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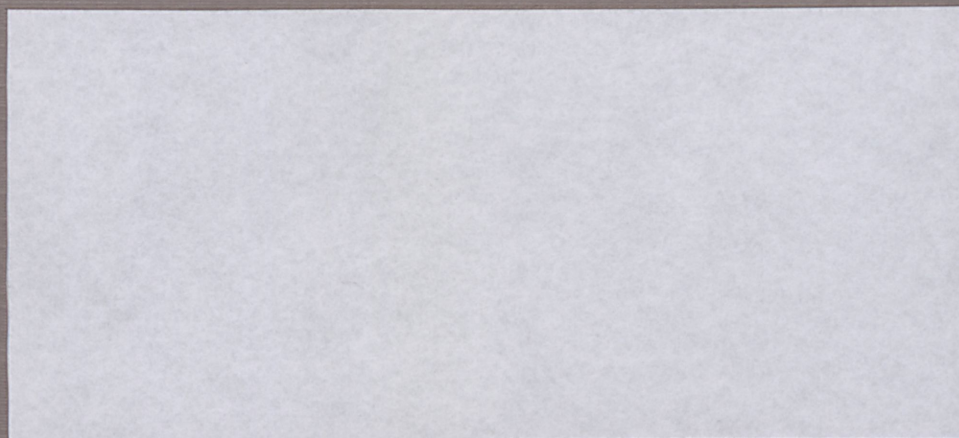
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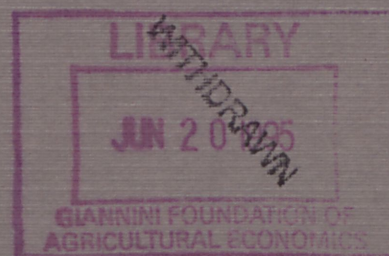


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**TOWARD A FRAMEWORK FOR ANALYZING
MULTIMARKET CONTACT AND
MULTINATIONAL COMPETITION**

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**I AM GRATEFUL TO DENNIS HENDERSON AND IAN SHELDON FOR THEIR INSIGHTFUL COMMENTS ON
AN EARLIER DRAFT OF THE PAPER.**

ABSTRACT

The possibility of noncompetitive behavior resulting from multimarket contact (i.e., mutual forbearance) has always been a source of concern among industrial organization economists and policy makers. The increasing global presence of multinational corporations has added a new dimension to the analysis of multimarket competition. Their growing influence on the world economy poses new questions about the effects of multinational competition on domestic welfare and the international competitiveness of domestic industries. Recent developments in the interface between industrial organization and international trade theories provide new research opportunities and may shed some light on the economic consequences of multinational competition and its policy implications. This paper outlines some of the major issues in the study of multinational competition and surveys recent theoretical and empirical studies of multinational and multimarket competition. It attempts to develop a conceptual framework whereby the nature of multinational competition in the food manufacturing sector can be analyzed. It is intended as a road map for on-going research.

1. Introduction

In recent years, the concept of global competition has become increasingly common both in academic literature as well as in the popular press. In reality, however, "global competition" really takes place in individual national markets, each separated from the rest by national boundaries, cultural differences, and artificial trade barriers. The global nature of this competition is reflected by the fact that a common set of major competitors compete against each other in each of these markets. Their collective strategy and behavior will have significant impacts on each country's domestic welfare and its international competitiveness as well as the nature of global competition. The situation poses an important question: does the presence of multinational corporations (MNCs) increase, decrease, or simply alter patterns of oligopoly interdependence in the world market [Caves, 1982]? This paper surveys recent theoretical and empirical studies of multinational and multimarket competition and attempts to develop a conceptual framework whereby the strategic behaviors of MNCs can be analyzed and their public policy implications ascertained.

2. Global Competition and Multinational Corporations

The MNC has been in existence for well over a hundred years. Some studies have traced its origin to the international activities of the medieval bankers [Caves, 1982]. In the past twenty years, MNCs have gained increasing importance as a form of international production organization. In fact, the total assets of some of the world's leading MNCs exceed the GNPs of various countries [Hertner and Jones, 1986]. Unlike the traditional vertical MNCs designed to secure resource bases and export markets, the new breed of MNCs are mostly horizontal enterprises across several national markets. A distinct feature of the new dimension of international competition is the fact that many of the MNCs encounter each other in multiple

national markets for the same or similar products. This kind of multimarket contact between MNCs has caused a great deal of concern among policy makers and economists about their potential effects on domestic/international welfare and on the competitiveness of domestic industries in international markets. The increasing global presence of MNCs poses new policy challenges to both home and host country governments. Unlike the problem of national sovereignty traditional MNCs posed to host countries in the past, the present wave of MNCs means that both home and host governments have to grapple with the effects of MNCs on domestic and global welfare and the competitiveness of domestic industries in international markets. In particular, researchers are beginning to wonder whether industrial policies should be used to further encourage domestic competition or should they be modified to breed "national champions" that are more likely to succeed in the increasingly brutal global competition [Henderson, 1992].

The strategic trade policy literature reexamines some of the welfare issues arising from imperfect competition in international markets [Brander and Spencer, 1985; Eaton and Grossman, 1985; Krugman, 1984; Thursby, 1988]. Traditional welfare economics stipulates that the rule for maximizing domestic welfare is for each firm to act competitively. To maximize national welfare in the context of imperfect international competition, however, each country would act like a monopolist to extract maximum rents from foreigners. The question for the domestic policy maker is how to encourage the domestic MNC to extract maximum monopoly rents from foreigners but act competitively in domestic markets? For all practical purposes, this is very difficult to achieve from the public policy standpoint. Even if this could be achieved through taxes, tariffs, subsidies, or other measures, it raises another question: Would such protective measures strengthen or reduce domestic MNCs' competitiveness in international markets? Recent evidence suggests that international competitiveness is positively correlated with domestic

competitiveness [Porter, 1990].

