Competition in the Vaporized Nicotine Market and its Potential Impact on the Cigarette Market

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Background

• No conflicts of interest
• Work is funded by NCI (P01 CA200512) to the ITC Project
• My background:
  – Recent work in public health, including e-cigarettes
  – Earlier work, including my PhD dissertation, was on the organization of the firm, market competition and antitrust, published some well-cited articles, worked for the Federal Trade Commission Competition Bureau, and served as an expert witness on antitrust cases.
• I would like to thank David Sweanor, Ron Borland, Mike Cummings, Geoff Fong, Eric Lindblom, Maciej Goneiwicz, Frank Chaloupka, Ce Shang, and Rich O’Connor who have provided valuable input into the ideas and analysis. I take full responsibility for the content of this presentation.
Industry Environment

• Since 2005, alternative forms of nicotine delivery products have come onto the market, and cigarette smokers more often use multiple tobacco products.*

• To understand the demand for tobacco products, it becomes increasingly important to understand the industry environment. The industry environment has been largely ignored in the tobacco control literature, except for concerns about lobbying by the large cigarette companies.

• The analysis here is based on the economics and marketing literature, and financial reports. The analysis has important implications for tobacco control policy, as well as the way that we study the industry.

* For simplicity, I will consider e-cigarettes to be a tobacco product. Here, the importance is their ability to substitute for cigarettes.
Four Essential Elements to Industry Analysis  
(as adopted by Fed Trade Comm and DoJ)

- **Industry Definition:** based on the range of close substitutes for the product, i.e., for a group of specific products, could firms acting in unison effectively increase price in a profitable manner?

- **Industry Concentration:** based on market shares, e.g., percent of the market by four largest firms or squared market shares (Herfindahl index)

- **Entry Barriers:** depends on reaching an efficient scale of operation, rapidly gaining a reputation among consumers, having the necessary technological and marketing knowledge, obtaining essential inputs, and effectively addressing regulatory constraints

- **Market Conduct:** whether existing firms are engaging in coordinated pricing, including tacit or explicit collusion, innovation and price discrimination
Cigarette Industry: Before 2005

- **Industry Definition:** Cigarette products alone (as applied in antitrust merger cases). Until at least 2005, there were no close substitutes for cigarettes, and smokeless tobacco use including dual use with cigarettes was declining.

- **Industry Concentration:** Cigarette industry has been highly concentrated dating back at least to the 1950s when there was 6 major firms. The industry became increasing concentrated with the growth of the Marlboro brand and industry mergers (most recently involving Reynolds later BAT). Now, there are 3 primary firms in the US (Altria, BAT, and Imperial).

- **Entry Barriers:**
  - Primarily through retail slotting allowances, which provided for point of sale displays, price promotions and the ability to limit shelf space to entrants
  - Absence of ability to advertise on mass media, but used brand proliferation in conjunction with the limited shelf space, and
  - Major legal liability and regulatory concerns

- **Market Conduct:** Substantial evidence of coordinated pricing (implicit or explicit collusion) at least through 2005, price discrimination, and little innovation other than brand proliferation.
The industry environment was relatively stable until mid-2000s with cigarettes. The cigarette industry was well defined and the firms faced limited competition.

From a public health perspective=> high prices (good), but faced a strong lobby (well-financed by the monopoly power). However, the target (“the enemy”) was clear.

At the same time, smokeless tobacco and cigars were relatively distinct and cigarette manufacturers set price with limited substitutes => relatively stable patterns of cigarette initiation and cessation by age.
World After 2005

• Increased rate of multi- (tobacco) product use. Cigarettes had become relatively more expensive.

• After 2005, cigarette companies purchased firms producing other tobacco products (especially smokeless tobacco). Smokeless was advertised as an option when smoking was prohibited, e.g., due to smoke-free air laws.

• E-cigarettes became available by 2007. Initially sold over the internet, they became readily available through retail by 2010, and later through vape shops. Initially, they were sold by independents. Later, cigarette companies (2012-5) entered the market, partially through acquisition (e.g., purchase of blu by Lorillard).

Complexity took hold! Distinctions between cigarettes and other tobacco products became blurred.
Economic Framework: Market Definition for E-cigarettes

Horizontal (competition at product level):
- **Vaporized nicotine products (VNPs)** are a highly differentiated, but cohesive market: many different types (disposables, closed and open system reusables) with more product variety (flavors, ability to deliver nicotine) than cigarettes
- While initially distinct, VNPs have become increasingly closer substitutes for cigarettes.

Vertical (different stages of production):
- Manufacture of devices and liquids, much of it produced in China
- Sellers of devices, mostly in the US
- Consumer purchase channels: retail stores (conventional and other retail), but vape shops and internet also play a key role.

