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GEOGRAPHIC MARKET DEFINITION

-- Note by Israel --

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More documents related to this discussion can be found at [ww.oecd.org/daf/competition/geographic-market-definition.htm](http://www.oecd.org/daf/competition/geographic-market-definition.htm)

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-- ISRAEL --

1. Background

1. Spatial aspects of competition among firms are, at times, a key part in the competitive analysis of markets. These geographic characteristics are carefully considered when the Israel Antitrust Authority ("IAA") evaluates proposed mergers, restrictive arrangements and license allocation, as well in the market studies that the IAA conducts. Examples of industries that exhibit local competition include retail food and gasoline, aggregate quarrying, transportation, infrastructure, recreation and leisure. The IAA's unit which conducts market studies has tackled the challenges of defining geographic markets in several of those industries in recent years, contributing to the accumulation of a substantial body of knowledge and professional expertise at the IAA.

2. While the focus of our contribution is on local markets, we shall briefly note that many markets are of a national scope or broader, and, even at that level, are characterized by a relatively small number of competitors. Israel is, in essence, a small market economy, whose trade with neighboring countries is rather limited. Consequently, the economy relies heavily on imports by sea and air. Analysis of imports' effect on competition is therefore inherent in almost every such case. The IAA routinely examines whether factors such as standardization of requirements, transportation costs, economies of scale, local consumer preferences (e.g. for Kosher products) and exposure to shifts in exchange rates adversely affects competitive pressure from imports.

3. Israel's rather limited trade with its neighbors not only effects competition in national markets, but also more localized markets: While Israel borders other countries and is far from physical isolation, the reality is that in many cases, spatial competition does not cross these borders due to political reasons.

4. In order to better understand and model spatial competition, the IAA has developed and implemented geospatial technical capabilities using GIS (Geographic Information System) software. Analyses performed using these tools can take into account the structure of road networks, and allow competition to be affected by travel time and distance, while incorporating local demand characteristics such as population density or demographics. The available spatial data allow us to define local geographic areas around either suppliers or customers, commonly dubbed isochrones, to serve as a framework for market analysis. Typically, isochrones are defined around a supplier, representing where demand for that supplier's products comes from, i.e. where customers are located. An alternative approach is to draw isochrones around a customer, representing the area within which suppliers are considered close substitutes, from the point of view of that customer.

5. In the context of spatial models, it is common to use concentration metrics as a measure of local competition. This metric, together with the two aforementioned approaches to isochrones definition, was used extensively in the retail food, retail gasoline, and aggregate quarrying industries. The results and insights of these studies were later implemented in pro-competitive legislation, advocacy measures, merger review and as a methodological infrastructure for future case evaluations.

6. This technological and methodological framework helps the IAA evaluate cases in a quick, efficient, and consistent manner. For example, the 2016 merger between the second largest food retailer,

Mega, that entered a stay of proceedings, and Yinot Beytan, a competitor. Mega possessed 118 branches on the eve of the merger and Yinot Beytan an additional 69. Using the predeveloped framework, the IAA could focus its resources on areas where the model pointed at the existence of competitive concerns. This allowed a quick yet thorough evaluation under tight time constraints.

7. Another example comes from the market for retail gasoline stations, where the IAA is tasked with evaluating proposed gas station construction and ownership transfers, in accordance with the Fuel Market (Promotion of Competition) Act of 1994. The Act established rules to increase geographic competition between gas stations, such as setting the minimum distance between stations of the same company. A firm interested in establishing a new gas station or purchasing the rights in an existing one, while having other stations closer than determined by the Act, must receive the approval of the IAA. The IAA's evaluations are carried out according to a uniform methodology, guaranteeing internal consistency in market definition and decision making, across locations and time.

2. General Methodology

8. The analysis of spatial competition is comprised of three steps: (i) defining catchment areas (or isochrones); (ii) constructing a competition set; and (iii) computing concentration metrics. The exact details of implementation may, of course, vary with respect to the industry in question.

2.1 Catchment Area definition

9. Competition takes a spatial form in markets where geographic characteristics such as location play an important role. When there are transportation costs involved, the underlying assumption is that, given similar products, the supplier located closer to the customer is preferred. This assumption becomes more meaningful the larger these costs are relative to the cost of the product. Customers must therefore weigh expected utility from the different products versus their respective transportation costs.