Multinational competition may take different forms, including licensing, joint ventures, and foreign subsidiaries, each representing increasing degrees of foreign involvement. Several factors contribute to the decision to operate in a foreign country: 1) The firm may possess some intangible assets it wants to protect, including patent, technological know-how, or managerial expertise (*e.g.*, marketing and promotion skills) which cannot be transacted at arm's length [Caves, 1982]; 2) Production facilities may be located in a particular country to economize on transportation costs, to take advantage of lower production costs, or to overcome trade barriers such as import quotas and tariffs; 3) direct foreign operations may be carried out as a strategic move in anticipation of future trade restrictions [Bhagwati, 1987] or to discipline other firms in the market [Caves, 1982]; 4) foreign direct involvement may reduce foreign exchange rate risk since most costs are denominated in the local currency [Cushman, 1987]; 5) when production facilities are located in the market where the final product is consumed, it is easier to tailor the product to local tastes; this is particularly important for many food products whose demand is heavily influenced by local factors [Reed, 1991].

3. MNCs in the Food Manufacturing Sector

The food manufacturing sector represents a growing international market. In 1990, the value of international trade in manufactured foods and beverages was about 3 times the value of world trade in bulk agricultural commodities. While U.S. exports of manufactured foods have grown rapidly in recent years, most large food manufacturers rely more heavily on various forms of foreign direct investment as their strategy to access foreign markets. Between 1982 and 1989, sales of U.S. MNC affiliates grew from \$39 billion to \$69 billion and have continued to grow at an annual rate of about 10 to 11 percent. U.S. MNCs had 734 food manufacturing plants

abroad in 1990 [Handy and Henderson, 1992]. Although the majority of these plants were located in developed countries in Europe, Canada and Japan, developing countries, especially Eastern Europe and the Pacific Rim, represent potentially fast-growing market for U.S. food manufacturing MNCs. In some branded food markets a small group of MNCs compete against each other and against non-MNC local firms in many national markets. Their ability to exercise market power is evidenced by the fact that they are able to price discriminate among different national markets even when these markets are within relatively close geographic proximity. An example is presented in Table 1.

Table 1 Pre-Tax Price Gap for Selected Products in the EC (March-April 1990)

Product	Lowest Price	Highest Price	Price Ratio
Coca-Cola	Amsterdam	Copenhagen	2.10
Heinz Ketchup	London	Madrid	1.98
Kelloggs Cornflakes	Amsterdam	Cologne	1.72
Mars Bars	London	Copenhagen	2.04
Nescafé	Athens	Milan	2.26
Toblerone	Amsterdam	Lisbon	1.92

Source: De Jonquieres, 1990

4. Strategic Interactions among MNCs and the Strategic Group Concept

The potential existence of market power resulting from multimarket contact brings forward a frequently suggested, albeit rarely tested economic concept: "mutual forbearance". The concept of mutual forbearance is hardly new. It has long been suspected that when the same set of firms compete in different markets, there is a tendency for them to engage in collusive behavior, *i.e.*, they tend to "pull their punches" realizing that all-out competition would hurt everyone. Instead, they can either put up token competition or compete in ways that benefit

themselves [Clarke, 1985]. Edwards summarized the concerns succinctly in his 1964 testimony before the U.S. Senate when he state:

When one large conglomerate competes with another, the two are likely to encounter each other in a considerable number of markets. The multiplicity of their contact may blunt the edge of their competition. A prospect of advantage from vigorous competition in one market may be weighted against the danger of retaliatory forays by the competitor in other markets. Each conglomerate competitor may adopt a live-and-let-live policy designed to stabilize the whole structure of the competitive relationship. [1964, p. 45]

The concept of mutual forbearance applies to diversified firms that operate in different product markets, or single-product firms that operate in several distinct geographic markets. Despite widespread multimarket contacts among firms, there has been relatively little research that examines its effects on economic performance. One of the obvious areas of application is the study of multinational competition. When MNCs encounter each other in several national markets, they have the incentive and opportunity to act strategically to maximize joint profits. In fact, there is evidence that some MNCs form foreign subsidiaries to preempt a rival or to punish one for an aggressive move undertaken elsewhere by an invading MNC [Caves, 1982]. Therefore, when used effectively, multimarket contact serves as a disciplinary mechanism in international oligopoly rivalry.

In recent years the concept of strategic groups has been widely used in both industrial organization and business policy research and may prove to be a useful analytical device for studying strategic interactions among MNCs. The term "strategic groups" was first introduced by Hunt [1972] to describe intraindustry group stratification. The idea was to subdivide an industry into finer groupings such that it "minimised economic asymmetry within each group". This concept was popularized by Caves and Porter [1977] and Porter [1980]. The most common criterion used to assign firms to strategic groups is according to the similarities of their strategies with group members and dissimilarities with nonmembers. Different strategic groups within an

industry are separated by what is called "mobility barriers" which are simply group-specific entry barriers. Under such a classification, "firms within a group resemble one another closely and recognize their mutual dependence most sensitively" [Caves and Porter, 1977]. The idea of strategic groups, combined with the dominant-firm model of oligopoly, provides a useful tool for analyzing multinational competition in the food manufacturing sector. Casual observation shows that some branded food and beverages markets are dominated by a group of MNCs and a fringe of national and local manufacturers. The MNCs are often larger in size and form a powerful core of oligopolists followed by a larger number of small and competitive firms. MNCs and national firms are affected by different factors and react to strategic moves by group members and nonmembers differently. Furthermore, the core group of MNCs encounter each other in several national markets while firms on the competitive fringe only compete locally or in one national market.

