

# **DYNAMIC RANDOM ACCESS MEMORY SEMICONDUCTORS OF 256 KILOBITS AND ABOVE FROM JAPAN**

**Determination of the Commission  
in Investigation No. 731-TA-300  
(Preliminary) Under the Tariff  
Act of 1930, Together With  
the Information Obtained  
in the Investigation**

**USITC PUBLICATION 1803**

**JANUARY 1986**

**UNITED STATES INTERNATIONAL TRADE COMMISSION**

**COMMISSIONERS**

**Paula Stern, Chairwoman**  
**Susan W. Liebeler, Vice Chairman**  
**Alfred E. Eckes**  
**Seeley G. Lodwick**  
**David B. Rohr**  
**Anne E. Brunsdale**

---

Ilene Hersher, Investigator  
Nelson J. Hogge, Industry Analyst  
Howard L. Gooley, Economist  
Chand Mehta, Accountant  
Judith Czako, Attorney

---

Lynn Featherstone, Supervisory Investigator

**Address all communications to**  
**Kenneth R. Mason, Secretary to the Commission**  
**United States International Trade Commission**  
**Washington, DC 20436**

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Note.—Data which would disclose confidential operations of individual concerns may not be published and therefore have been deleted from this report. Deletions are indicated by asterisks.

UNITED STATES INTERNATIONAL TRADE COMMISSION  
Washington, DC

Investigation No. 731-TA-300 (Preliminary)

DYNAMIC RANDOM ACCESS MEMORY SEMICONDUCTORS  
OF 256 KILOBITS AND ABOVE FROM JAPAN

Determination 1/

On the basis of the record 2/ developed in the subject investigation, the Commission determines, pursuant to section 733(a) of the Tariff Act of 1930 (19 U.S.C. § 1673b(a)), that there is a reasonable indication that an industry in the United States is materially injured or threatened with material injury by reason of imports from Japan of dynamic random access memory semiconductors having a memory capacity of 256 kilobits and above, 3/ of both the N-channel and the complementary metal oxide semiconductor type, whether in the form of processed wafers, unmounted die, mounted die, or assembled devices, provided for in item 687.74 of the Tariff Schedules of the United States, which are alleged to be sold in the United States at less than fair value (LTFV). 4/

Background

This investigation was instituted by the Commission in response to notification from the Department of Commerce on December 11, 1985, that it was self-initiating an antidumping investigation on the subject products (50 F.R. 51450, Dec. 17, 1985). Notice of the institution of the Commission's investigation and of a public conference to be held in connection therewith was given by posting copies of the notice in the Office of the Secretary, U.S.

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1/ Commissioner Brunsdale was sworn in on Jan. 3, 1986, and, therefore, did not participate in this determination.

2/ The record is defined in sec. 207.2(i) of the Commission's Rules of Practice and Procedure (19 CFR § 207.2(i)).

3/ Vice Chairman Liebler and Commissioner Eckes base their determinations in this preliminary investigation on semiconductors up to and including 1 megabit.

4/ Commissioner Lodwick determines that there is a reasonable indication that an industry in the United States is materially injured by reason of imports from Japan of the subject merchandise.

International Trade Commission, Washington, DC, and by publishing the notice in the Federal Register of December 18, 1985 (50 F.R. 51613). A second notice was published on December 26, 1985 (50 F.R. 52869), rescheduling the conference from January 3, 1986, to January 6, 1986. All persons who requested the opportunity were permitted to appear at the conference in person or by counsel.



VIEWS OF THE COMMISSION 1/

We determine that there is a reasonable indication that an industry in the United States is materially injured or threatened with material injury by reason of imports of dynamic random access memory semiconductors (DRAM's) of 256 kilobits and above from Japan which are allegedly being sold at less than fair value (LTFV). 2/ Our determination is based primarily on the poor financial condition of the domestic industry, the rapid increase in import volumes, the adverse impact of imports on recent price trends, and the particular sensitivity of this industry to decreased profitability due to the necessity for high expenditures in research and development and in capital investment for production facilities.

Like product and the domestic industry 3/

The term "industry" is defined in section 771(4)(A) of the Tariff Act of 1930 as "the domestic producers as a whole of a like product, or those producers whose collective output of the like product constitutes a major

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1/ Commissioner Brunsdale did not participate in this determination.

2/ Commissioner Lodwick determines that there is a reasonable indication that a domestic industry is materially injured by reason of allegedly LTFV imports of DRAM's of 256 kilobits and above from Japan.

3/ Should this case return to the Commission for a final investigation, the Commission strongly urges the parties to address the general question of appropriate frameworks for the analysis of the like product and domestic industry issues in this investigation. In addition, among the factual matters which the Commission believes should be further addressed are a more complete analysis of the assembly/testing process, including the technologies and costs involved; the relationships between the various corporate entities which may be involved in the production process for DRAM's; and more complete cost of production information. The Commission notes that it asked these same questions in its recent determination in Erasable Programmable Read Only Memories from Japan, Inv. No. 731-TA-288 (Preliminary), USITC Pub. No. 1778 (1985) (hereinafter EPRM's). Nothing in this opinion should be construed to indicate a predisposition by the Commission as to the answers to questions raised herein in any final investigation concerning the articles at issue here, or concerning other semiconductor products.

proportion of the total domestic production of that product." 4/ In turn, "like product" is defined as "a product which is like, or in the absence of like, most similar in characteristics and uses with, the article subject to an investigation . . . ." 5/

The "article subject to an investigation" is defined by the scope of the investigation initiated by the Department of Commerce (Commerce). In this case, Commerce defined the scope of the investigation to be:

Japanese DRAMs having a memory capacity of 256 kilobits and above, of both the N-channel and complementary metal oxide semiconductor type, whether in the form of processed wafers, unmounted die, mounted die, or assembled devices. 6/

A DRAM is a monolithic integrated memory circuit containing thousands of memory storage cells (bits), each of which contains a transistor and capacitor. A stored program can be created in the DRAM by charging selected capacitors. The storage cells in a DRAM are arranged in a rectangular array of columns and rows, which allows each cell to be accessed independently (random access). The electrical charge stored on the cells must be regenerated after being accessed, and periodically because of leakage. The required regeneration of the charge on the capacitors makes the device

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4/ 19 U.S.C. § 1677(4)(A).

5/ 19 U.S.C. § 1677(10).

6/ Notice of Initiation, 50 Fed. Reg. 51,450 (Dec. 17, 1985). Commerce had originally included within the scope of its investigation processed wafers and dice produced in Japan and assembled into finished DRAM's in another country prior to importation into the United States from the other country. These imports have been dropped from the scope of the investigation by Commerce. Letter of Jan. 3, 1986, from Gilbert Kaplan, Deputy Assistant Secretary for Import Administration to Paula Stern, Chairwoman. The majority of the imports at issue consist of assembled DRAM's of 256K. Imports of unassembled DRAM's of 256K are substantially less, while imports of DRAM's of above 256K, whether assembled or unassembled, are negligible. Report of the Commission (Report) at A-27. Processed wafers and dice are referred to in the Report as "uncased DRAM's," while assembled, or finished DRAM's are referred to as "cased DRAM's."

"dynamic." 7/ DRAM's vary in the speed at which the storage cells can be addressed (access time), and in density (the number of capacitors, expressed as multiples of 1,024 capacitors, kilobits, or K).

The production of DRAM's can be divided into several basic manufacturing operations. The production of the dice on the silicon wafer, called wafer fabrication, is one of the most difficult and costly of these operations. 8/ It involves significant investment of capital, both in basic research and in developing the highly sophisticated manufacturing technology. Following fabrication, each die on the wafer is electrically tested. Defective dice are marked for discards. This stage, known as wafer sorting, is generally performed at the same manufacturing establishment where wafer fabrication takes place. The process of wire bonding and final sealing of the individual die in a case is called assembly, and may take place in the same manufacturing establishment as wafer fabrication, or elsewhere. After assembly, each unit is tested and marked for identification prior to shipment.

#### like product

The Commission's decision regarding the appropriate like product in an investigation is essentially a factual determination. The Commission looks for clear dividing lines among products in terms of distinct characteristics and uses. Minor variations in products have been determined to be an

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7/ The need to regenerate the stored charges distinguishes DRAM's from other random access memory semiconductors, called static RAM's (SRAM's), which do not require refresh charges, but are more costly to produce. Report at A-4.

8/ Wafer fabrication involves repeated photolithographic steps and the controlled introduction of impurities (dopants) into the silicon crystal wafer.

insufficient basis for separate like product analysis. 9/ In making its determinations, the Commission has considered such factors as physical appearance, customer perceptions of the articles, common manufacturing facilities and production employees, channels of distribution, and interchangeability between products. 10/ In addressing the question of whether products at an earlier stage of their production process are "like" a "finished" product, the Commission may consider the necessity for and the costs of further processing, the degree of substitutability or interchangeability of the articles at the different stages of production, the degree to which the article at an earlier stage is dedicated to use in the finished product, whether there exists a significant independent use or an independent commercial market for the article at the earlier stage of production, and whether the article at the earlier stage of production embodies an essential characteristic of the finished product or imparts such a

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9/ See, e.g., EPROM's, supra note 3. Certain Radio Paging and Alerting Receiving Devices from Japan, Inv. No. 731-TA-102 (Final), USITC Pub. No. 1410 at 5 (1983); Certain Amplifier Assemblies and Parts Thereof from Japan, Inv. No. 731-TA-48 (Final), USITC Pub. No. 1266 at 4-5 (1982); Certain Steel Products from Belgium . . . ., Invs. Nos. 701-TA-86-144, 146, and 147 (Preliminary), USITC Pub. No. 1221 at 14-16 (1982).

10/ See, e.g., Certain Television Receivers from the Republic of Korea and Taiwan, Invs. Nos. 731-TA-134 and 135 (Final), USITC Pub. No. 1514 at 3-6 (1984); Certain Radio Paging and Alerting Receiving Devices from Japan, supra note 9, at 8-9 (1983).

characteristic to the final product. 11/ 12/ No single factor is determinative.

In addition, we are cognizant of Congress' admonition against too narrow an interpretation of the term "like product" in the legislative history of the Trade Agreements Act of 1979:

The requirement that a product be 'like' the imported article should not be interpreted in such a narrow fashion as to permit minor differences in physical characteristics or uses to lead to the conclusion that the product and the article are not 'like' each other, nor should the definition of 'like product' be interpreted in such a fashion as to prevent consideration of an industry adversely affected by the imports under investigation. 13/

The first question which arises with respect to the like product determination in this investigation is whether cased DRAM's are like uncased DRAM's. Several of the parties in opposition to the imposition of antidumping

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11/ See, e.g., Cellular Mobile Telephones and Subassemblies Thereof from Japan, Inv. No. 731-TA-207 (Final), USITC Pub. No. 1786 (1985); EPROM's, supra note 3; 64K Dynamic Random Access Memory Components from Japan, Inv. No. 731-TA-270 (Preliminary), USITC Pub. No. 1735 (1985) (hereinafter 64K DRAM's); Live Swine and Pork from Canada, Inv. No. 701-TA-224 (Final), USITC Pub. No. 1733 (1985); Nylon Impression Fabric from Japan, Inv. No. 731-TA-269 (Preliminary), USITC Pub. No. 1726 (1985); Photo Albums and Photo Album Filler Pages from Hong Kong and the Republic of Korea, Invs. Nos. 731-TA-240-241 (Preliminary), USITC Pub. No. 1660 (1985); Cellular Mobile Telephones and Subassemblies Thereof from Japan, Inv. No. 731-TA-207 (Preliminary), USITC Pub. No. 1629 (1984); Oil Country Tubular Goods from Argentina, Brazil, Korea, Mexico, and Spain, Invs. Nos. 731-TA-191-195 and 701-TA-215-217 (Preliminary), USITC Pub. No. 1555 (1984); Certain Steel Valves and Certain Parts Thereof from Japan, Inv. No. 731-TA-145 (Preliminary), USITC Pub. No. 1446 (1983); Forged Undercarriage Components from Italy, Inv. No. 701-TA-201 (Preliminary), USITC Pub. No. 1394 (1983); Fireplace Mesh Panels from Taiwan, Inv. No. 701-TA-185 (Preliminary), USITC Pub. No. 1284 (1982); Rail Passenger Cars from Canada, Inv. No. 701-TA-182 (Preliminary), USITC Pub. No. 1277 (1982).

