and "efficiencies" (to be proven by firms) is difficult
- also here an innovation-specific approach might be necessary: thinking carefully what kind of effects should be proven by whom

Remedies:

- Divestiture of an entire bundle of necessary resources for innovation in regard to certain innovation spaces or the entire industry to another independent firm is an appropriate remedy (but already well-established in pharma merger cases)
- but also here: what are the methods for identifying the necessary resources? What are the problems / experiences?

5. Perspectives (1)

Philipps Universität Marburg

Dow/DuPont as a step to an innovation-specific assessment concept

- distinction between two kinds of innovation competition very helpful
  + identifiable R&D projects + firms with the capabilities/resources to innovate
- Identification of the relevant competitors ("market definition"):
  + positive: resource-based approach instead of the old product market concept (innovation market / R&D market approach)
  + positive: application of new methods (e.g., patent analysis)
  + much more clarification / methods necessary (resource-based view of firm)
- Effects of mergers on innovation
  + this is still very unclear/under-developed (concept of innovation competition?)
  + traditional IO models can contribute to that but only in a limited way
  + need for using more insights from other approaches (innovation research, evolutionary approaches, strategic management etc. …)
  + AND: using presumptions: where to draw the line: 6:5 / 5:4 / 4:3 mergers? (see also 4 plus-rule in IP licensing guidelines in EU and US)

5. Perspectives (2)

Philipps Universität Marburg

A parallel discussion: The resource data, innovation, and the digital economy

- data as a valuable resource for innovation
  - + critical: access to data can be necessary for offering services or innovation (or for training algorithms)
  - + other critical resources: capabilities for data analytics / artificial intelligence, human resources (data scientists), algorithms
- Relevance of data as a resource in competition law:
  - + data cartels/ pools
  - + data in merger cases: monopolization/concentration of certain sets of data
  - + abuse of market dominance / market power:
    - > exclusive control about specific sets of data can lead to foreclosure in up-/downstream or complementary markets and impede innovation
    - > (example: access to in-vehicle data in connected cars; Kerber 2018)
  - => new discussion about obligations to grant access to data (eg, essential facility): (Schweitzer/Haucap/Kerber/Welker: Modernising the law on abuse of market power)