10. We define catchment areas using a spatial cutoff, in terms of travel distance (or time), such that a customer will be willing to travel the distance (or time) in order to buy from the supplier as long as it does not exceed the cutoff.

11. To correctly classify customers or suppliers into different groups, we must gather data on observed characteristics that may influence customer preference. Gathering, constructing and working with economic and geospatial data is challenging as it is necessary to incorporate data from various technical platforms and to correctly specify, *ex ante*, the relevant variables of interest. The variable set changes across markets, and includes supplier characteristics like location, ownership, branding, commercial area, opening hours, vertical integration, and product variety; customer characteristics such as location, ownership, vertical integration; and transaction data like location, players' ownership, travel distance, frequency, quantity and revenue. The spatial aspects of transaction data allow for the study of customer behavior while accounting for geographic competition.

12. In addition, there is a variety of characteristics influencing the definition of a catchment area and below is a partial list:

2.1.1 Firms' ability to identify and discriminate customers

13. This feature is key in determining the firm's behavior and subsequently the definition of the catchment area: the ability to discriminate allows the firm to consider the choice set that a given customer faces and optimize accordingly.

14. A good example of such a market is the aggregate quarrying industry: quarries (firms) know the location of concrete plants (customers) and of other quarries. Taking into account the potential quarries a certain plant will be willing to purchase from, the firm can tailor the price and product for that specific plant taking into account the degree of competition this plant sees. This calls for a definition of catchment areas around customers, to better represent the competitive scene each customer observes.

15. On the other hand, when suppliers cannot discriminate among customers, either because they do not have the relevant information about the client or that it is not feasible to charge different prices from different customers, it is common practice to define catchment areas around suppliers. This approach captures the geographic distribution of supplier's competitors, and allows deriving the overlapping demand with each competitor. For example, this is the case in the retail food industry, where grocery retailers generally do not discriminate among consumers entering the store based on their geographical characteristics.¹

2.1.2 *Customer behavior*

16. To set the cutoff for the maximum distance (or travel time) a customer is willing to travel to a supplier, we must examine various aspects that are potentially important to the customer, depending on the market under investigation, such as:

- Product characteristics – including price and consumption patterns. It is likely that consumers are less willing to travel far for frequent purchases, such as basic groceries, but are more willing to do so for infrequent purchases, such as cars, furniture or home appliances. The willingness to travel can depend on product characteristic. It was observed, for example, that consumers were willing to travel further to buy groceries in larger supermarkets, where store size acts as a proxy to many store characteristics, such as product variety, the presence of specialty food counters or other amenities;
- Regional characteristics (customer or supplier) – manifest mainly through the richness of the customer's choice set, e.g., lack of suppliers nearby may induced customers to travel further away. Examples include: (i) for food retailers, where isochrones were centered around the retailers, it was found that consumers were willing to travel further when living in "low-demand" areas, with the latter defined using a statistical analysis of populations density around retailers; (ii) for aggregate quarries, where isochrones were centered around customers (concrete plants), it was found that plants in areas which enjoy a larger offering of quarries, defined using a statistical analysis of the distance to the third nearest quarry, were traveling a shorter distance to make their purchases.
- Vertical integration – in a manner similar to the effect of transportation costs on the willingness to travel, other transaction costs potentially have impact. It is therefore reasonable to assume that if transactions costs are lower when a customer and a supplier are vertically integrated, and that these costs are significant, then the customer will exhibit higher willingness to travel in order to purchase from a vertically-integrated supplier in order to benefit from the cost reduction associated with the deal. This tendency was observed in practice in connection with purchases of aggregated that concrete plants make from quarries.
- Means of transportation – this feature mainly affects the physical road network across which the market operates, and varies profoundly across sectors and industries. Examples range from

¹ There could be indirect means such as sending coupons to certain areas as opposed to others but this is not a common practice.

traveling by trucks and trailers (to quarry aggregates), through private cars and public transit (to grocery retailers), to traveling by foot (from parking lots to desired destination). The constraints introduced impact the overall network structure and travel distances: given that quarry aggregate shipments are carried out by truck, limiting the network only to road suitable for vehicles over a certain tonnage dramatically changes market boundaries.