12/ As he noted in EPROM's, supra note 3, at 7 n.13, Commissioner Rohr notes that while these factors may be implicit in prior Commission decisions, they have not necessarily been expressed in the terms stated above. It is not clear therefore that they account for the decisions in those investigations. If this matter returns to the Commission for a final investigation, the parties should address both the factual basis for the consideration of these factors as well as whether these factors or others should form the basis for the Commission's like product analysis.

13/ S. Rep. No. 249, 96th Cong., 1st Sess. 90 (1979).

duties argue that assembled DRAM's and "components," i.e., processed wafers and unassembled dice, are separate like products. The Commission has had occasion to consider this question in a previous investigation. 14/ The parties have made no new arguments concerning the analysis of this issue.

There appears to be virtually no independent commercial market for DRAM wafers and dice. 15/ Moreover, once wafer fabrication commences, the resulting dice are dedicated to a single use, as the memory storage unit in a finished DRAM. 16/ The die in each DRAM embodies, and imparts to the finished DRAM, the essential characteristic for which a DRAM is purchased by end users, randomly accessible memory capacity. 17/ Sales to end users are almost entirely of finished DRAM's, which are sold as the product of the company

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14/ In the only other case in which the question was addressed, EPROM's, supra note 3, the Commission preliminarily concluded that wafers, dice, and assembled EPROM's are a single like product. The Commission emphasized that this conclusion was only for purposes of that preliminary investigation and that the issue would be considered anew in any final investigation.

Vice Chairman Liebler raised the question of whether wafers and dice and assembled integrated circuits are like in 64K DRAM's, supra note 11, at 21, 22, & n.1. However, the question had not previously been raised in that investigation, and no determination as to that issue was made. It is clear from the Commission's report that in that investigation there were imports of both assembled and unassembled chips, with assembly operations taking place overseas using both U.S.-produced and foreign-produced wafers and dice. The issue of whether assembled or unassembled DRAM's constitute one or two like products was not specifically addressed in 64K DRAM's.

15/ An insignificant percentage of dice may be sold to manufacturers of "hybrid" semiconductor chips. Tr. at 176. Further information on the extent of any such sales will be sought should this matter return for a final investigation.

16/ Commissioner Eckes and Commissioner Rohr note that whether the article at an earlier stage of production is dedicated to a single use is a relevant, but not a determinative factor. Thus, the preliminary determination here, that DRAM wafers and dice are like finished DRAM's, is not inconsistent with the Commission's determination in Live Swine and Pork from Canada, Inv. No. 701-TA-224 (Final), USITC Pub. No. 1733 (1985), where, in a final investigation, the Commission determined that live swine are not like fresh, chilled, or frozen pork.

17/ We note that this may be an oversimplification of the essential characteristics of a DRAM and urge the parties to address this question should this matter return to the Commission for a final investigation.

which manufactured the wafers and dice. Therefore, we have determined for purposes of this preliminary investigation that cased DRAM's are like uncased DRAM's. 18/

The second question which arises with respect to the like product determination in this investigation is whether there is more than one like product based on different densities of DRAM's. Several parties argued that the Commission should determine that there are two like products in this investigation, 256K DRAM's and 1 megabit (1M) DRAM's. In addition, these parties argued that since there are no imports of DRAM's of a density greater than 1M, there is no corresponding like product. The question of whether DRAM's of different densities constitute a single like product or whether each density constitutes a separate like product has not previously been addressed by the Commission as a whole, although the issue has been noted. 19/

The parties in support of the imposition of antidumping duties argue that each successive generation of DRAM, from the first introduction of the 1K DRAM, has been an evolutionary development of a single product, and that

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18/ No party has argued that wafers and dice should be found to be separate like products. In our view, these two should not be analyzed separately; DRAM dice are simply DRAM wafers which have been cut apart.

Fujitsu, a party in opposition to the imposition of antidumping duties, has argued that DRAM's of the complementary metal oxide semiconductor (CMOS) type are not like DRAM's of the N-channel metal oxide semiconductor (NMOS) type. For purposes of this preliminary investigation, we have concluded that CMOS and NMOS DRAM's are like products. See n.3, supra.

19/ In the 64K DRAM's investigation, the petition was filed with respect only to DRAM's of 64K, the scope of Commerce's investigation was limited to DRAM's of 64K, and no party raised the issue of whether domestically produced DRAM's of different densities are "like" the imports subject to that investigation. The Commission, in concluding that the like product was DRAM's of 64K, simply did not address the possibility that other densities may be "like" the imported 64K DRAM's. Similarly, in EPROM's, while the Commission recognized that the density question existed, no party made any arguments against the conclusion argued by petitioners in that investigation, and preliminarily reached by the Commission, that EPROM's of all densities are a single like product. EPROM's, supra note 3, at 8 n.16.

therefore there is only one like product, DRAM's. They recognize that there have been major changes in both design and process (i.e., manufacturing and test technology), but argue that the essential characteristics and uses of DRAM's of all densities remain the same, to provide memory storage capacity for a wide variety of end-use products. Moreover, they argue that these changes have simply been the result of a continuous learning process and refinements of technology, whereby smaller and more complex circuits have become possible.

Parties in opposition to the imposition of antidumping duties argue that while the "evolution" of DRAM's may have been true through the development of the 256K DRAM, the 1M DRAM represents a change in technology, sufficient to render it a different product. 20/ Moreover, they argue that DRAM's of different densities are physically different, although this may only be discernible under microscopic examination. 21/ In addition, they argue that DRAM's of different densities cannot be substituted for one another by the end user, as each end-use product is generally designed to incorporate a particular level of memory storage capacity. 22/ Moreover, the 1M DRAM's reputedly are not pin-to-pin compatible with previous generation DRAM's, and thus cannot be used interchangeably.

DRAM technology has advanced since the introduction of the 1K DRAM in 1970 with each succeeding generation representing a quadrupling of memory capacity, and being introduced within three to four years following the previous generation. The design and process technology for DRAM's has changed over the succeeding generations. It can be argued that the essential

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20/ Toshiba Brief at 13-15.

21/ Fujitsu Brief at 29.

22/ Fujitsu Brief at 30.



characteristic of a DRAM, its memory function, has remained the same. 23/ Moreover, each succeeding generation of DRAM performs its function in fundamentally the same manner, the storage of electrical charges in a capacitor, which is connected to a transistor, which can be randomly accessed, and which charge must be regenerated periodically. 24/

It is true that different densities of DRAM's are not necessarily interchangeable, and cannot in all instances be substituted for one another. Thus, while four 64K DRAM's provide the same memory storage capacity as one 256K DRAM, they cannot necessarily be piggy-backed and used in an end-use application designed to accommodate one 256K DRAM. It is also true that, as DRAM memory storage capacity increases, end-use products are similarly being redesigned to accommodate the higher density chips, which save space on circuit boards and manufacturing costs. Similarly, because of this generational shift in both DRAM capacity and end-use designs, the pricing of successive generations of DRAM's is closely linked. 25/

With respect to manufacturing facilities, DRAM's of different densities can be manufactured in common facilities, although the higher the density, the greater the need for "clean" manufacturing processes to prevent contamination. 26/ Similarly, DRAM's of different densities share common distribution systems, and are sold to the same categories of customers. For

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23/ See note 17, *supra*.

24/ See Report at A-3-A-4.

25/ Chairwoman Stern and Commissioner Rohr note that the closeness of this linkage is an issue requiring further analysis. There is generally a downward sloping price curve for DRAM's over time. There is a point at which the widespread introduction of a succeeding generation becomes cost effective. The implications of these phenomena must be examined.

26/ There is also information which indicates that some manufacturers dedicate particular facilities to the production of specific densities of DRAM's, and that changes, if any, are made only in the long run, as succeeding generations of DRAM's are introduced.

purposes of this preliminary investigation, we conclude that DRAM's of different densities are one like product. 27/

In addition to the question of what DRAM's are "like" imported DRAM's of 256K and 1M, the Commission in this investigation is faced with the issue of what, if any, domestically produced item is "like" a non-existent DRAM of a density above 1M. There are no imports of DRAM's of a density above 1M, i.e., the as-yet undeveloped future generations of 4M, 16M, and so forth DRAM's. However, these are included in the scope of Commerce's investigation by virtue of the "and above" language in the Notice initiating the investigation. 28/ In addition, the Commission must consider whether an as-yet undeveloped domestically-produced DRAM of density above 1M is "like" the imports subject to this investigation. We have concluded, for purposes of this preliminary investigation, that the information available does not support a conclusion as

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27/ This definition of like product includes DRAM's of 64K, which are the subject of a pending final antidumping investigation, as well as DRAM's of less than 64K. As noted above, the issue of whether different densities of domestically produced DRAM's are like imported 64K DRAM's was not before the Commission in the 64K DRAM's preliminary investigation. See note 19, supra. Thus, in that investigation, the Commission defined the like product as 64K DRAM's. However, the Commission did not determine that DRAM's of other densities are not like imported 64K DRAM's; it simply never reached the issue.

In any final investigation which may be instituted, we expect the parties to provide further and more complete information and arguments concerning the question of whether different densities of DRAM's are "like" within the meaning of the statute.

28/ We note that in EPROM's, the Commission determined that the like product was "all EPROM's." Thus, the like product definition remained open-ended, allowing for the possibility that future generation EPROM's would automatically be encompassed within the like product. However, the question of future generation EPROM's was not specifically raised or addressed in that preliminary investigation.

to whether future generation DRAM's are or are not like DRAM's currently being produced. 29/

For the reasons stated above, we have determined that the like product in this preliminary investigation is all DRAM's. 30/

domestic industry

Having determined that there is one like product in this investigation, we must determine the identity of the companies which are "domestic producers

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29/ Again, we expect that this issue will be more fully addressed by the parties in any final investigation. This question of what domestic product is "like" imports which, while within the scope of the investigation as established by Commerce, do not as yet exist, becomes particularly relevant should the Commission conclude in a final investigation that different densities of DRAM's are distinct like products. A separate question is whether a distinction between DRAM's currently being produced and those to be produced in the future can be made if the Commission does not distinguish between different densities of DRAM's.

30/ Vice Chairman Liebler and Commissioner Eckes make the following alternative determinations: (1) DRAM's over 1 megabit are not included within the determinations to be made by the Commission; and (2) alternatively, if DRAM's over 1 megabit are within our purview, we find no reasonable indication that a domestic industry is materially injured or threatened with material injury, and the establishment of an industry is not materially retarded, by reason of imports of DRAM's over 1 megabit.

Ordinarily, we would not look beyond the Notice of Institution to determine which imports are the subject of the investigation by the administering authority. However, in view of the precedent set by a determination that would include an infinite variety of future generations of DRAM's, we think that such a step should not be even considered unless it is the clear intent of Commerce for the Commission to do so. In its submission, Commerce explained that its use of the open-ended term "and above" was meant to prevent circumvention of an anti-dumping order covering only 256K DRAM's. Commerce, Submission of Additional Information at 2-3 (Jan. 14, 1985). For example, Commerce is concerned that imports of 257K DRAM's might occur or that "by soldering and packaging two 256K DRAM's together, manufacturers could produce a '512K' DRAM that would fall outside the scope of an order which is limited to 256K DRAM's." An insignificant number of 1 megabit chips have been imported. Moreover, Commerce foresees significant commercial production of 1 megabit chips within six months. The submission from Commerce clearly only refers to DRAM's up to and including 1 megabit. It would be an unwarranted step for the Commission to make determinations in this investigation which include chips that do not yet exist.