5. Theories and Empirical Studies of MNCs and Multimarket Competition

MNCs have been the focus of attention of several disciplines, including international trade and industrial organization. Prior to the 1970s, the two fields had carried out their work independently, with trade theorists concentrating on theoretical research and industrial organization economists applying their empirical tradition to the study of MNCs. Trade theorists made numerous attempts to incorporate the theory of the MNC into the general framework of the Heckscher-Ohlin-Samuelson model of international trade. These efforts were largely unsuccessful because the neoclassical tradition of the Heckscher-Ohlin-Samuelson model imposes simplifying assumptions that are too restrictive for the analysis of MNCs [Casson, 1986]. Industrial organization economists, on the other hand, had restricted their attention to the study of monopoly power and oligopoly rivalry in domestic markets. Since the early 1970s, the two fields

began to adopt theoretical and research ideas from the other [Sheldon, 1992]. Industrial organization studies began to incorporate the impacts of both imports and exports on domestic market power and behavior while the trade literature has been adapted to allow for increasing returns to scale, monopolistic competition, differentiated products, and imperfect information. These new developments in the interface between industrial organization and international trade provide new analytical tools for the study of MNCs and the convergence of the two research traditions provides new opportunities to advance the study and understanding of the MNC. Section 5.1 describes recent theoretical work on MNCs that incorporates new developments in the interface between industrial organization and international trade. Section 5.2 summarizes theoretical and empirical studies of oligopoly rivalry in the presence of multimarket contacts.

5.1. Models of Multinationals

Two different kinds of economic forces are at work to ensure that MNCs make good economic sense. First, there must be incentives for integrating two or more economic activities within a single firm. Second, there must also be incentives to disperse economic activities geographically. Models of MNCs examine how the combination of these two kinds of incentives leads to MNCs [Helpman and Krugman, 1986]. Two influential models of MNCs are presented in this paper.

A. The Helpman/Krugman Model

The Helpman/Krugman [1986] model is a modified version of the 2x2x2 model of international trade. There are two factors of production; labor, L , and capital, K . The production of the homogeneous product requires labor and capital. What is different between this model and the usual trade model is that the production of the differentiated product requires what Helpman and Krugman call headquarters services, H , in addition to labor and capital. Headquarter services

can be converted to a firm specific asset at a cost. Once converted, it can serve many plants and need not be located within a plant in order to serve its product lines. The conversion of H is assumed to be more capital-intensive than the production of either the differentiated good or the homogeneous good. A graphical representation of the model is presented below.

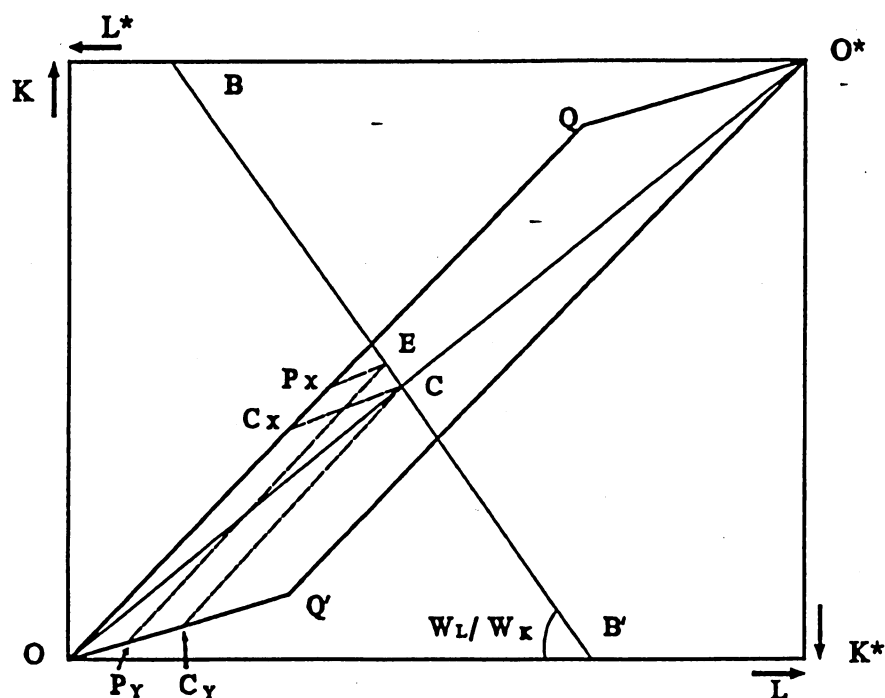


Figure 1 The FPE set without MNC

The dimensions of the figure show the combined factor endowments of the home and foreign countries. Assuming full factor employment, the vector OQ represents factors used in the differentiated goods sector and OQ' represents factors used in the homogeneous goods sector. The production of the differentiated goods is assumed to be capital-intensive while the production of the homogeneous goods is assumed to be labor-intensive. The vector OO^* represents aggregate employment and if all income is paid to factors, it is also, therefore GDP. The slope of the BB' line is the ratio of factor prices, w_L/w_K . The set $OQQ'O^*$ represents the so-called factor-price-equalization (FPE) set. If the initial factor endowment point falls anywhere within the FPE set, a trading equilibrium can be obtained whereby both factors are fully employed and factor prices

are equalized. One such endowment point is E where the Home produces OP_x of the differentiated good and OP_y of the homogeneous good. Home is a net exporter of the differentiated good and a net importer of the homogeneous good.