2.1.2.1 Translating the cutoff(s) into Isochrones

17. Taking into account the above factors and considerations, we calculate a number of cutoffs corresponding to the chosen characteristics (for example, on the retail food market we used store size (three groups) and population density (two groups)). Thus, six cutoffs were defined, and accordingly six isochrones in terms of distance (or time) were derived. The analysis outputs a set of parameters, depicting the maximum travel distance (or time) that corresponds to each supplier (or customer) category. In a number of leading applications, the measurement used to define the cutoff was the distance within which 80% of transactions were carried out.²

2.2 *Constructing competition sets*

18. Having computed isochrones for each category of interest, the next step is to determine the set of suppliers competing within each locality. The sets include all suppliers or selling points within isochrones that, in turn, can be centered around either customers or suppliers. Defining isochrones around customers is likely a better representation of markets where firms can discriminate and negotiate prices with each customer. Competition sets, in that case, include all selling points that fall within a defined travel distance (or time) from each customer and members of a given set are all potential suppliers that compete for the purchases of that customer. This was used in the quarrying aggregate study, with travel distance to quarries around each concrete plant;

19. Isochrones around suppliers, on the other hand, model markets where firms cannot discriminate different customers. In this case we consider two approaches:

- a) All vendors within a given travel distance (or time) around the vendor are considered as competitors;
- b) The degree to which vendors are seen as competitors depends on the rate at which their isochrones overlap, in terms of population covered. It is assumed that beyond a minimal overlap rate (say 20%), the greater the overlap, the closer the competitor. This way of modeling, coupled with the above overlap rate, were used to study the retail food market.³

² See:(1) COMPETITION COMMISSION, Aggregates, cement and ready-mix concrete market investigation, 2014 at 6-4 and appendix 6.1 (U.K.); <https://www.gov.uk/cma-cases/aggregates-cement-and-ready-mix-concrete-market-investigation>;

(2) COMPETITION COMMISSION, THE SUPPLY OF GROCERIES IN THE UK MARKET INVESTIGATION, 2008 at 52-57 (U.K.)<http://webarchive.nationalarchives.gov.uk/20140402141250/www.competition-commission.org.uk/ourwork/directory-of-all-inquiries/groceries-market-investigation-and-remittal/final-report-andappendices-glossary-inquiry>;

(3) IAA study on grocery retail market;

(4) IAA study on aggregate quarrying market.

³ For more details see annex 2.2(b).

2.3 *Computing concentration metrics*

20. After defining the geographic market using isochrones and the set of competitors in question, a number of indices may be used to study market concentration. Among these are indicators for a firm's dominance, including market shares and the Herfindahl-Hirschman index (HHI). Additional variables can be indicative of low supply levels, like local market structure in terms of firms and vending points.

21. 'Concentration', in many of our applications, refers to market shares above a certain threshold which varies across markets and industries. In retail food, for example, legislation had introduced two thresholds in terms of market shares (at 30% and 50%), along with different regulation for firms in each segment. In the quarrying industry, concentration (of concrete plants) was defined according to two criteria: (i) low number of suppliers (under three); and (ii) an HHI over 5 000 points (on a 10 000 scale).

22. The use of said metrics enables the IAA to identify potential competitive issues of different types. Using hypothetical examples, these include:

- Concentration resulting from a single firm's dominance in an area with a single point of sale (a local monopoly).
- Concentration resulting from a single firm's dominance in an area, controlling several points of sale (e.g., grocery retail stores or retail gasoline stations).
- Concentration resulting from a low number of competing firms – addresses instances where a firm might not be dominant in terms of quantitative market shares, yet dominant in terms of the share of points of sale that it controls in the relevant geographic market.

23. Classifying competitive issues by different types and categories allows us tailor appropriate remedies for each. Whenever the analysis indicates that the number of firms and sale points is low, the IAA may limit the expansion of incumbents and encourage entry by competitors. In contrast, an instance of a single firm possessing a multitude of supply points may in an extreme case be remedied by having it divest one (or more) to competitors.

3. *Summary*

24. In recent years the Competition Division at the IAA have conducted three extensive market studies. Those studies contributed to the accumulation of a substantial body of knowledge in the scope of local geographic markets. Our experience allow us working with complex economic and geospatial data and help developing models that differ across markets, with respect to the industry in question. The models defines local areas around suppliers and customers with the different approaches presented.