Moreover, even if non-existent DRAM's over 1 megabit were to be considered by the Commission, non-existent chips could not cause or threaten injury to a domestic industry, nor could they materially retard the establishment of an industry in the United States.

of the like product." 31/ A number of firms produce DRAM wafers and dice in the United States. Some of these are then assembled overseas, while others are assembled in the United States. In addition, some companies import wafers and dice from Japan, which are then assembled into DRAM's in the United States. For purposes of this preliminary investigation, we have determined that all these companies are part of the domestic industry. 32/ 33/

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31/ Commissioner Eckes and Commissioner Rohr note that this entire discussion of domestic industry is based upon their preliminary like product determination. Consequently, had they determined that different densities of DRAM's are different like products, they might have concluded that there are two industries in the United States, one producing 256K DRAM's like the imported 256K DRAM's, and one producing 1M DRAM's like the imported 1M DRAM's. In addition, they might have been faced with the question of whether there is a domestic industry producing DRAM's of a density greater than 1M which are "like" the non-existent imports covered by the "and above" description of the scope of the investigation instituted by Commerce. Moreover, there would also be the question of whether a domestic industry producing 1M DRAM's exists, raising, as an alternative method of analysis, the question of material retardation of the establishment of such an industry.

32/ Some of the companies which we have determined to be part of the domestic industry produce only certain of the existing densities of DRAM's, i.e., 64K DRAM's, but not 256K. Other companies have developed a particular density of DRAM, but have not commenced commercial production, or have decided to abandon commercial production. For purposes of this preliminary investigation, we have included all companies which have manufactured wafers and dice, and/or assembled DRAM's of any density, whether in commercial production or not, in the United States, during the period under investigation. See Report at A-5-A-7 for the specific companies involved, and their particular activities. More detailed information from individual companies concerning their activities will be required should this matter return to the Commission for a final investigation.

33/ Commissioner Lodwick joins the remainder of the domestic industry section on pages 14-16 for discussion purposes. He notes that since he has determined that the single like product includes processed wafers, dice, and assembled DRAM's, for the purposes of this preliminary determination, he has included all domestic operations which produce processed wafers, dice, or assembled DRAM's in defining the domestic industry. He further notes that though some of these operations also import, the imports do not skew the data to the extent that any exclusions from the domestic industry are appropriate.

The Commission's analysis of domestic industry is a factual determination and is made on a case-by-case basis. 34/ The activities in the United States of the companies which manufacture wafers and dice may include research and development of all aspects of DRAM technology, from wafer fabrication through assembly and final testing technology. 35/ In addition, wafer fabrication and wafer sorting are done in U.S. facilities. These operations require sophisticated technology and extremely high capital investment levels. To the extent that companies may assemble overseas, we have preliminarily determined that the nature of the activities conducted in the United States is sufficient to warrant their consideration as part of the domestic industry. Similarly, those companies which import wafers and/or dice from Japan for assembly in the United States perform significant operations in the assembly process which

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34/ In prior investigations, the Commission has examined the overall nature of production-related activities in the United States, including the extent and source of a firm's capital investment, the technical expertise involved in production activity in the United States, the value added to the product in the United States, employment levels, the quantity and type of parts sourced in the United States, and any other costs and activities in the United States directly leading to production of the like product. No single factor is determinative, and the Commission's analysis should consider all of these factors, and any other factors which are deemed relevant in light of the specific facts of the investigation. See EPROM's, supra note 3; Certain Television Receivers from the Republic of Korea and Taiwan, supra note 10, at 8; Certain Radio Paging and Alerting Receiving Devices from Japan, supra note 9, at 8.

35/ Tr. at 79-80. As is the case with the entire semiconductor industry, DRAM manufacturers invest substantial sums in research and development of future generation products. It has been argued that DRAM manufacturers view DRAM production as both a revenue generator and technology driver, necessary to the development of future generation products. Should this matter return to the Commission for a final investigation, further information will also be sought concerning the extent and nature of any research and development activities conducted by the foreign affiliates of U.S. companies.

warrant their inclusion in the domestic industry in this preliminary investigation. 36/

One further question arises. Some of the companies within the domestic industry as defined above import DRAM's within the scope of the investigation, or are related to exporters or importers. 37/ Thus, we must consider whether those companies should be excluded from consideration of the domestic industry under the related parties provision of the statute, 19 U.S.C. § 1677(4)(B). That provision calls for the Commission to exercise its discretion in determining whether "appropriate circumstances" exist for the exclusion of related parties from the industry. The primary purpose for the provision is to avoid the distortion in the aggregate data concerning the domestic industry which might result from the inclusion of related parties whose operations are shielded from the effect of imports. Based on the information available in this preliminary investigation, we have concluded that exclusion of these companies would not be appropriate. 38/

#### Condition of the domestic industry

In assessing the condition of the domestic industry, the Commission considers, among other factors, consumption, production, capacity, capacity

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36/ The domestic content share of the assembled DRAM's sold by the various companies varied significantly. Report at A-7. As we noted in EPROM's, supra note 3, at 10 & n.27, the range of values provided by producers indicates that further analysis of this issue would be appropriate if a final investigation is undertaken.

Some of the final assembly of DRAM's produced by the domestic industry takes place overseas. We have concluded that Customs' determination of substantial transformation is not binding on us for purposes of determining like product or whether a domestic industry exists. See EPROM's, supra note 3, at 12 n.31.

37/ Report at A-5-A-9.

38/ Again, we note that further and more complete information concerning these issues will be required should this matter return for a final investigation.

utilization, inventories, employment, wages, sales, and profitability. 39/ No single factor is determinative, and in each investigation, the Commission must consider the particular nature of the industry which it is examining in making its determination. 40/

Apparent U.S. consumption of all cased DRAM's increased by 389 percent from 1982 to 1984, from 66.7 million units to 325.8 million units. 41/ During the most recent period, there appears to have been a decline in consumption of cased DRAM's as compared with the corresponding period of 1984. 42/ This decline appears to be attributable to the declining consumption of lower density DRAM's, as consumption of 256K DRAM's increased dramatically from January-September 1984 to January-September 1985.

U.S. producers' domestic shipments of cased DRAM's also increased steadily from 1982 to 1984, from 46 million units to 228 million units. 43/ As with consumption, shipment levels of 256K DRAM's rose dramatically in

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39/ 19 U.S.C. § 1677(7)(C)(iii).

40/ The Commission requested information concerning these factors for certain specific densities of DRAM's, and all DRAM's. Because of the failure of some companies to provide information at all, to provide the information requested, or to provide usable information, the data in this investigation are less than satisfactory. Nonetheless, we have reached our determination on the basis of the best evidence available at this time. We have examined the available data in detail, and have made allowances where possible for differences in reporting and availability of information. We would expect that the data available in a final investigation, should one be instituted, will provide a more satisfactory underpinning for the determinations which the Commission must make.

41/ Report at A-63.

42/ Because the information concerning all DRAM's was, in part, gathered in different investigations, interim periods for certain information vary. See Id. at A-62-A-63.

43/ Id. Because of the need to aggregate data with respect to all DRAM's from several sources, and to avoid counting that portion of domestic production which is assembled overseas as both domestic production and imports, domestic shipment information is being considered as a surrogate for production data.

1982-84, while overall domestic shipments declined slightly during the most recent period.

The data concerning capacity indicate that total capacity to produce DRAM's has increased throughout the period under investigation. 44/ Capacity utilization was high throughout the period from 1982-84, increasing from 1982 to 1983, then declining slightly in 1984. 45/ Capacity utilization fell sharply in the most recent period as compared with the corresponding period of 1984. 46/

The number of production and related workers employed in the production of DRAM's increased steadily during the period under investigation despite reductions in employment by some domestic producers. 47/ Similarly, hours worked increased throughout the period under investigation, as have wages and total compensation paid to production and related workers producing DRAM's. 48/ This picture of the domestic industry may be somewhat deceptive, as some companies have instituted layoffs. 49/

The Commission received financial information from four firms which perform wafer fabrication in the United States, and two firms which conduct assembly and/or testing and marking operations in the United States on their operations relating to the development and/or sale of cased DRAM's of 256K and above. For DRAM's of 256K and above, there were no sales prior to the last quarter of 1984, and hence there are no trends for sales and profitability. Because of the diverse experiences of the reporting firms, there is no

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44/ Id. at A-64.

45/ Id.

46/ Id.

47/ Id. at A-20 and A-65.

48/ Id. at A-65.

49/ Id. at A-20.



aggregate data upon which meaningful comparisons can be made. 50/ However, it is clear that none of the reporting firms which perform wafer fabrication in the United States has reached a sales volume which would enable it to recoup its research and development costs and initial outlay costs. 51/

In addition, the Commission received income and loss data on overall DRAM operations of four firms which perform wafer fabrication in the United States. For overall DRAM operations, the firms reporting sustained an operating loss in 1982 and 1983, then reported operating income in 1984. Net sales rose rapidly from 1982 to 1984. During the interim period ended September 30, 1985, these firms reported a significant operating loss, as compared with a large operating income during the corresponding period of 1984. Net sales declined sharply in the 1985 interim period, as compared with the corresponding period of 1984. All four firms responding reported net losses during interim 1985. 52/

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50/ In addition, analysis of the financial data provided by firms that both use and sell the subject DRAM's is further complicated by the fact that such firms must assign a value to the captively consumed products. We note that in this investigation higher unit values were assigned to products used captively than actual unit values of market sales, thus generating lower losses than would have been reported had market values been assigned to the captive usage.

51/ Report at A-24.

52/ Id. at A-24-A-25.

Based on our overall assessment of the condition of the domestic industry, we conclude that there is a reasonable indication of material injury to the domestic industry producing DRAM's. 53/ 54/ 55/

Reasonable indication of material injury by reason of allegedly LTFV imports 56/

When making a determination as to whether there is a reasonable indication of material injury, the statute provides that:

- the Commission shall consider, among other factors:
- (i) the volume of imports of the merchandise which is the subject of the investigation,
  - (ii) the effect of imports of that merchandise on prices in the United States for like products, and
  - (iii) the impact of imports of such merchandise on domestic producers of like products. 57/

U.S. shipments of imports of cased DRAM's of 256K from Japan increased from virtually none in 1982, to over 10 million units in 1984. Interim data for the period January-September 1985 show a dramatic increase to over 27

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53/ Chairwoman Stern believes that the causal context is critical to a reliable material injury determination. Therefore, she does not believe it necessary or desirable to make a determination on the question of material injury separate from the consideration of causation. She joins her colleagues by concluding that the domestic industry is experiencing economic problems. For a fuller discussion of this issue, see Additional Views of Chairwoman Stern in Cellular Mobile Telephones and Subassemblies Thereof from Japan, supra note 11, at 18.

54/ Commissioner Eckes believes that the Commission is to make a finding regarding the question of material injury in each investigation. See Additional Views of Commissioner Eckes in Cellular Mobile Telephones and Subassemblies Thereof from Japan, supra note 11, at 20.

55/ Commissioner Eckes and Commissioner Rohr note that were they to treat different densities of DRAM's as separate like products it appears that the question before the Commission with respect to 1M DRAM's is one of material retardation. They expect the parties in this investigation to provide the information necessary to permit analysis on this basis should this matter return to the Commission for a final investigation. See Certain Dried Salted Codfish from Canada, Inv. No. 731-TA-199 (Final), USITC Pub. No. 1711 (1985).

56/ Vice Chairman Liebeler does not join in the remainder of this opinion. See her Additional Views which follow.

57/ 19 U.S.C. § 1677(7)(B).

million units, as compared with 6 million units during the corresponding period of 1984. 58/ U.S. shipments of imports of uncased DRAM's of 256K increased sharply during the period January-September 1985. 59/

The share of apparent U.S. consumption of all DRAM's accounted for by imports of cased DRAM's of 256K from Japan increased significantly during the period under investigation, from 0.2 percent in 1983, to 3.3 percent in 1984. 60/ Data for the most recent period showed a continued marked increase, from approximately 3.7 percent during the interim period of 1984, to 16.9 percent during the interim period of 1985. 61/ While these figures are not entirely comparable, due to differences in reporting, they indicate a trend of increasing imports capturing an increasing share of the U.S. market.

The Commission collected pricing information from domestic producers and importers for 256K DRAM's with respect to each of the three major channels of distribution. 62/ Although there are some variations with respect to sales to particular purchasers, on the whole the data demonstrate a dramatic collapse in both domestic and import prices. November 1985 price levels in some cases are only a small fraction of what they were in late 1984. 63/ Since domestic

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58/ Report at A-28-A-29. As noted above, there were no imports of DRAM's of a density above 256K until the most recent period, when a few units were imported for sampling and qualification purposes.