If factor endowment points lie outside of OQO^*Q^* , factor prices would not equalize if firms had to employ all factors in the same country. However, if firms did not have to employ all factors at a single location, and assuming capital is cheaper in Home and labor is cheaper in Foreign, firms would locate headquarter activities in Home and move production activities to Foreign. This gives rise to the MNC. This process will continue until either factor prices are equalized or Home becomes the parent of all firms. This situation is illustrated in Figure 2. As shown, employment in the manufacturing sector is decomposed into headquarter activities OD and plant employment DQ . Endowment points in the shaded areas will result in the formation of MNCs. Depending on the exact location of the initial endowment points, the MNC will produce some or all of the differentiated good in Foreign.

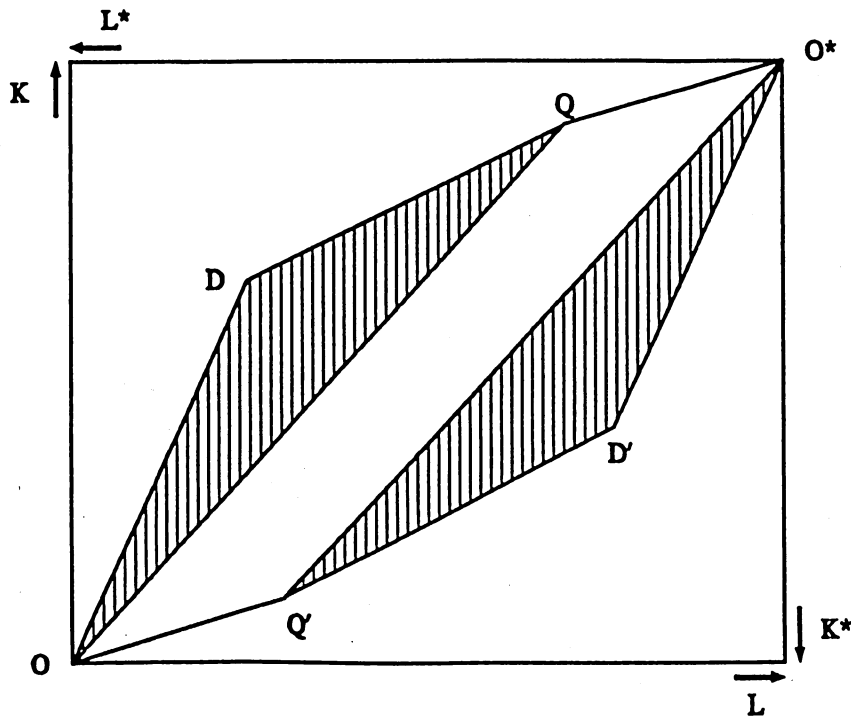


Figure 2 The FPE set in the presence of MNC

B. The Ethier Model

The Ethier [1986] model is also based on the standard 2x2x2 model of international trade. There are two factors of production, land and labor. The production of wheat requires both land and labor. Manufactures are a collection of n differentiated goods. The production of manufactures is divided into three stages: research, upstream production, and downstream production. Research and production of manufactures require only labor. Upstream production turns out a variety of manufactures; each variety can be produced at different quality levels. The unit cost of production is expressed as $c = aQw$, where w is the wage rate in terms of wheat, Q is the quality index ($0 \leq Q \leq Q_1$), and a is a technological parameter that relates the firm's research efforts to the unit cost of production. a can assume either of two values, $a_H > a_L$. Let R be the amount of resources spent on research, then the more resources are spent on research, the more likely a will be equal to a_L , i.e., $P'(R) > 0$, where $P(R)$ is the probability that $a = a_L$. But $P''(R)$ is assumed to be negative. The downstream production applies labor to the unfinished products from upstream production to produce the final good. The downstream activity is nontraded.

The key to deciding how much resources should be committed to research and downstream production is the value of a . But the value of a is not known until after such a commitment has been made. However, if the number n of varieties is sufficiently large, then the expected value of a can be obtained, i.e., $E(a) = P(R)a_L + [1 - P(R)]a_H$. In an integrated economy, the problem becomes one of deciding whether to produce and which quality to produce based on the value of w relative to a_L and a_H , given the following profit function:

$$p(R)Q_L(1 - a_Lw) + (1 - p(R))Q_H(1 - a_Hw) - (wR + qw^0) \quad (1)$$

where $w^0 = uw + (1 - u)w^*$ and w^* is foreign wage, u is the fraction of manufactures consumed

in the home country and $1 - u$ is the fraction consumed in the foreign country. In particular,

- 1) $w > (1/a_L) > (1/a_H)$. The firm produces nothing.
- 2) $(1/a_L) > (1/a_H) > w$. The firm may or may not enter depending on whether expected profit is non-negative. If it enters, it will produce the highest feasible quality, Q_I .
- 3) $(1/a_L) > w > (1/a_H)$. The firm again may or may not enter depending on the value of a . If $a = a_H$, it will not produce anything; if $a = a_L$, the firm will again produce the highest feasible quality, Q_I .

Theoretically, the same kind of equilibrium achieved in the internationally integrated firm can also be obtained by an arms' length contract between the home research and production firm and downstream firms in the foreign country. However, the public good nature of information produces an informational asymmetry between the home and foreign firms. The foreign firm would be willing to pay the full amount for the home firm's research results only if it could verify the value of the research. However, the home firm cannot prove the value of its research to the foreign firm without losing some of its proprietary control over the information. Under these circumstances a contract has to be designed such that it covers all conceivable states of nature in regard to the results of the research (or the amount of efforts the home firm puts into the research) and the quality of upstream products. This becomes increasingly difficult when the quality of good delivered becomes more difficult to measure. These difficulties in contract design and negotiation will eventually lead to the decision by the home firm to internalize the downstream activity. Differences in relative factor endowments play a crucial role in deciding the volume and type of trade, direct investment, and the international pattern of factor prices. Suppose that factor endowments differ greatly between the two countries with the home country being more labor abundant, the thus home wages lower than foreign wages. Since research and production of manufactures are labor intensive, all research and production activities take place at home. The home country exports unfinished manufactures in exchange for wheat. All trade

is interindustry and interfirm in nature. Foreign direct investment, two-way intraindustry and intrafirm trade will take place only when factor endowments become sufficiently similar and factor prices become equalized across countries.