Diversification (firms producing different final products)
- Cigarette manufacturers producing VNPs (as well as smokeless and cigars): have strong incentives to protect profits from cigarettes
- Independents: no other tobacco products, some technology-oriented.
Vertical Structure of the VNP Industry

Stage One: Components
- DEVICES
  - Disposables
  - Reusables: Closed and Open systems

Stage Two: Marketing
- CIGARETTE MANUFACTURERS
  - Mostly disposables and refillable devices

Stage Three: Consumer Purchase Channels
- Mass Market Retail
- Internet and other retail
- Vape Shops

Stage One: Components
- LIQUIDS

- Stage One Components
- Stage Two Marketing
- Stage Three Channels
Role of VNP Firms

Central focus from an antitrust perspective is the device sellers* => greatest potential source of market power

- More complicated and specialized than producing liquids
- Source of brand name: much of the marketing is for devices.
- Each of the purchase channels has multiple device sellers and compete with each other

Generally fluid market across purchase channels, but potential bottlenecks to device sellers in specific consumer channels-

- **Retail**: large number of sellers, but potential limits to independents through slotting allowances
- **Internet**: freely accessible to all, although there can be advantages to particular firms, e.g., cigarette firms have customer lists
- **Vape shops**: thousands throughout the US, almost exclusively sell devices of independents, often with an anti-cigarette smoking orientation
## Market Segments and Industry Shares (in millions)

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<tbody>
<tr>
<td><strong>E-cigarettes (Disposables and Closed system)</strong></td>
<td>1,000</td>
<td>1,400</td>
<td><strong>42.4%</strong></td>
<td>1,600</td>
<td>1,400</td>
<td><strong>31.8%</strong></td>
<td>2,080</td>
<td><strong>36.4%</strong></td>
</tr>
<tr>
<td><strong>Mass Market Retail (convenience store, Food, Drug stores)</strong></td>
<td>600</td>
<td>600</td>
<td><strong>18.2%</strong></td>
<td>700</td>
<td>700</td>
<td><strong>15.9%</strong></td>
<td>1,100</td>
<td><strong>20.0%</strong></td>
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<tr>
<td><strong>Online</strong></td>
<td>200</td>
<td>400</td>
<td><strong>12.1%</strong></td>
<td>500</td>
<td>400</td>
<td><strong>9.1%</strong></td>
<td>500</td>
<td><strong>9.1%</strong></td>
</tr>
<tr>
<td><strong>Other Retail (including tobacconists and kiosks)</strong></td>
<td>200</td>
<td>400</td>
<td><strong>12.1%</strong></td>
<td>400</td>
<td>300</td>
<td><strong>6.8%</strong></td>
<td>400</td>
<td><strong>7.3%</strong></td>
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<tr>
<td><strong>Vapors/Tanks/Mods &amp; Personal Vaporizers (Open System)</strong></td>
<td>1,500</td>
<td>1,900</td>
<td><strong>57.6%</strong></td>
<td>2,500</td>
<td>3,000</td>
<td><strong>68.2%</strong></td>
<td>3,500</td>
<td><strong>63.6%</strong></td>
</tr>
<tr>
<td><strong>Mass Market Retail (convenience store, Food, Drug stores)</strong></td>
<td>300</td>
<td>300</td>
<td><strong>9.1%</strong></td>
<td>500</td>
<td>500</td>
<td><strong>11.4%</strong></td>
<td>650</td>
<td><strong>11.8%</strong></td>
</tr>
<tr>
<td><strong>Online and other retail outlets</strong></td>
<td>300</td>
<td>400</td>
<td><strong>12.1%</strong></td>
<td>600</td>
<td>700</td>
<td><strong>15.9%</strong></td>
<td>850</td>
<td><strong>15.5%</strong></td>
</tr>
<tr>
<td><strong>Vape Shops</strong></td>
<td>900</td>
<td>1,200</td>
<td><strong>36.4%</strong></td>
<td>1,400</td>
<td>1,800</td>
<td><strong>40.9%</strong></td>
<td>2,080</td>
<td><strong>37.8%</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,500</td>
<td>3,300</td>
<td><strong>100.0%</strong></td>
<td>4,100</td>
<td>4,400</td>
<td><strong>100.0%</strong></td>
<td>5,500</td>
<td><strong>100.0%</strong></td>
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**Type:** Open Systems 68%, Closed Systems and Disposables 32% in 2017  
**Purchase channels:** Mass market retail 27%, Other retail 7%-20%, Online 15-20%, Vape shops 41% in 2017  

*Most growth in vape shops and online through 2017, then major growth in retail e-cigarettes in 2018*

Source: Wells Fargo Securities
Conventional Retail Shares of Firms*

- The conventional retail market for VNPs was concentrated, initially dominated by independents (21st Century, NJOY, Mistic, Logic), but less concentrated by mid-2012.\(^3\) The large cigarette companies entered the market in 2012-2014.

- While the large cigarette companies controlled 72% of conventional retail by 2015, that sector accounted for 27% \([(900)/3300]\) of all purchase channels (see previous slide). With minimal sales at vape shops or via the Internet, the share in all purchase channels by cigarette companies via conventional retail was less than 20% (72% x 27%). Shares of individual independent firms were all less than 5% of conventional retail, but they remained viable with a combined 25% share.