59/ Id. at A-27-A-28.

60/ Id. at A-63.

61/ Id.

62/ The three major channels of distribution are (1) sales to end users, i.e., original equipment manufacturers and circuit board stuffers, (2) sales to distributors, and (3) spot sales. Id. at A-10. The Commission collected pricing information for four different categories of end use products from original equipment manufacturers: (1) office automation equipment; (2) telecommunications equipment; (3) industrial automation equipment; and (4) consumer electronic products, including personal computers. Id. at A-31.

63/ Id. at A-31-A-39. For instance, the price of imported 256K DRAM's sold to original equipment manufacturers dropped from a contract award price index of 100 in September-October 1984 to as low as 7 in November 1985. Similar price indices constructed for sales to circuit board stuffers, distributors, and in the spot market, show prices dropping from an index level of 100 in fourth quarter 1984 to lows ranging from 6 to 78 in fourth quarter 1985. Id.

producers have only recently entered the market for 256K DRAM's, comparisons were not possible for many categories of purchasers. 64/ However, the available information suggests that the downward price pattern was precipitated by the Japanese imports. 65/ 66/

The Commission confirmed several instances of lost sales due to price competition from Japanese imports. 67/ Most of the original equipment manufacturers require producers of DRAM's to qualify as suppliers, and then negotiate long-term contracts with a particular supplier. These contracts are generally subject to price renegotiation at the purchaser's option. Thus, once a supplier has qualified, competition is largely based on price.

The Commission also confirmed numerous instances of lost revenues resulting from domestic producers being forced to reduce prices in the face of competition from Japanese imports. 68/

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64/ Some U.S. firms that both import and produce 256K DRAM's could not distinguish between such products for purposes of reporting prices. In any final investigation we will further examine this issue.

65/ See, e.g., information concerning lost sales and revenues due to price competition, Report at A-36-A-47.

66/ As noted, certain U.S.-based and Japan-based DRAM producers not only have wafer-fabrication as well as assembly and testing capabilities both in the United States and Japan, but also conduct assembly and test operations in third countries. This can pose a problem with respect to price comparisons. In a final investigation the Commission will seek assurance that transaction prices submitted for particular sales do indeed accurately reflect a "domestic" or "import" source. The possibility of multiple sourcing patterns also emphasizes, with respect to prices and price comparisons, the importance of the definitions of like product and domestic industry and the related party question.

With respect to the question of price undercutting, comparisons of domestic and import prices do not reflect a clear picture of underselling or overselling but rather a mixture of both. This suggests that in this market, characterized by early dominance by Japanese imports, later entry by domestic producers of necessity required offer prices at or below the price of imported Japanese DRAM's. Supporting this conclusion are examples of lost revenue that stemmed from sales made by domestic producers after they reduced their offer prices in competing with imports from Japan.

67/ Report at A-36-A-44.

68/ Id. at A-44-A-47.

There is no doubt that the 256K DRAM market has experienced a dramatic price decline, particularly during 1985. Domestic producers have been unable to obtain a significant share of the U.S. market, despite a willingness to sell at prices far below what had been anticipated based on the declining cost structures typical in this industry. The profitability of the U.S. producers therefore declined dramatically during this period. The information presently before the Commission suggests that the aggressive pricing of the allegedly LTFV imports has contributed to the dramatic downward price spiral. Thus, we conclude that there is a reasonable indication of material injury by reason of allegedly LTFV imports from Japan.

Reasonable indication of threat of material injury by reason of allegedly LTFV imports

The statute sets forth a series of factors the Commission is to consider in analyzing the issue of a reasonable indication of threat of material injury. 69/ These factors include:

- (1) any increase in production capacity or existing unused capacity in the exporting country likely to result in a significant increase in imports to the United States;
- (2) any rapid increase in U.S. market penetration and the likelihood that the penetration will increase to an injurious level;
- (3) the probability that imports of the merchandise will enter the United States at prices that will have a depressing or suppressing effect on domestic prices of the merchandise;
- (4) any substantial increase in inventories of the merchandise in the United States;
- (5) the presence of underutilized capacity for producing the merchandise in the exporting country;
- (6) any other demonstrable adverse trends that indicate the probability that the imports will be the cause of actual injury; and
- (7) the potential for product-shifting.

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69/ 19 U.S.C. § 1677(7)(F).

In addition, in order to conclude that there is a reasonable indication that allegedly LTFV imports are a threat of material injury to the domestic industry, the Commission must find that the threat of material injury is real and that actual injury is imminent. Such a determination may not be made on the basis of mere conjecture or supposition. 70/

The information currently available to the Commission indicates that there have been significant increases in Japanese capacity to produce DRAM's during the period under investigation. 71/ The United States is the largest market in the world for DRAM's and, therefore, we consider it likely that a significant portion of Japanese exports will continue to be directed at the U.S. market. Inventories of both cased and uncased 256K DRAM's from Japan increased dramatically during the period under investigation. Moreover, the aggressive pricing of the Japanese imports, as well as recent price trends, indicate that future imports will continue to depress and suppress U.S. prices. In addition, we note that the DRAM industry, like other semiconductor producers, is extremely sensitive to declines in profitability. 72/ DRAM

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70/ Id.

71/ Report at A-13-A-14. Official Japanese statistics report production for all MOS memories, including DRAM's. Should this matter return for a final investigation, the Commission will attempt to obtain information specifically concerning production and capacity for DRAM production.

72/ Parties in support of the imposition of antidumping duties apparently would argue that the imports of 256K and above DRAM's from Japan threaten material injury to the domestic producers of other semiconductor products, such as logic circuits or memory circuits other than DRAM's. As we noted in EPROM's, there may be some economic validity to this argument. EPROM's, supra note 3, at 23, n.76. However, the production of other types of memory circuits or logic circuits is not a part of the domestic industry producing DRAM's under any definition of that industry. We have not relied on a threat of injury to an industry (or industries) producing products other than DRAM's in making our affirmative preliminary determination.

production is highly capital intensive. Moreover, producers must continually invest large sums in research to develop "next generation" DRAM's, to keep pace with demand for memory capacity on the part of end users. Consequently, declines in profitability indicate a threat of material injury to the industry in the future. We, therefore, determine that there is a reasonable indication of threat of material injury by reason of allegedly LTFV imports from Japan.





## ADDITIONAL VIEWS OF VICE CHAIRMAN LIEBELER

Based on the record in Investigation No. 731-TA-300 (Preliminary), I determine that there is a reasonable indication that an industry in the United States is materially injured or threatened with material injury by reason of imports of dynamic random access memory semiconductors (DRAM's) of 256 kilobit and 1 megabit from Japan allegedly sold at less than fair value (LTFV). I concur in the decision of the majority with respect to like product,<sup>1</sup> domestic industry, related parties and condition of the industry.

In order for a domestic industry to prevail in a preliminary investigation, the Commission must determine that

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I find no reasonable indication that a domestic industry is materially injured or threatened with material injury, and that the establishment of an industry is not materially retarded, by reason of imports of DRAM's over 1 megabit. The reference in the Department of Commerce (Commerce) submission to DRAM's over 256K refers to DRAM's up to and including 1 megabit. Commerce, Submission of Additional Information in Inv. No. 731-TA-300 (Jan. 14, 1986). Since there have been no imports of 4 megabit DRAM's and no attempted domestic production of such DRAM's, I find that it would be an unreasonable interpretation of the statute to make a preliminary affirmative determination in such a case. My affirmative vote in this case applies only to DRAM's with memory between 256K and 1 megabit.

the allegedly dumped imports cause or threaten to cause material injury to the domestic industry producing the like product. This analysis is usually recognized to be a two-step procedure. First, the Commission must determine whether there is a reasonable indication that the domestic industry producing the like product is injured or is threatened with material injury. Second, the Commission must determine whether there is a reasonable indication that any injury or threat thereof is by reason of the allegedly dumped imports. Only if the Commission answers both questions in the affirmative will it make an affirmative determination in the investigation.

In Certain Red Raspberries from Canada, I set forth a framework for examining causation in Title VII investigations:<sup>2</sup>

The stronger the evidence of the following . . . the more likely that an affirmative determination will be made: (1) large and increasing market share, (2) high dumping margins, (3) homogeneous products, (4) declining prices and (5) barriers to entry to other foreign producers (low<sup>3</sup> elasticity of supply of other imports).

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Inv. No. 731-TA-196 (Final), USITC Pub. 1680, at 11-19 (1985) (Additional Views of Vice Chairman Liebeler).

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Id. at 16.

These factors, when viewed together, serve as proxies for the injury that Congress has directed the Commission to undertake: whether foreign firms are engaging in unfair price discrimination practices that cause or threaten to cause material injury to a domestic industry.<sup>4</sup>

The starting point for the five factor approach is import penetration data. This factor is relevant because unfair price discrimination has as its goal, and cannot take place in the absence of, market power. The calculation of import penetration ratios in this case is complicated because different density DRAM's have been found to be like products. Import penetration is normally calculated by dividing the number of imports of the allegedly dumped product into domestic consumption of the like product. This generally provides a useable framework from which to discern trends in market share. For instance, in a steel case, the unit of measurement would be tons. If there was one ton of imports and two tons of domestic shipments, the import penetration ratio would be 33 percent.

With respect to DRAM's, however, simply measuring the number of DRAM's can be a misleading indicator. The

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Trade Reform Act of 1974, S. Rep. 1298, 93rd Cong. 2d Sess. 179.

characteristic and use that DRAM's share is memory, which can be measured in kilobits. For example, if one 256K DRAM is equivalent to four 64K DRAM's in terms of memory, then it might be more appropriate to weight the statistics so that the import penetration ratio is calculated as a fraction of the total amount of memory (K's) sold, rather than as a fraction of the number of DRAM's sold.<sup>5</sup>

Insufficient data are available to calculate the weighted import penetration.<sup>6</sup>

The unweighted measure of import penetration (units of DRAMS) indicates that penetration has increased from 3.7 percent during January-September 1985 to 16.9 percent

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This issue first appeared in Erasable Programmable Read Only Memories From Japan, Inv. No.1 731-TA-288 (Preliminary), USITC Pub. 1778, at 26-27 (Additional Views of Vice Chairman Liebeler).

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This calculation involves either multiplying or dividing to normalize the units of measurement. For instance, if domestic consumption consisted of eight 64 K DRAM's and two 256K DRAM's, memory consumption (in 256K units) would be 4 units ( $8/4 + 2/1 = 4$ ). An import of one 256K DRAM would yield an import penetration of 25 percent when weighted versus 10 percent unweighted.

The Commission in Erasable Programmable Read Only Memories From Japan, Inv. No. 731-TA-288 (Preliminary), USITC Pub. 1778, at 19 n.65. (November 1985) made use of this weighting technique. In the event of a final investigation, I would ask interested parties to address whether weighting according to densities is appropriate or required.

during the same period of 1985. The information collected indicates that 256K DRAM's have captured an increasing share of the DRAM market, and that Japanese imports of 256K DRAM's have captured a large share of the 256K DRAM market. Thus, the unweighted import penetration ratio probably understates the weighted penetration ratio. I conclude that the unweighted ratio is moderate and increasing.

The second factor is a high margin of dumping. The higher the margin of dumping, ceteris paribus, the more likely it is that the product is being sold below marginal cost, which is a requirement for predatory pricing, and the more likely it is that the domestic producers will be adversely affected by the dumping. The margin of dumping is determined by the Department of Commerce, but only after the Commission has made an affirmative determination in the preliminary investigation. Thus, there are usually no computed margins available. As Commerce initiated this

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Report at A-63. This import penetration ratio is calculated only for cased DRAM's. Because the like product has been defined as all DRAM's, cased and uncased, imports of uncased DRAM's from Japan should also be included. Shipments of cased DRAM's made from uncased DRAM's produced in Japan and assembled in the United States serve to measure the actual impact of uncased DRAM's. Through September of 1985, uncased imports comprised a very small percentage of total imports and thus the cased DRAM figures provide a sufficient proxy for the total import penetration ratio. Report at Table 5.

investigation, one might presume that the margins alleged will be closer than normal to those eventually calculated. In any event, because title VII requires the Commission's determination in a preliminary investigation to be based on the best available evidence, I have been using the margins alleged by petitioners in preliminary investigations.<sup>8</sup> Commerce has estimated a dumping margin of 33 percent for Japanese imports of the subject DRAM's.