Although both models incorporate the concept of intangible assets, they are dramatically different in their diagnoses of what contributes to the formation of MNCs. The Helpman/Krugman model suggests that *differences* in relative factor endowments between the home and foreign countries cause the firm to become multinational. The Ethier model, on the other hand, predicts that *similarities* in relative factor endowments lead to the formation of MNCs. Specifically, it claims that information asymmetry between the upstream and downstream firms and imperfections in the market for information leads firms to internalize transactions that would have been carried out at arms' length. A major contribution by both models is that they incorporate recent developments in the theory of international trade in the presence of imperfect competition in analyzing the decision to go multinational. Once it is cast in the framework of international imperfect competition, many of the behavioral aspects of multinational strategic interactions can be analyzed by the traditional theory of oligopoly rivalry.

5.2. Recent Theoretical Developments and Empirical Studies of Multimarket Competition

Although the discussion of mutual forbearance resulting from multimarket contact and its economic consequences has been going on for many years, there has been relatively little formal theoretical exposition and modeling of multimarket competition. Among the few exceptions are Bulow *et al* [1985] and Bernheim and Whinston [1990]. This section first presents a stylized model of multimarket duopoly which has served as the basis of several empirical studies. The Bulow *et al* and Bernheim and Whinston models are summarized followed by a brief discussion of recent empirical studies on this subject. All the models examined here were designed to study

domestic multimarket competition, but they can easily be extended to describe oligopoly rivalry in the multinational setting.

A. A Stylized Model of Multimarket Competition

Most of the empirical studies of multimarket contacts are based on an extended version of the conventional single-market duopoly model widely used in the industrial organization literature. In a conventional single-market duopoly model with two firms competing in the same market, each firm chooses a strategy s_i from a set of strategies $S_i = \{s_1, \dots, s_n\}$, $i = 1, 2$.

Total revenue for firm i : $R_i = (S_1, S_2)$

Total cost for firm i : $C_i = (S_i)$

Total profit for firm i : $\Pi_i = R_i - C_i$

The first-order condition for profit maximization requires:

$$\frac{\partial \Pi_1}{\partial S_1} = \frac{\partial R_1}{\partial S_1} + \frac{\partial R_1}{\partial S_2} \cdot \frac{dS_2}{dS_1} - \frac{\partial C_1}{\partial S_1} = 0 \quad (4)$$

The choice of S depends on the nature of the competition. It may be output level in the case of Cournot competition, or price in the Bertrand model, or some other variable such as advertising, investment in fixed costs, *etc.* Oligopoly interdependence is captured by the term:

$$\frac{\partial R_1}{\partial S_2} \cdot \frac{dS_2}{dS_1} \neq 0 \quad (5)$$

Now suppose firm 1 operates in markets A and B, and firm 2 operates in markets A and C. Firm 1's strategy in market A will be affected by the basic demand/supply conditions and firm 2's strategy in market A, but not by what firm 2 does in market C. Neither is firm 2's strategy in market A affected by firm 1's strategy in market B. More generally:

$$\frac{\partial R_{1j}}{\partial S_{2k}} \cdot \frac{dS_{2k}}{dS_{1j}} \neq 0 \quad \text{for } j=k, \quad \text{and} \quad \frac{\partial R_{1j}}{\partial S_{2k}} \cdot \frac{dS_{2k}}{dS_{1j}} = 0 \quad \text{for } j \neq k. \quad (6)$$

where, $j, k = 1, \dots, n$ denote markets in which firms 1 and 2 operate.

In a multimarket duopoly model in which firms meet in more than one market, things will be different. Suppose firm 1 and firm 2 now both operate in n markets, then

Firm 1's total revenue in market j : $R_{j1} = R_{j1}(S_{j1}, S_{j2}) \quad j = 1, \dots, n.$

Firm 1's total cost in market j : $C_{j1} = C_{j1}(S_{j1})$

Firm 1's total profits are equal to the sum of its profit in each of the n markets:

$$\Pi_1 = \Pi_{j1} + \dots + \Pi_{n1} \quad (7)$$

The first-order condition for profit maximization requires:

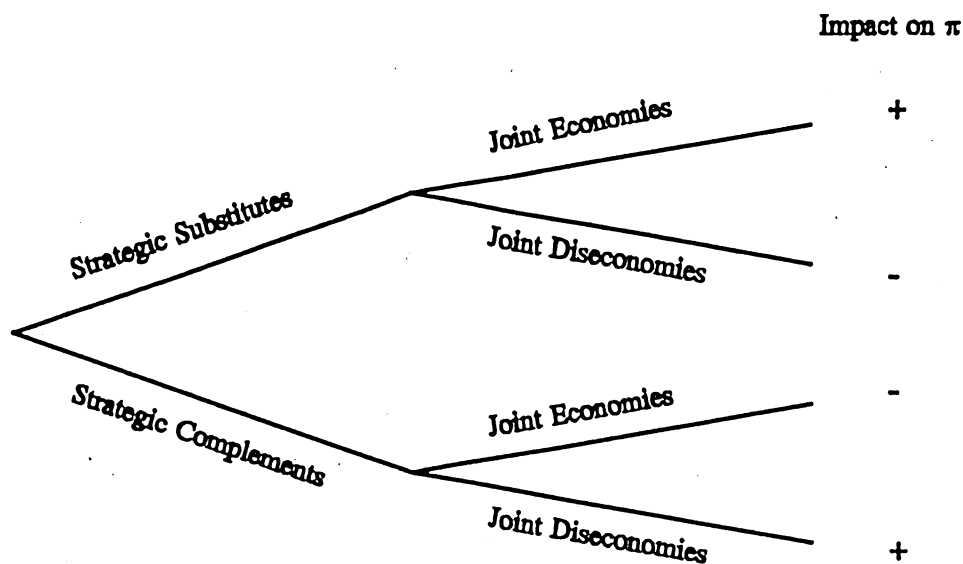
$$\frac{\partial \Pi_1}{\partial S_{j1}} = \frac{\partial R_{j1}}{\partial S_{j1}} + \frac{\partial R_{j1}}{\partial S_{j2}} \cdot \frac{dS_{j2}}{dS_{j1}} + \sum_{\substack{k=1 \\ j \neq k}}^n \frac{\partial R_{k1}}{\partial S_{k2}} \cdot \frac{\partial R_{k2}}{\partial S_{j1}} - \frac{\partial C_{j1}}{\partial S_{j1}} = 0 \quad (8)$$