- An independent, Pax Labs entered the market with Juul in June 2015 and replaced Vuse for top position by the end of 2017, with projected conventional retail sales reaching a 55% share in dollar sales and a 36% in unit sales by March 2018 (roughly 17.5% in $ sales and 11% in unit sales of all purchase channels). By 2018, projected conventional retail sales of the four cigarette companies’ plummeted to 41% and 56% of unit sales -- or roughly 13% of $ sales and 18% of unit sales from all purchase channels.

* Based on Nielsen data as found in 2016 SGR and in Wells Fargo Reports, but these data only cover conventional retail
Shares in other channels by device sellers

- **Other sectors:**
  - Other retail?
  - Internet? But probably minimal by cigarette manufacturers
  - Vape shops? But probably minimal by cigarette manufacturers

- **Concentration in retail is relatively low, but probably much less for all purchase channels combined (27 independent firms listed in 2016 SGR for the year 2015)= > low overall industry competition**

*To be or not to be, that is the question!*

*For vape shops and internet, tis nobler to be an independent 😊*
Economic Framework: Entry Barriers in VNP Market

Pre-deeming

**Horizontal:**
- Production of devices: appears to be minimal economies of scale in production and can purchase from others firms (e.g., China).
- Marketing of devices: internet, social media, and word of mouth are important, does not appear to require large expenditures.

**Vertical:**
- Entry barriers potentially through foreclosure of retail, e.g., through shelf-space slotting allowances, but appears to be minimal (e.g., Juul).
- Limit supplies of essential inputs upstream: not likely for VNPs, unless proprietary or patents to produce devices or e-liquids (can be produced in China).
- Vape shops and internet appear to require minimal investment (and franchised), and publicized by word of mouth, social media and chat rooms_reviewers.
Overall Entry Barrier Picture

• Low entry barriers at least up until deeming in 2017, and appears to still be low given the growth in Juul.

• In future years, there are potential major entry barriers through government regulations through deeming, and perhaps some at state level (e.g., regulation of vape shops). Future will depend heavily on FDA, both in terms of new product requirements and uncertainty surrounding how requirements are implemented.
Market Conduct in VNPs

- Price levels have generally been falling over time. At the same time, there is considerable price variation (e.g., price promotions) at any point in time. Both are indicative of competition.
- Unstable market shares
- Highly differentiated product market (flavors, device type, etc.). New products through innovation, e.g., recent growth in sales of Juul.
- Demand seemed to have flattened, but then major recent growth.

*Industry still can be characterized as in the growth stage of the product life cycle literature (see marketing literature). The growth stage is generally characterized by relatively high competition.*
Overall Picture of the Market

• Relevant market is VNPs, but may change with HnB and VNPs becoming closer substitute with cigarettes and possibly smokeless and little cigars.

• Market Concentration: probably quite low indicative of strong competition, but information on shares of device sellers is poor.

• Entry barriers low, but future will depend on the implementation of deeming. Vape shops and internet play a key role in promoting competition, especially by independents vis-à-vis cigarette companies.

• Market conduct characterized by high levels of competition, although probably less innovation as a results of uncertainty surrounding deeming.
Implications for Future: Policy

• VNP market is increasingly a threat to cigarette profits. From a public health perspective, VNPs provide the potential for major harm reduction. Vape shops and the internet are potentially important in providing competition to the cigarette companies.

• The availability of VNPs provides the justification for stronger policies against cigarette use, e.g., increased cigarette taxes. In particular, a healthy VNP market provides the potential to make reduced nicotine in cigarettes a potent policy by providing a substitute, lower risk product.

• Healthy competition may even make cigarette companies’ promises to move to non-combustible, lower risk products a reality in the not-too-distant future.

• Implementation of deeming rules by FDA will be important—Could reduce competition, especially if regulations place a heavy burden on independents
  – Could encourage competition if helps regulations help insure safer products, encourage innovation and provide accurate information on relative risks.
Future Needs

• Need to collect better data, especially with regard to device sales in other (non-conventional) retail, vape shops and internet sales

• Need to closely monitor competition within the VNP market and vis-à-vis cigarettes and HnB, paying more attention to market structure changes and accordingly adjusting strategies

• Research evaluation needs a different focus away from the assumption of stable age patterns and towards a focus on cohorts and the role of experience in a changing world

*Need to be pay closer attention to the more complex market environment than the cigarette-dominated world of the past*
Increasingly, use of different tobacco products will depend on past experience, regardless of age. For example, future e-cigarette use is likely to decline if cigarette smokers have tried them and found them unappealing (e.g., due to perceived harms or other characteristics of the product) or found that they did not yield anticipated effects, i.e. the ability to quit cigarette use. Increased e-cigarette taxes or restrictions on product availability would also reduce use. Opposing tendencies leading to greater use may result from well-publicized improvements in the product, which may be intensified by policies that increase the desirability of e-cigarettes or discourage cigarette use.

Because of the central role of past experiences in smoking cigarette ("smoking") and using VNPs ("vaping"), a cohort-based approach has special importance in examining initiation and cessation of cigarettes and e-cigarettes. While these patterns may vary by age, they can also be expected to have effects common to most ages at a point in time, and may continue to have common effects on each cohort over time.