The third factor is the homogeneity of the products. The more homogeneous the products, the greater will be the effect of any allegedly unfair practice on domestic producers. There is no significant evidence of record suggesting that these products are differentiable.

The fourth factor is declining prices. Evidence of declining domestic prices, ceteris paribus, might indicate that domestic producers were lowering their prices to maintain market share. Almost no evidence with respect to domestic prices of 256K DRAM's or above has been

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See, e.g., Certain Steel Wire Nails from the People's Republic of China, Poland, and Yugoslavia, Inv. Nos. 731-TA-266-268 (Preliminary), USITC Pub. 1730, at 22 (1985) (Views of Vice Chairman Liebler).

provided. The absence of this information is troubling. Because the like product is DRAM's of all densities, a proxy for domestic prices of 256K DRAM's is prices of 64K DRAM's, at least for purposes of this preliminary investigation. Evidence from the 64K DRAM preliminary indicates that domestic prices were declining to the same extent as the price of imports.<sup>9</sup> The price of imports in the instant investigation has declined substantially. Because the price of different density memory is interrelated, domestic prices of all DRAM's are probably declining.<sup>10</sup>

The fifth factor is barriers to entry. The presence of barriers to entry makes it more likely that a producer can gain market power. Firms in Japan are the only major exporters of DRAM's to the United States. No other countries appear to have substantial capacity to produce DRAM's at this time.

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64K DRAM's, at Tables 22-27.

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It would not be consistent with the like product and domestic industry definition (all DRAM's) to observe only the prices of 256K DRAM's. It has been alleged that the decline in prices is the natural result of cost savings achieved through the learning curve phenomenon. If this case proceeds to a final investigation, I would be interested in further information detailing the trend in marginal and average costs in this industry. The trend in prices should also be analyzed in view of increasing domestic capacity to produce DRAM's (of increasing density) and static domestic demand.

These factors must be balanced in each case to reach a sound determination. The best information available at this stage indicates that there is a reasonable indication that the five factor test has been satisfied. The data available indicate that import penetration is moderate and increasing. The alleged margins are moderately high. The product is homogeneous. Domestic prices appear to be declining. There do not appear to be other countries with capacity to produce DRAM's. Thus, my analysis of the factors indicates that there is a reasonable indication that a domestic industry in the United States is materially injured or threatened with material injury by reason of allegedly LTFV imports of 256 kilobit and 1 megabit DRAM's from Japan.



## INFORMATION OBTAINED IN THE INVESTIGATION

## Introduction

On December 11, 1985, the U.S. Department of Commerce initiated an antidumping investigation concerning dynamic random access memory semiconductors (DRAM's) having a memory capacity of 256 kilobits (256K) and above (50 FR 51450; Dec. 17, 1985). 1/ Commerce announced that it has evidence indicating that imports from Japan of DRAM's of 256K and above are being sold in the United States at less than fair value (LTFV) and that these imports may be having an injurious effect upon the U.S. industry.

Accordingly, effective December 11, 1985, the Commission instituted a preliminary antidumping investigation (investigation No. 731-TA-300 (Preliminary)) under section 733(a) of the Tariff Act of 1930 to determine whether there is a reasonable indication that an industry in the United States is materially injured, or is threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports from Japan of DRAM's having a memory capacity of 256K and above, of both the N-channel and the complementary metal oxide semiconductor types, whether in the form of processed wafers, unmounted die, mounted die, or assembled devices, provided for in item 687.74 of the Tariff Schedules of the United States (TSUS), which are alleged to be sold in the United States at LTFV. 2/

Notice of the institution of the Commission's investigation and of a public conference to be held in connection therewith was given by posting copies of the notice in the Office of the Secretary, U.S. International Trade Commission, Washington, DC, and by publishing the notice in the Federal Register of December 18, 1985 (50 FR 51613). 3/ On December 26, 1985, the Commission published notice in the Federal Register (50 FR 52869) of the rescheduling of the conference which was held in Washington, DC, from January 3 to January 6, 1986. 4/

The Commission's briefing and vote on this investigation were held on January 22, 1986. The statute directs that the Commission make its determination within 45 days after Commerce's initiation, or in this case, by January 27, 1986.

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1/ A copy of Commerce's notice of initiation is presented in app. A.

2/ In its notice of initiation, Commerce tentatively included processed wafers and die produced in Japan and assembled into finished DRAM's in another country prior to importation into the United States from the other country (indirect imports). In a letter to Chairwoman Stern dated Jan. 3, 1986, Commerce stated that it subsequently decided not to investigate these indirect imports and not to consider them within the scope of this investigation.

3/ A copy of the Commission's notice of institution is presented in app. B.

4/ A copy of the Commission's notice of rescheduling of the conference is presented in app. C. A list of witnesses appearing at the conference is presented in app. D.

## Previous Commission Investigations

The Commission has not previously conducted an investigation on DRAM's having a memory of 256K and above; however, DRAM's having a memory of 64 kilobits (64K) were recently the subject of a preliminary antidumping investigation conducted by the Commission (investigation No. 731-TA-270 (Preliminary)). The investigation was instituted on June 24, 1985, in response to a petition filed by Micron Technology, Inc., Boise, ID, on behalf of merchant manufacturers of 64K DRAM's. On August 8, 1985, the Commission made a preliminary affirmative determination (50 FR 32778, Aug. 14, 1985). On December 2, 1985, Commerce preliminarily determined that 64K DRAM's from Japan, are being, or are likely to be, sold in the United States at LTFV (50 FR 50649, Dec. 11, 1985). According to Commerce's determination, the weighted-average margins on sales during the period January 1 through June 30, 1985, ranged from 8.93 percent to 94.00 percent. On December 11, 1985, the Commission instituted a final antidumping investigation to determine whether an industry in the United States is materially injured, or threatened with material injury, by reason of imports from Japan of 64K DRAM's, of the N-channel metal oxide semiconductor type, which are alleged to be sold in the United States at LTFV. Commerce subsequently announced the postponement of its final determination as to whether sales of 64K DRAM's from Japan have occurred at less than fair value until not later than April 23, 1986 (51 FR 234, Jan. 3, 1986).

In addition to the investigation concerning DRAM's, the Commission recently conducted preliminary antidumping investigation No. 731-TA-288 on imports from Japan of a related product, erasable programmable read only memories (EPROM's). The investigation was instituted on September 30, 1985, in response to a petition filed by Intel Corp., Santa Clara, CA; Advanced Micro Devices, Inc., Sunnyvale, CA; and National Semiconductor Corp., Santa Clara, CA. On November 14, 1985, the Commission determined that there is a reasonable indication that an industry in the United States is materially injured or threatened with material injury by reason of imports from Japan of EPROM's which are alleged to be sold in the United States at LTFV. Commerce is scheduled to make its preliminary determination by March 10, 1986.

The Commission also has conducted investigations in 1978-79 and in 1984-85, as discussed below, which included DRAM's among the subject products.

On December 7, 1978, pursuant to a request by the Subcommittee on Trade of the Senate Committee on Finance and the Subcommittee on International Finance of the Senate Committee on Banking, Housing, and Urban Affairs, the Commission instituted investigation No. 332-102 under section 332 of the Tariff Act of 1930 to examine the competitive factors influencing world trade in integrated circuits. A report on this investigation was transmitted, with confidential information included, to the Senate Committees on October 31, 1979. The Commission released a public report on the investigation on

November 16, 1979. <sup>1/</sup> The report focused on factors affecting the international competitive position of U.S. producers of integrated circuits and presented production and trade data on integrated circuits for 1974-78. The study identified the principal economic factors which affect the growth of the U.S. industry, analyzed the influence of governments on the industry, and compared the U.S. industry with the industry in Japan during 1974-78.

On October 19, 1984, at the direction of the President, the U.S. Trade Representative (USTR) requested that the Commission prepare advice concerning the probable economic effects of providing duty-free treatment for U.S. imports of certain high-technology products (including DRAM's). On October 26, 1984, in response to the request from the USTR, the Commission instituted investigation No. 332-199; subsequently, upon enactment of the Trade and Tariff Act of 1984, which changed the investigative authority, the Commission instituted investigation No. TA-131(b)-9, effective October 30, 1984. A classified report and other classified information were transmitted to the USTR on December 14, 1984. After receiving authorization from the USTR, the Commission released a public version of the report in June 1985. <sup>2/</sup>

## The Product

### Description and uses

A 256 kilobit DRAM is a monolithic integrated circuit with 261,344 storage cells (bits), each of which contains a miniature transistor and capacitor. The 256K DRAM is one of a series of DRAM's produced with increasing densities since the 1K DRAM was first introduced in 1970. Following the introduction of the 4K and 16K DRAM during the 1970's and the 64K DRAM around 1980, the 256K DRAM was first offered for sale in limited quantities in 1982. Currently, samples of DRAM's with a density of 1 megabit (1,045,376 bits) are being evaluated by potential users, and progress has been reported on the development of a 4 megabit (4,181,504 bits) device.

Information is stored in each 256K DRAM cell as an electrical charge (voltage) impressed on the capacitor, which is connected to one of the transistor elements. Storage requires two different levels of energy—one to represent the binary digit "0" and another to represent the digit "1." The storage cells in the DRAM's are arranged in a rectangular matrix of columns and rows, which allows each cell to be accessed independently (random access). When a column or row is selected and activated, the cell transistor

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<sup>1/</sup> Competitive Factors Influencing World Trade in Integrated Circuits, Report to the Subcommittee on International Trade of the Committee on Finance and the Subcommittee on International Finance of the Committee on Banking, Housing, and Urban Affairs of the United States Senate on Investigation No. 332-102 Under Section 332 of the Tariff Act of 1930, as Amended, USITC Publication 1013, November 1979.

<sup>2/</sup> Probable Economic Effect of Providing Duty-Free Treatment for U.S. Imports of Certain High-Technology Products, Report to the President on Investigation No. TA-131(b)-9 Under Section 131(b) of the Trade Act of 1974, USITC Publication 1705, June 1985.

acts as a solid-state switch that connects the capacitor to the column or data line. The simultaneous selection of a row and column determines the specific cell address. The speed at which the cell can be addressed is called access time (expressed in nanoseconds (ns), or one-billionths of a second). DRAM's sold in the U.S. market are largely designed with an access time of either 150 ns or 200 ns.

The information stored on cell capacitors must be regenerated after each address (read sequence), since the charge is attenuated by the sharing of the cell capacitance with the capacitance of the data line. The charge is also attenuated by leakage across the cell capacitor plates. Because of the leakage, the energy on the cell capacitors is constantly sampled and maintained at a predetermined charge level by "threshold" amplifiers. A threshold amplifier is required to maintain the charge level on the cell capacitors connected to each data line. The required regeneration of the charge on cell capacitors makes the device "dynamic." Other random access memory devices called static RAM's (SRAM's) do not require the sampling and refresh charges, but SRAM's are more costly to produce because tight cell densities cannot be achieved.

DRAM's are produced in large numbers on a single silicon wafer; each of the uncased DRAM's is called a chip or a die. The process needed to produce the chips includes repeated photolithographic steps and the controlled introduction of impurity atoms (dopants) into the silicon crystal. After production and separation (including testing of the dice), the good chips are wire bonded to lead frames and encapsulated (final sealed) for installation into printed circuit boards.

The production of DRAM's can be divided into four separate operations. The production of the chips on the wafer, called wafer fabrication, is one of the most difficult and costly operations. Following fabrication, each die on the wafer is electrically tested and defective dice are marked. This stage, known as wafer sorting, is generally conducted where wafer fabrication is performed. The process of wire bonding and encapsulation/final sealing (or installation into a plastic or ceramic case) is called assembly. Assembly operations are labor intensive and, for some producers, occur in developing countries. The final operations include testing and marking.

DRAM's imported into the United States from Japan are essentially interchangeable with those produced by U.S. firms. The devices are dual inline packages that are pin-to-pin compatible; pin spacings and encapsulation are standard. The largest uses for 256K and above DRAM's are in computers, office machines, data processing equipment, and telecommunications equipment where digital information storage is needed.