The theory of mutual forbearance suggests that, in choosing its strategy in each market, firm 1 must consider its own demand function, and its conjecture of its rival's reaction in the market and in other markets where they meet. A threatening move by firm 1 in one market may prompt firm 2 to react in that market. Since they meet in multiple markets, firm 2 may also choose to retaliate against firm 1 in other markets where firm 2 is better positioned to counterattack. Therefore, in formulating a strategy for one market, firm 1 must take into consideration the consequence on its total revenue of all possible reactions by firm 2 in all markets where they meet. Recognizing the multimarket interdependence, the duopolists may wish to choose strategies that are mutually beneficial, those that reinforce their collective competitive positions against potential entry or against small, single-market firms on the competitive fringe. By avoiding direct confrontation, the duopolists maximize their combined multimarket profitability.

B. The Bulow *et al* Model

Bulow *et al* [1985] expand the conjectural variation approach toward analyzing oligopoly rivalry by introducing the concepts of "strategic substitutes" and "strategic complements" into the

framework of analysis. In a two-firm, two-market model, suppose firm A is a monopolist in market 1, and a duopolist with firm B in market 2. The two firms compete in market 2 by choosing to be more "aggressive" or less "aggressive". The strategy variable may be price, quantity, *etc.* The two firms' products are strategic substitutes (complements) if a more aggressive strategy by firm A lowers (raises) firm B's marginal profits. They suggest that firm B's reaction to an aggressive move by firm A in market 2 hinges on whether the two firms' products are strategic substitutes or strategic complements. If the products are strategic substitutes, firm B's best response to a more aggressive strategy is to be less aggressive; if the products are strategic complements, firm B's best response is to be more aggressive as well. The core result of the model is that a positive demand shock (in favor of firm A) in market 1 may increase or decrease firm A's total profits depending on whether the two markets exhibit joint economies or joint diseconomies since firm A's gain in total profits from a change in market 1 is affected by changes in its optimization behavior in market 2, which in turn affects and is affected by firm B's reactions. The exact impact of such a demand shock in market 1 on firm A's total profits can be summarized by the following diagram.



Therefore, in formulating its competitive strategies (to be more aggressive or less aggressive), firm A must determine whether the two firms' products are strategic substitutes or complements. Bulow *et al* argue that distinguishing the two types of products helps clarify some of the ambiguities in oligopoly theory and make more precise predictions of oligopoly behavior.

C. The Bernheim-Whinston Model

The main focus of the Bernheim-Whinston study is how multimarket contact affect firms' abilities to sustain non-competitive outcomes. The basic idea of the model is straightforward. In an oligopolistic market characterized by mutual interdependence, firms have two options: to cooperate and, therefore, share jointly maximized profits, or to cheat by deviating from the agreed-upon strategy slightly and, therefore, get a bigger slice of the pie. The incentive constraint that ensures the existence of a sustainable collusive equilibrium is binding when the payoff from abiding by the agreement is no less than the gain from cheating. In the presence of multimarket contacts, the cheating firm will not only have to consider the gains and losses in the market in which it cheats, but also potential losses in other markets in which other firms may choose to retaliate. Therefore, a firm facing the same set of competitors has more incentive to cooperate than one that does not compete with the same set of firms.

Specifically, in a two firm, single-market model, suppose S_{ik} is the strategy set of firm i in market k , $\pi_{ik}(s_{ik}, s_{jk})$ is firm i 's static payoff function in market k , where, $s_{ik} \in S_{ik}$ and $s_{jk} \in S_{jk}$. If firm i deviates from the collusive regime in market k , the optimal punishment yields a discounted payoff to firm i of \underline{v}_{ik} . Therefore, strategies (s_{ik}, s_{jk}) are supportable as a perfect equilibrium in market k if and only if:

$$\pi_{ik}(\hat{s}_{ik}(s_{jk}), s_{jk}) + \delta \underline{v}_{ik} \leq \left(\frac{1}{1-\delta}\right) \pi_{ik}(s_{ik}, s_{jk}) \quad i = 1, 2 \quad (2)$$

where, $\hat{s}_{ik}(s_{jk})$ is firm i 's static best response to s_{jk} ,
 δ is the discount factor used by both firms.

The left-hand side of the equation is firm i 's profits if it deviates, while the right-hand side is firm i 's discounted profits from abiding by the agreement.