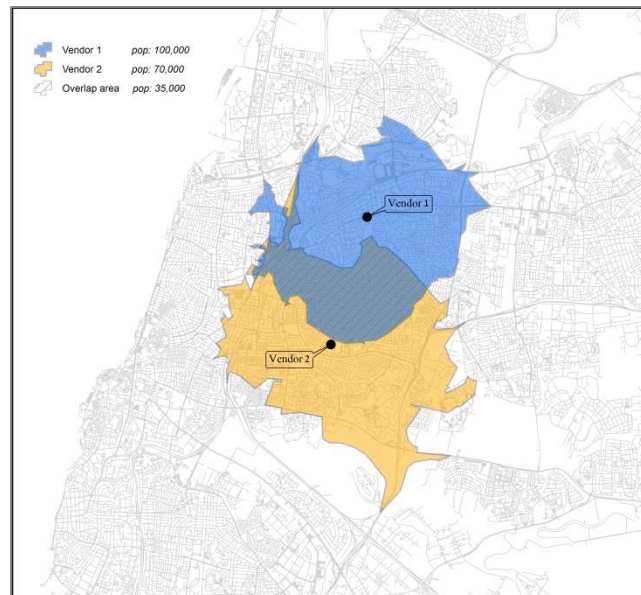
25. The capabilities and methodologies constructed are important and provide a rich tool set that assists the IAA in approaching local market. This technological and methodological framework helps the IAA evaluate cases in a quick, efficient, and consistent manner.

ANNEX 2.2(B)

26. The following is relevant to defining isochrones around suppliers as described in section 2.2(b) above (i.e. in cases where the degree to which vendors are seen as competitors depends on the rate at which their isochrones overlap, in terms of population covered). In such cases, some additional considerations to keep in mind are illustrated using examples and maps from the retail food study:

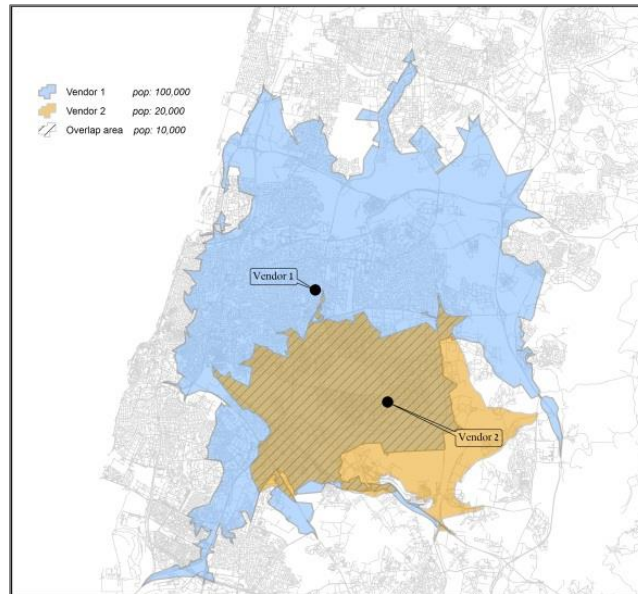
- A grocery store may be positioned outside the isochrones while still competing with the supplier in question, due to sufficient population overlap. An example is presented in Figure 1, where vendor 2 is located beyond the isochrones of vendor 1, yet is considered a competitor since the isochrones overlap at a 35% rate (of vendor 1's surrounding population).

Figure 1. Competitor outside isochrones



- Alternatively, a store may lie well within the isochrones yet not be considered a competitor: Figure 2 illustrates how vendor 2 falls inside the isochrones of vendor 1, while not seen as competition due to a low overlap rate (10%), from vendor 1's perspective.

Figure 2. Non-competitor inside isochrones



- Finally, given any two suppliers, spatial competition might not be symmetric in the sense that it is certainly possible that vendor 1 falls beyond the isochrones of vendor 2, while the opposite is not true. That is indeed the case in Figure 2: from the perspective of vendor 1, the overlapping area with vendor 2 covers only 10% of its potential clientele, and therefore does not see vendor 2 as competition. Whereas from the perspective of vendor 2, the overlapping area with vendor 1 covers some 50% of its potential clientele, and thus does see vendor 1 as competition.