#### U.S. tariff treatment

The U.S. Customs Service has determined that, for tariff purposes, the country of origin of imported DRAM's with densities of 256K and above is the location of the final sealing operations, which constitute a substantial transformation to a new article of commerce. Chips produced in the United

States and final sealed abroad do not bear the marking "Made in USA," but rather bear the marking of the country in which they were final sealed. Under customs regulations in effect in the European Community and Japan, the country of origin is determined by the location of the wafer fabrication.

Imports of DRAM's are classified in TSUS item 687.74. This tariff item provides for monolithic integrated circuits, including metal oxide semiconductor (MOS) memory devices. Uncased or unassembled DRAM's are reported under statistical annotation 687.7405, along with all uncased monolithic integrated circuits. Cased or assembled DRAM's with a density of 256K are reported under statistical annotation 687.7443 (over 80,000 but not over 300,000 bits), and cased or assembled DRAM's with a density above 300K are reported under annotation 687.7444.

Effective March 1, 1985, the column 1 or most-favored-nation rate of duty on imports of 256K and above DRAM's and certain other semiconductors was eliminated by Presidential Proclamation 5305 of February 21, 1985 (50 FR 7571). Prior to that date, the column 1 rate of duty applied to imports of DRAM's was 4.2 percent ad valorem. The elimination of the duty was supported by the Semiconductor Industry Association (SIA). The most-favored-nation rate of duty on imports into Japan of 256K and above DRAM's and certain other semiconductors was also eliminated on March 1, 1985. The U.S. rate of duty applied to imports from certain Communist countries enumerated in TSUS general headnote 3(d) (col. 2) is 35 percent ad valorem.

#### Nature and Extent of Alleged LTFV Sales

Commerce estimated that a dumping margin of 33 percent may exist for exports of the subject DRAM's from June through October 1985. Commerce based its estimate of the U.S. price upon bid and price quotes obtained from U.S. industry sources. Commerce examined Japanese bids, price quotes, and cost data obtained from industry and public sources and calculated that sales were made at prices below the cost of production. Commerce therefore estimated foreign market value based on constructed value, adding the statutory minimum for profit.

#### The Domestic Market

##### Producers

Producers of uncased 256K and above DRAM's perform wafer fabrication (and wafer sorting) in the United States and assembly (and final unit testing) in the United States or in foreign countries, whereas, producers of cased 256K and above DRAM's perform wafer fabrication (and wafer sorting) either in the United States or offshore and conduct assembly (and final unit testing) operations in the United States. The Commission sent producer's questionnaires to 13 firms believed to produce uncased or cased 256K or above DRAM's during January 1982-September 1985. Of the 13 firms, \* \* \* firms have

started production of the specified DRAM's and 2 firms have completed the design and development of the product through the prototype stage. Each of the firms and the nature of their operations relating to the production of 256K or above DRAM's are discussed below.

Advanced Micro Devices, Inc. (AMD), Sunnyvale, CA, announced a 256K DRAM design and developed the product through the prototype stage. AMD constructed a facility in the Austin-San Antonio, TX, area geared specifically for DRAM manufacture. AMD indicated that \* \* \*.

AT&T Technology Systems (AT&T), Berkeley Heights, NJ, is wholly owned by American Telephone & Telegraph Co. \* \* \*.

Fujitsu Microelectronics, Inc. (FMI), Santa Clara, CA, is wholly owned by Fujitsu, Ltd., in Japan. FMI encases 256K DRAM's in the United States \* \* \*. FMI does not support the imposition of antidumping duties and asserted in its questionnaire response that \* \* \*.

Hitachi Semiconductor (America), Inc. (HISUS), Irving, TX, a wholly owned subsidiary of Hitachi, Ltd., in Japan, performs assembly operations in the production of cased 256K DRAM's in the United States. HISUS imports both uncased and cased 256K DRAM's from Hitachi, Ltd., in Japan. HISUS opposes the imposition of antidumping duties in this investigation, stating in its questionnaire response that \* \* \*.

IBM Corp. (IBM), Armonk, NY, performs \* \* \*. \* \* \*. In its questionnaire response, the company stated that \* \* \*.

Intel Corp. (Intel), Santa Clara, CA, announced the development of a mainstream 256K DRAM but withdrew from the commodity 256K DRAM market in 1985. The company instead chose to focus on a specialty, low-power CMOS epitaxial product. During January-September 1985, Intel \* \* \*. The company reportedly has also developed a 1 megabit DRAM design.

Micron Technology, Inc. (Micron), Boise, ID, performs both wafer fabrication and assembly of 256K DRAM's in its Boise, ID, facility. All of Micron's uncased 256K DRAM's are used to produce the cased DRAM's. Micron supports the imposition of antidumping duties in this investigation and stated in its response to the Commission's questionnaire that \* \* \*.

Mitsubishi Semiconductor America, Inc. (MSAI), Durham, NC, is wholly owned by Mitsubishi Electric America, Inc. (MEA), which is, in turn, owned by Mitsubishi Electric Corp. (MELCO). During \* \* \*, MSAI produced roughly \* \* \* 256K DRAM's and \* \* \*. According to counsel for MSAI, the company \* \* \*. MSAI opposes the imposition of antidumping duties in this investigation.

Mostek Corp. (Mostek), Carrollton, TX, a former subsidiary of United Technologies Corp., developed and produced a 256K DRAM through the sampling stage. Mostek was reportedly entering volume production of 256K DRAM's when the firm was shut down by its parent company in October 1985 and its assets subsequently sold to Thompson (France).

Motorola, Inc. (Motorola), Schaumburg, IL, produced uncased 256K DRAM's during January-September 1985. These units were transferred to Motorola's affiliate in \* \* \* for assembly and imported to the United States as cased 256K DRAM's. The \* \* \* square mil dice were largely produced on \* \* \*-inch diameter wafers. Motorola ceased production of the NMOS device but continues its development efforts on 256K and 1 megabit DRAM's of the CMOS type. Motorola supports the imposition of antidumping duties in this investigation.

National Semiconductor Corp. (National), Santa Clara, CA, announced the design and developed the prototype of the 256K DRAM but has not to date produced the product.

NEC Electronics, Inc. (NEC), Mountain View, CA, is wholly owned by NEC Corp. in Japan. NEC began production of 256K DRAM's in its Roseville, CA, facility in 1985. NEC performs both wafer fabrication and assembly operations in the United States. NEC also imports cased 256K DRAM's produced by affiliated companies in Japan. NEC opposes the imposition of antidumping duties in this investigation.

Texas Instruments, Inc. (TI), Dallas, TX, began production of uncased 256K DRAM's in the United States in 1985. The dice, measuring \* \* \* square mils each, are produced on \* \* \*-inch diameter wafers. \* \* \*. According to TI, its facility in the United States, identical to its facility in Miho, Japan, was constructed to produce 1 megabit DRAM's as well as 256K DRAM's. In addition, the company has announced a prototype 4 megabit DRAM. TI imports cased 256K DRAM's from its foreign affiliates in Japan and \* \* \*. The company supports the imposition of antidumping duties in this investigation and stated in its response to the Commission's questionnaire that \* \* \*.

Of the \* \* \* firms known to have at least started sampling and production of uncased or cased 256K DRAM's in the United States, \* \* \* firms completed responses to the Commission's questionnaire. As shown in the following tabulation, 1/ \* \* \* firms perform wafer fabrication, wafer sorting, assembly, and final testing in the United States, 2/ \* \* \* firms conduct only wafer fabrication and sorting in the United States, and \* \* \* firms only assemble and test in the United States cased DRAM's made from wafers (uncased DRAM's) produced in Japan. For the \* \* \* firms producing only cased 256K DRAM's in the United States, \* \* \*, the domestic content share 3/ represented only \* \* \* of sales of cased 256K DRAM's during January-September 1985. 4/

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1/ For those firms with operations outside the United States, the location of operations in the tabulation relates to only those products that were at least in part produced in the United States.

2/ All \* \* \* of these firms, with the exception of \* \* \*, conduct most of the research and development of 256K DRAM's in the United States.

3/ The term domestic content refers to the ratio of domestic product costs to total cost of goods sold for producers' operations relating to the sale of cased 256K DRAM's that were at least in part produced in U.S. establishments.

4/ Initially, \* \* \* was only marking and testing the product in the United States. In \* \* \* 1985, the company began assembly operations in the United States.

\* \* \* \* \*

### U.S. importers

The Commission's questionnaires were sent to 26 firms believed to import uncased or cased 256K and above DRAM's from Japan. According to the data submitted, 1/ there were 10 importers of 256K DRAM's from Japan from January 1982 through September 1985. \* \* \* imported a negligible quantity of 1 megabit DRAM's that were produced in Japan. \* \* \* of the 10 importers produced either uncased or cased 256K DRAM's in the United States, \* \* \* of which are related to firms that produce 256K DRAM's in Japan. The other \* \* \* importers are also \* \* \* related to companies in Japan producing 256K DRAM's. \* \* \*, the three largest importers, accounted for over \* \* \* percent of shipments of imports from Japan of uncased and cased 256K DRAM's during January-September 1985. \* \* \* are the only firms to import uncased 256K DRAM's from Japan; \* \* \* encase these units in the United States. \* \* \*. Each of the 10 importers responding to the Commission's questionnaire is discussed below.

FMI, as indicated in the producers' section of this report, imports from Japan uncased 256K DRAM's for final assembly in the United States. FMI also imports cased 256K DRAM's produced by its parent company or its affiliates in Japan.

Hitachi America, Ltd. (HAL or Hitachi), Tarrytown, NY, is wholly owned by Hitachi, Ltd. HAL imports \* \* \* 256K DRAM's produced by \* \* \*. \* \* \*.

HISUS, as indicated in the producers' section of this report, imports \* \* \* 256K DRAM's from \* \* \*. HISUS assembles the imported uncased 256K DRAM's to produce cased DRAM's in the United States.

Mitsubishi Electronics America, Inc. (MELA or Mitsubishi), Sunnyvale, CA, is wholly owned by MEA. MELA imports \* \* \* 256K DRAM's produced by \* \* \* in Japan. \* \* \*.

NEC imports \* \* \* 256K DRAM's from Japan. \* \* \*.

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1/ \* \* \* of the 26 firms responded to the Commission's questionnaire. \* \* \*.



Nissei Sangyo America, Ltd. (Nissei Sangyo), Rolling Meadows, IL, is a wholly owned subsidiary of Nissei Sangyo Co., Ltd., which is approximately \* \* \* percent owned by Hitachi, Ltd. Nissei Sangyo imports \* \* \* 256K DRAM's produced by \* \* \* in Japan.

Oki Semiconductor Group of Oki America, Inc. (Oki), Sunnyvale, CA, is wholly owned by Oki Electric Industry Co., Ltd. Oki imports \* \* \* 256K DRAM's from \* \* \* in Japan.

Panasonic Industrial Co. (Panasonic), Secaucus, NJ, is a division of Matsushita Electric Corp. of America (MECA). MECA is wholly owned by Matsushita Electric Industrial Co., Ltd. (MEI), in Japan. Panasonic imports from Japan \* \* \* 256K DRAM's produced by \* \* \*.

TI imports \* \* \* 256K DRAM's from its affiliates in Japan and \* \* \*. The uncased DRAM's used to make these units are fabricated from wafers produced in the Miho plant in Japan. \* \* \*.

Toshiba America, Inc. (Toshiba), Tustin, CA, is a wholly owned subsidiary of Toshiba Corp. in Japan. Toshiba imports \* \* \* 256K DRAM's from its parent company. Toshiba Corp. and its affiliates in Japan started production of 256K DRAM's in \* \* \* 1983 and production of 1 megabit DRAM's in \* \* \* 1985.