When firms operate in two markets, they recognize that deviation from the collusive regime in one market will be met with punishment in both markets. Therefore, if a firm decides to deviate, it pays to do so in both markets. In doing so, the firm pools the incentive constraints of both markets. As a result, strategies $[(s_{1A}, s_{2A}), (s_{1B}, s_{2B})]$ are supportable as a perfect equilibrium if:

$$\sum_{k=A,B} \{ \pi_{ik}(s_{ik}(s_{jk}), s_{jk}) + \delta v_{ik} \} \leq \sum_{k=A,B} \left\{ \left(\frac{1}{1-\delta} \right) \pi_{ik}(s_{ik}, s_{jk}) \right\} \quad i=1, 2 \quad (3)$$

Pooling the incentive constraints of the two markets can potentially relax binding constraints and increase collusive profits. Bernheim and Whinston demonstrate that when identical firms using identical technologies operate in identical markets, multimarket contacts do not have a real effect the outcome of market competition. However, when any of these conditions is relaxed, multimarket contacts may indeed induce collusive behavior. Interestingly, the sign of the effect can be either positive or negative depending on the value of the discount factor. This implies that the effects of multimarket contact may not necessarily be socially undesirable.

D. Empirical Studies of Multimarket Competition

In recent years, attempts have been made to evaluate the performance impact of multimarket contact. The hypothesized relationship between multimarket contact and the degree of competition has been tested in a number of empirical studies. Most of these studies examine whether cross-sectional or time-series differences in performance are related to operationalized measures of multimarket contact. In particular, the study by Heggstad and Rhodes [1978] examined the degree of multimarket interdependence in the banking industry and its impact on local market competition. They concluded that multimarket encounters tended to reduce the intensity of competition among major banks and lead to misallocation of resources. Using the

line of business data, Scott [1982] examined the degree of multimarket contact among 437 manufacturing firms and its impact on firm profits. He concluded that, when accompanied by mobility barriers, multimarket contact had a significant positive impact on firm profits. Interestingly, he found that multimarket contact alone was not a sufficient condition for collusion unless it was coupled with intraindustry mobility barriers. This raises the prospect of using multinational strategic groups as a unit of analysis in the study of multinational competition. Although the literature in general has found a significant multimarket effect, some studies concluded otherwise. In particular, Strickland [1985] examined the possible link between multimarket contact and the intensity of price competition for 200 large manufacturing firms. He found no evidence supporting the mutual forbearance hypothesis and suggested that conglomerate mergers should not be restricted based on this hypothesis. As Bernheim and Whinston point out, one of the most challenging tasks in empirical studies of multimarket contact is how to separate the effects of multimarket mutual forbearance from those of other factors. Partly because of this difficulty, a growing body of literature examining multimarket behavior under experimental conditions has emerged [Feinberg and Sherman, 1985, 1988; Phillips and Mason, 1992]. These studies generated mixed results about the performance impacts of multimarket contact.

6. Evidence of Multinational Contact in Food Manufacturing

The primary objective of this research is to develop a conceptual framework whereby further evidence can be obtained and analyzed to ascertain the possibility that MNCs in the food manufacturing sector are acting strategically. As a first step toward achieving this objective, detailed case studies of a small group of target industries were conducted. These industries include beer, soft drinks, confectionery, ready-to-eat (RTE) breakfast cereals, and prepared soups. This investigation generated ample descriptive information concerning the structures of these

industries and the behavior of MNCs in these industries. Data for the case studies come from a number of sources, including company annual reports and 10-K forms, news reports in *The Wall Street Journal* and *Business Week*, financial and market information published in *Euromonitor* and cited in Sutton [1991]. These studies focused on the United States and four European markets: France, Germany, Italy, and the U.K.

Three of the five industries were eliminated from the group. Both the U.S. and European beer markets are dominated by national firms. No foreign MNCs are in the top four market share bracket in any of the five markets. Most of these markets are highly concentrated with CR4 ranging from 55% in Italy to 83% in France. The exception is the German market which is highly fragmented, with CR4 less than 30%. The soft drink industry was eliminated because no MNC poses a credible competitive force against Coca-Cola in the European markets. Despite its intense rivalry with Coca-Cola in the U.S. market, Pepsi does not have a significant presence in most European markets where Coca-Cola enjoys a comfortable lead over most domestic producers. Coca-Cola's competitive strengths in Europe are largely attributed to its first-mover advantage due to historical reasons. The confectionery market exhibits similar characteristics, where Mars is the only firm that has significant presence in both U.S. and European markets.

Two industries that appear to be good candidates for empirical analysis are RTE breakfast cereals and prepared soups. The RTE cereals markets are characterized by a leader-follower relationship between Kellogg and Quaker Oats in both the U.S. and European markets. Kellogg has 42% of the U.S. market and 50% or more in all the European markets surveyed. Quaker Oats is among the top four in all but the German market. In most cases, their competitors are national firms whose operations are limited to domestic markets. Of more interest is the prepared soups industry which is characterized by a "reciprocal leader-follower" relationship between Campbell Soup and Heinz in the U.S. and U.K. markets. The reciprocal relationship is evidenced

not only by market shares with Campbell Soup controlling the U.S. market and Heinz dominating the U.K. market, but also by the distinctly different strategies the two firms adopt in each market. In the U.S., Campbell dominates the branded soup market while Heinz mainly supplies the private label market. In the U.K. the roles are reversed with Heinz controlling the branded soup market and Campbell selling primarily to the private label market. Although this particular market structure may have resulted from the fact that the host firms enjoyed first-mover advantage in the early days of the industry's development, it is interesting nevertheless to investigate how multimarket contact and interdependence have contributed to their selection of strategies in competing with one another and in competing with other non-MNC firms in the industry. Studies have shown that the reciprocal leader-follower relationship has been challenged by the follower in both markets [Sutton, 1991]. In the early years of the century, Heinz spent heavily on advertising and other promotional efforts in an attempt to break into the branded soups market in the U.S. Selling costs exceeded one third of its sales revenue, but the company failed to significantly erode Campbell's market position. During the 1960s and early 1970s, Campbell began a foray into the branded soups market in the U.K. Despite staggering advertising expenditure, Campbell's share remained stable at 12 percent. Since then the two firms have adopted a strategy to avoid direct confrontation, each focusing on the branded segment in the home market and the private label market in the other's home market. The lesson both firms appeared to have learned in the battle for market share is that life for both can be a lot easier if they learn to live with each other.