#### Apparent U.S. consumption

Data on U.S. consumption of cased 256K DRAM's were compiled from information submitted in response to questionnaires of the U.S. International Trade Commission. The consumption data are composed of reported shipments of cased 256K DRAM's, whether domestically produced or imported, in the U.S. market by each of the known major entities (producers and importers) supplying 256K DRAM's to the market. Of the \* \* \* firms that produced, at least in part, cased 256K DRAM's in the United States, \* \* \* also imported cased 256K DRAM's, and \* \* \* other firms that imported cased 256K DRAM's submitted data. The consumption totals include producers' and importers' shipments of cased 256K DRAM's but exclude shipments from small importers that were not surveyed by the Commission, resales such as sales from inventory by customers, and so-called "grey-market" sales. <sup>1/</sup>

Data on consumption of uncased 256K DRAM's are not presented because uncased DRAM's produced in the United States are exported to foreign affiliates or subcontractors or are transferred to domestic affiliates or used

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<sup>1/</sup> The term "grey-market" sales generally refers to spot-market sales that are made to brokers.

internally for the assembly of cased DRAM's; and uncased DRAM's from Japan are imported for assembly in the United States. <sup>1/</sup>

The following tabulation presents information collected on total apparent U.S. consumption (including captive consumption) and apparent U.S. open-market (merchant market) consumption of cased 256K DRAM's (in thousands of units):

<u>Period</u>	<u>Total apparent U.S. consumption</u>	<u>Apparent U.S. open-market consumption</u>
1982	***	***
1983	***	***
1984	***	***
January-September		
1984	***	***
1985	***	***

Total apparent U.S. consumption of cased 256K DRAM's increased from \*\*\* units in 1982 to \*\*\* units in 1983 and climbed to over \*\*\* units in 1984. Total apparent U.S. consumption continued to rise dramatically during January-September 1985, increasing to \*\*\* units, compared with \*\*\* units during the corresponding period of 1984.

There was virtually no apparent U.S. open-market consumption in 1982. However, in 1983 open-market consumption accounted for \*\*\* percent of total U.S. consumption. In 1984, U.S. open-market consumption reached \*\*\* units, accounting for \*\*\* percent of total consumption. Open-market consumption of cased 256K DRAM's continued to follow the trend of total U.S. consumption of cased 256K DRAM's, rising to \*\*\* units during January-September 1985, compared with the level of \*\*\* units during January-September 1984. The ratio of open-market consumption to total consumption \*\*\* during January-September 1985, compared with \*\*\* during January-September 1984.

There was no U.S. consumption of cased DRAM's with densities over 256K from 1982 to 1984. During January-September 1985, total U.S. apparent consumption of cased 1 megabit DRAM's amounted to \*\*\* units \*\*\*.

#### Channels of distribution

Producers of DRAM's, including 256K DRAM's, supply the merchant market (open market) through three channels of distribution: (1) sales to end users, i.e., original equipment manufacturers (OEM's) and circuit board stuffers, (2) sales to distributors, and (3) spot-market sales. Sales to OEM's are made either factory direct or through a factory representative. Sales to "key

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<sup>1/</sup> Small quantities of uncased 256K DRAM's are used to assemble hybrid integrated circuits; transcript of the conference on investigation No. 731-TA-300 (Preliminary), p. 176.

accounts" generally are negotiated by high-level executives of the vendor firm. According to \* \* \*, roughly \* \* \* purchasers generate \* \* \* percent of the DRAM industry's shipment volume. At least one-half of these purchasers could be termed key accounts. Key accounts include such purchasers as \* \* \*. Sales of DRAM's to end users accounted for an estimated \* \* \* percent of total domestic shipments in 1985 and sales of DRAM's to distributors accounted for roughly \* \* \* percent. 1/ Casual sales, i.e., spot-market sales, accounted for the balance. 2/

Factory direct sales to OEM's are long-term contract sales. Contract awards are based on bids made in response to an OEM's request for quotes (RFQ). Such contracts cover "anticipated" requirements and range in length from 3 months to 1 year and call for scheduled deliveries, usually monthly, during the contract period. 3/ Most factory direct contract sales provide for price renegotiation on the downside of the demand cycle. 4/ Factory direct sales to board stuffers also are based on competing bids. Board stuffers issue RFQ's more frequently than OEM's and award purchase orders to winning bidders on a project-by-project basis. Releases are made for shipment to scheduled production run rates. Prices are subject to renegotiation on a "meet-competition" basis.

Sales to distributors provide broad market coverage and access to smaller accounts. Although authorized distributors have both stocking and reporting requirements, they also have price protection. The relatively short life cycle of a particular DRAM (because of the fast-paced technology) and the volatile "boom and bust" nature of the market for DRAM's strongly affect price. Consequently, the industry practice is to offer price protection to authorized distributors. Such protection takes the form of "meet-competition" allowances, or as it is also called, a "d.p.a" (distributor price authorization). This policy enables distributors to quote and sell competitively and supply from inventory purchased at higher prices.

The casual or spot market is the third channel of distribution. This market includes sales to board stuffers, brokers, small OEM's, and so-called walk-ins. These purchasers are making a one-time purchase for quick delivery. Terms are usually cash, but can be on credit. Spot-market purchasers may call directly to the factory, call a manufacturer's rep, call a distributor, or buy over the counter. This market is sometimes called the

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1/ For importers, the distribution of sales volume among the three channels ranged from \* \* \* to \* \* \* percent to end users, \* \* \* to \* \* \* percent to distributors, and \* \* \* to \* \* \* percent to their "spot market."

2/ Domestic producers and importers agree that "spot-market" sales increase as a share of total shipments in a down market.

3/ The third quarter of the year is the usual time for negotiating contracts with OEM's. The contract period generally begins in June of the coming year.

4/ Contract sales to \* \* \* are made on a central purchase basis and are an exception to this pattern. Prices to \* \* \* are rarely renegotiated during the contract period. In contrast, OEM's such as \* \* \* renegotiate price during the contract period.

grey market, especially referring to sales to brokers. Brokers take a position (take title) and look for a price that allows resale at a profit. \* \* \* characterizes the grey market as a "wheeler-dealer" channel of distribution. Other domestic producers and importers term the "grey market" disruptive, particularly in a down market. Pressure on prices is created by grey-market supply coming into the market at sharply lower prices. Brokers, buying for OEM's, board stuffers, or distributors, source their grey-market supply from surplus inventory held by OEM's and distributors and from offshore oversupply. Purchasers state that Japanese DRAM producers sell to distributors and trading companies in Japan then let the trading company be the intermediary to the grey market. <sup>1/</sup>

Major OEM accounts during the last cyclical downturn in the DRAM market did not source from grey-market vendors. They viewed the potential problems associated with the quality of the incoming product as extremely serious. Grey-market supply was known to include mislabeled, stolen, and even rejected products. Currently, according to industry sources, significant grey-market supply is offered complete with offshore producers' quality seals on the boxes. Consequently, major accounts are now sourcing part of their requirements with grey-market vendors.

Sales of DRAM's to OEM's involve a certification process whereby a particular producer's DRAM's are qualified as acceptable for use in that OEM's product(s). An OEM first looks at the producer's memory product specifications, (in this case, 256K DRAM's), then selects several producers' products for certification. This process involves a design engineering dimension, components systems checks, environmental tests, a product reliability phase, and a life test. The time involved varies from as little as a few weeks to as long as 6 months. Because of late entry into the market, domestic producers of 256K DRAM's have not yet qualified their product with many of the largest OEM purchasers of DRAM's, e.g. \* \* \*. Only in recent months have they begun to qualify or to be qualified with many of the lesser-volume OEM's. Purchasers such as \* \* \* note that late entry poses the problem of exclusion from consideration as a qualified source for 256K DRAM's. The certification process can cost an OEM as much as \$150,000. Consequently, an OEM that already has three or four alternative qualified vendors is often not interested in adding a late entrant to the list. This, in turn, limits the production volume a late-entry 256K DRAM producer can achieve and thus impacts on the learning curve and the derived cost reductions that stem from growth in production volume.

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<sup>1/</sup> In investigation No. 731-TA-270 (Preliminary), \* \* \* described this pattern with respect to 64K DRAM's. According to \* \* \*, Japanese producers such as \* \* \* insulate their participation in the grey market by selling to trading companies who, in turn, sell to brokers and wholesalers who sell to minor OEM's, board stuffers, distributors, and others. \* \* \* asserts that it does not operate in the grey market.

## The Industry in Japan

According to information supplied by Integrated Circuit Engineering Corp. (ICE), eight semiconductor firms produced 256K DRAM's in Japan in 1984-85. The largest of these firms is Hitachi, Ltd., which first introduced 256K DRAM's in sample quantities in early 1982 and in production quantities in early 1983. Following the introduction by Hitachi, Ltd., Oki Electric Co. and Toshiba Corp. offered 256K DRAM's for sale in sample quantities later in 1982. Although Toshiba Corp. subsequently offered production quantities for sale during July-September of 1983, Oki Electric Co. did not follow until October-December of 1984. Fujitsu, Ltd., Nippon Electric Co., and Mitsubishi Electric Co. began sampling 256K DRAM's in 1983, with Fujitsu providing production quantities in 1983 and the other two firms in 1984. Matsushita Electric Co. was the last of these firms to enter the industry, providing sample quantities in April-June of 1984 and production quantities in October-December of 1984. TI also produced 256K DRAM's in Japan during the period.

Official Japanese statistics do not separately provide for 256K and above DRAM's. Data published on Japanese semiconductors are disaggregated to the level of MOS memories, which include read-only memories (ROM's), SRAM's, and DRAM's other than 256K DRAM's (such as 16K DRAM's and 64K DRAM's). Based on information published by the Yano Research Institute, DRAM's accounted for approximately 31 percent of MOS memory devices produced in Japan in 1983, with 64K DRAM's accounting for a large share of total DRAM production. ICE reported that only three Japanese firms were offering 256K DRAM's for sale in production quantities in 1983. ICE estimated that 1984 unit production of 256K DRAM's was 10.2 million for Hitachi, Ltd., 9.4 million for Nippon Electric Co., 3.7 million for Fujitsu, Ltd., and 1.1 million for Toshiba Corp. Data on production of MOS memories in Japan during 1982-84 are shown in table 1.

Table 1.—MOS memories: Production in Japan, 1982-84

Item	1982	1983	1984
Quantity—1,000 units—	311,477	740,621	1,152,252
Value—million yen—	140,873	367,256	753,711
Unit value—yen per unit—	452	496	654

Source: Electronics Industries Association of Japan.

Production of MOS memories in Japan increased by 137.8 percent between 1982 and 1983, and by 55.6 percent between 1983 and 1984. The ability of producers in Japan to increase production of MOS memory from 311 million units in 1982 to 1.2 billion units in 1984 indicates that a significant increase in production capacity may have occurred during the period. In a study of Japanese semiconductor producers, John J. Laszlo, Jr., of the investment advisory firm Hambrecht & Quist, stated that:

"Since 1982, the major Japanese semiconductor companies have added capacity at a faster rate than have the major U.S. semiconductor suppliers. The majority of the spending has been allocated to MOS memory production. . . . Currently, there is excess capacity in Japan. Capital spending increased an estimated 100% in 1984 over 1983 and is expected to increase 25% or more in 1985, further aggravating the over-capacity situation. The severe imbalance between supply and demand should result in further sharp price declines in 1985, particularly for commodity devices . . . ." 1/

#### Consideration of Alleged Material Injury

Data on the 256K and above DRAM industry in this section of the report were compiled from questionnaire responses submitted by \* \* \* firms producing either uncased or cased 256K or above DRAM's in the United States. Separate data on production, shipments, and inventories for uncased and cased 256K DRAM's are presented. Data for cased 256K DRAM's are further presented separately on the basis of the country of origin of the uncased DRAM used in the production of cased DRAM's. 2/ Data on employment are presented separately for firms that perform wafer fabrication 3/ and for those that do not perform wafer fabrication but conduct assembly operations in the United States. Similarly, data on the industry's financial experience are presented separately for firms that are U.S.-owned (all of which perform wafer fabrication in the United States) and that are Japanese-owned (both of which do not perform wafer fabrication in the United States). 4/

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1/ John J. Laszlo, The Japanese Semiconductor Industry: Aggressive Capital Expansion Could Deleteriously Impact Industry Profitability in 1985, January 1985, as quoted in the postconference brief of Dewey, Ballantine, Bushby, Palmer & Wood in investigation No. 731-TA-288 (Preliminary), July 18, 1985, p. 22.

2/ Data on cased 256K DRAM's made from uncased DRAM's produced in the United States include data for \* \* \*. The inclusion of \* \* \* does not affect the trends for the domestic industry.