7. Summary and Future Research

This paper outlines some of the major issues and policy concerns arising from imperfect competition in international markets. Recent developments in the interface between industrial organization and international trade present new opportunities and challenges to researchers to

reexamine the strategic interactions between MNCs who may be enticed by the potential payoffs to engage in tacit collusion in order to maximize joint profits. Insights into multinational competition may have significant implications for public policies toward MNCs.

Further analysis is needed to investigate the following aspects of multinational competition in these industries:

- Types of foreign investment strategies, *e.g.*, licensing, joint ventures, foreign subsidiaries.
- Pricing strategies and nonprice strategies used by MNCs and non-MNC firms.
- Industry conditions, *e.g.*, entry conditions, concentration, scale economies, *etc.*
- Government policy including incentives for and restrictions on foreign investment.

Such qualitative and quantitative data will provide more insight into the extent of multinational operations in these industries, their competitive practices, their impact on domestic and international welfare, and other aspects of multinational competition. Equipped with this information, the multimarket duopoly model can be expanded to analyze multinational competition and its economic consequences. There is an existing body of literature on estimating oligopoly power in domestic markets [Iwata, 1974; Appelbaum, 1982; Geroski, 1988; Schroeter, 1988; Azzam and Pagoulatos, 1990]. These models typically use conjectural elasticities, or variations of it, to estimate the degree of oligopoly interdependence and market power. These models can be modified to generate cross conjectural elasticities which measure oligopoly interdependence and market power across national markets. Such analysis will provide insights into the nature of multimarket contact and multinational competition.

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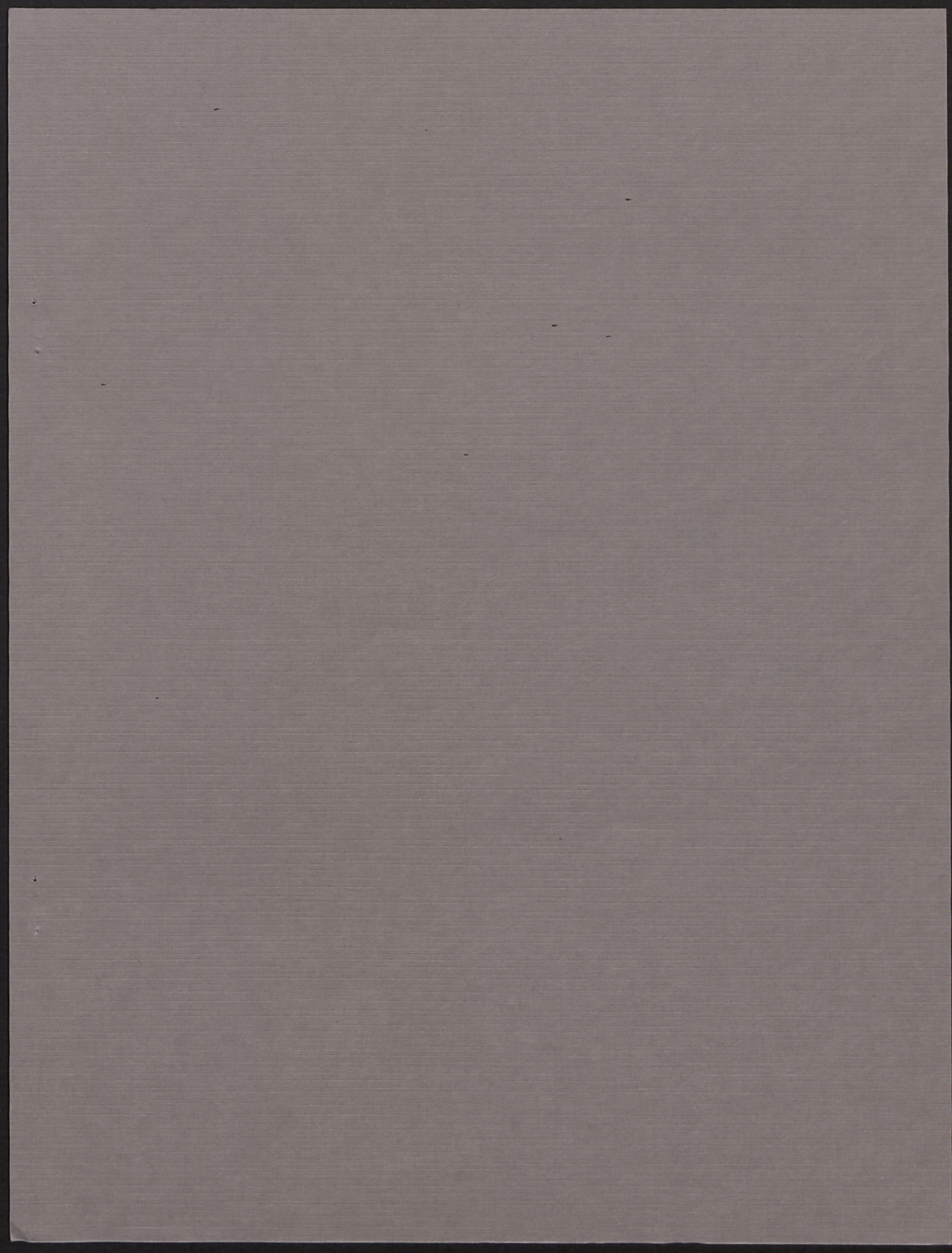
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