3/ All such firms reporting, with the exception of \* \* \*, also conduct nearly all their research and development in the United States. \* \* \*. The inclusion of \* \* \* does not affect the trends for the domestic industry.

4/ \* \* \* did not provide data on its financial experience relating to its U.S. operations on 256K and above DRAM's.

In its questionnaire the Commission requested data on all DRAM's. The Commission, however, did not receive adequate responses to present these data. 1/

### Production, capacity, and capacity utilization

Data on capacity and production were compiled from responses to the Commission's producer questionnaires submitted by \* \* \* firms producing uncased or cased 256K or above DRAM's in the United States. Production of uncased or cased DRAM's should include all units produced (including yield lost during wafer fabrication for uncased DRAM's and including yield lost during assembly for cased DRAM's). Table 2 presents capacity and production data on 256K and above DRAM's based on the production operations performed in the United States.

There was no U.S. production of or practical capacity to produce 256K and above DRAM's in 1982. \* \* \* produced 256K DRAM's in 1983. For all firms reporting, production and average-for-period capacity increased exponentially from 1983 to 1984, largely because of the sharp increases in production and practical capacity for \* \* \*. There was also \* \* \* which began assembly and final testing operations in the United States in 1984. During January-September 1985, production and average-for-period capacity for all firms producing 256K and above DRAM's increased dramatically compared with production and capacity during the corresponding period of 1984, because \* \* \*.

Capacity utilization for all firms declined from \* \* \* percent to \* \* \* percent from 1983 to 1984. The ratio of production to capacity for all firms reporting fell from \* \* \* percent during January-September 1984 to \* \* \* percent in January-September 1985 because average-for-period capacity rose at a much faster rate than production of 256K and above DRAM's for all firms reporting. 2/

### Production of 256K DRAM's

Data on production of uncased and cased 256K DRAM's were compiled from responses to the producer's questionnaire submitted by \* \* \* firms. Production of uncased 256K DRAM's includes those units produced to make cased 256K DRAM's in the United States, those units shipped to foreign affiliates or subcontractors for the offshore assembly of cased 256K DRAM's, and those units remaining in inventory. 3/ In 1982, \* \* \* uncased 256K DRAM's produced in the United States were used in the U.S. production of cased 256K DRAM's. In 1983 and 1984, \* \* \* percent and \* \* \* percent, respectively, of U.S.-produced

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1/ \* \* \* of the \* \* \* firms, \* \* \*, did not provide data on all DRAM's. Available data relating to all DRAM's is presented in app. E.

2/ Capacity increased at a faster rate than production because the facilities must first be put in place before production can be ramped up.

3/ These figures are net of any losses that occur during wafer sorting.

Table 2.—256K and above DRAM's: U.S. production, average-for-period capacity, and capacity utilization, 1983, 1984, January–September 1984, and January–September 1985

Item	1983	1984	January–September—	
			1984	1985
*** firms performing wafer fabrication and sorting in the United States: <u>1/</u>				
Production—1,000 units—	***	***	***	***
Average-for-period capacity—do—	***	***	***	***
Capacity utilization—percent—	***	***	***	***
*** firms performing wafer fabrication, sorting, assembly, and final testing in the United States: <u>2/</u>				
Production—1,000 units—	***	***	***	***
Average-for-period capacity—do—	***	***	***	***
Capacity utilization—percent—	***	***	***	***
*** firms performing assembly and final testing in the United States: <u>3/</u>				
Production—1,000 units—	***	***	***	***
Average-for-period capacity—do—	***	***	***	***
Capacity utilization—percent—	***	***	***	***
All firms:				
Production—1,000 units—	***	***	***	21,922.8
Average-for-period capacity—do—	***	***	***	143,820.3
Capacity utilization—percent—	***	***	***	15.2

1/ Includes \* \* \*. During January–September 1985, \* \* \*. \* \* \*.

2/ Includes \* \* \*.

3/ Includes \* \* \*.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.



uncased 256K DRAM's were in turn used in the U.S. production of cased 256K DRAM's. During January-September 1984, \* \* \* percent of the uncased 256K DRAM's produced were used in the U.S. production of cased 256K DRAM's; during January-September 1985, \* \* \* percent of the uncased 256K DRAM's produced in the United States were assembled in the United States. \* \* \* of the uncased 256K DRAM's that were not used in the U.S. production of cased 256K DRAM's remained in inventory, and \* \* \* were shipped to foreign affiliates or subcontractors for offshore assembly.

Production of uncased 256K DRAM's increased from \* \* \* units in 1982 to \* \* \* units in 1984 (table 3). Production of uncased 256K DRAM's continued to increase sharply, \* \* \* during January-September 1985, compared with production during January-September 1984.

Production of cased 256K DRAM's <sup>1/</sup> followed the same trend, rising dramatically from \* \* \* units in 1982 to \* \* \* units in 1984. Production of cased 256K DRAM's \* \* \* during January-September 1985, compared with production during the corresponding period of 1984.

There was no production of uncased or cased DRAM's with densities over 256K in 1982, 1983, or 1984. In its questionnaire response, \* \* \* reported sample production of 1 megabit DRAM's during January-September 1985. Reportedly, \* \* \* also developed and sampled 1 megabit DRAM's in January-September 1985.

#### Producers' shipments

As shown in table 4, U.S. producers' total shipments of uncased 256K DRAM's increased from \* \* \* units in 1982 to \* \* \* units in 1983 and to \* \* \* units in 1984. Total shipments of uncased 256K DRAM's continued to follow the trend for production of uncased 256K DRAM's, rising from \* \* \* units during January-September 1984 to almost 20.0 million units during the corresponding period of 1985. From January 1982 to September 1985, intra- or intercompany transfers for the U.S. assembly of cased 256K DRAM's accounted for \* \* \* shipments of uncased 256K DRAM's. Though there were \* \* \* of uncased 256K DRAM's transferred to foreign affiliates or subcontractors, there were \* \* \* domestic or merchant export shipments of uncased 256K DRAM's from January 1982 through September 1985.

U.S. producers' total shipments of cased 256K DRAM's also increased dramatically, rising from \* \* \* units in 1982 to \* \* \* units in 1983 and \* \* \* units in 1984 (table 5). \* \* \* of these cased 256K DRAM's, \* \* \* of which were made from uncased 256K DRAM's produced and assembled in the United States, were used captively. In 1984, domestic shipments of cased 256K DRAM's accounted for \* \* \* percent of total shipments, and export shipments accounted for \* \* \* percent of total shipments of U.S. producers' cased 256K DRAM's. The total number of shipments of cased 256K DRAM's during January-September 1985 was \* \* \* times the number of shipments during the corresponding period of 1984. Also, during January-September 1985, there were \* \* \* shipments of

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<sup>1/</sup> These figures are net of any losses that occur during assembly and testing. As indicated, by comparing data for uncased production with data for cased production, these losses can be significant.

Table 3.—256K DRAM's, uncased and cased: Production, 1982-84,  
January-September 1984, and January-September 1985

(In thousands of units)

Item	1982	1983	1984	January-September—	
				1984	1985
Uncased	***	***	***	***	***
Cased:					
Made from uncased DRAM produced in the United States	***	***	***	***	***
Made from uncased DRAM produced in Japan	***	***	***	***	***
Total	***	***	***	***	14,697.8

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 4.—256K DRAM's, uncased: U.S. producers' shipments, 1982-84,  
January-September 1984, and January-September 1985

(In thousands of units)

Item	1982	1983	1984	January-September—	
				1984	1985
Domestic shipments	***	***	***	***	***
Intra- and intercompany transfers	***	***	***	***	***
Transfers to foreign affiliates	***	***	***	***	***
Export shipments	***	***	***	***	***
Total	***	***	***	***	19,990.0

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 5.—256K DRAM's, cased: U.S. producers' shipments, by country in which specified production operations are performed, 1982-84, January-September 1984, and January-September 1985

Item	(In thousands of units)				
	1982	1983	1984	January-September—	
				1984	1985
Made from U.S.-produced uncased DRAM and assembled in the United States:					
Domestic shipments—	***	***	***	***	***
Intra- and intercompany transfers—	***	***	***	***	***
Export shipments—	***	***	***	***	***
Total shipments—	***	***	***	***	***
Made from U.S.-produced uncased DRAM and assembled in third countries:					
Domestic shipments—	***	***	***	***	***
Intra- and intercompany transfers—	***	***	***	***	***
Export shipments—	***	***	***	***	***
Total shipments—	***	***	***	***	***
Made from Japanese-produced uncased DRAM and assembled in the United States:					
Domestic shipments—	***	***	***	***	***
Intra- and intercompany transfers—	***	***	***	***	***
Export shipments—	***	***	***	***	***
Total shipments—	***	***	***	***	***
Total:					
Domestic shipments—	***	***	***	***	***
Intra- and intercompany transfers—	***	***	***	***	***
Export shipments—	***	***	***	***	***
Total shipments—	***	***	***	***	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

cased 256K DRAM's made from U.S.-produced uncased DRAM's that were assembled offshore and shipments of cased 256K DRAM's made from uncased DRAM's produced in Japan and assembled in the United States. During January-September 1985, however, shipments of cased 256K DRAM's made from uncased DRAM's produced and assembled in the United States still accounted for \* \* \* percent of U.S. producers' total shipments of cased 256K DRAM's. \* \* \* of U.S. producers' total shipments were used captively; \* \* \* percent were shipped domestically and \* \* \* percent were exported during January-September 1985.

### Producers' inventories

There were no end-of-period inventories of uncased 256K DRAM's in 1982, the first year these uncased DRAM's were produced in the United States (table 6). Producers' end-of-period inventories of uncased 256K DRAM's rose from \* \* \* units in 1983 to \* \* \* units in 1984. Inventories on September 30, 1984, amounted to \* \* \* units, and inventories on September 30, 1985, amounted to \* \* \* units.

The ratio of end-of-period inventories to production increased from \* \* \* percent in 1983 to \* \* \* percent in 1984 but declined to \* \* \* percent during January-September 1985, compared with the \* \* \* ratio during the corresponding period of 1984.

There were no U.S. producers' end-of-period inventories of cased 256K DRAM's in 1982 (table 7). Producers' total end-of-period inventories of cased 256K DRAM's increased from \* \* \* units in 1983 to \* \* \* units in 1984. As of September 30, 1984, end-of-period inventories of cased 256K DRAM's amounted to \* \* \* units, compared with end-of-period inventories of \* \* \*, as of September 30, 1985.

The ratio of total end-of-period inventories of cased 256K DRAM's to total shipments rose from \* \* \* percent in 1983 to \* \* \* percent in 1984. This ratio declined \* \* \* during January-September 1985, to \* \* \* percent, compared with the ratio of \* \* \* percent during January-September 1984.

### Employment and wages

The average number of production and related workers producing 256K and above DRAM's at U.S. establishments at which wafer fabrication is performed increased from \* \* \* persons in 1983 to \* \* \* in 1984 (table 8). The number of such workers \* \* \* during January-September 1985, compared with the number employed during the corresponding period of 1984. \* \* \*, however, reported indefinite layoffs of \* \* \* workers engaged in the production of 256K and above DRAM's, respectively, during January-September 1985. \* \* \* reported a reduction of an additional \* \* \* production and related workers producing 256K and above DRAM's in \* \* \* 1985. \* \* \* reported that the number of all DRAM production workers was reduced from \* \* \* to \* \* \* during January-October 1985. For those firms that do not perform wafer fabrication in the United States, \* \* \*, the average number of workers engaged in the production of 256K and above DRAM's also increased, to \* \* \* workers during January-September 1985, compared with \* \* \* workers employed during the corresponding period of 1984 (table 9).

Hours worked by production and related workers producing 256K and above DRAM's at U.S. establishments that perform wafer fabrication increased, from \* \* \* hours in 1983 to \* \* \* hours in 1984. The number of hours worked by such production and related workers \* \* \* during January-September 1985, compared with the number of hours worked during the corresponding period of 1984. Hours worked by production and related workers producing 256K DRAM's at U.S. establishments that do not perform wafer fabrication showed an \* \* \* increase during January-September 1985, compared with hours worked during January-September 1984.

Table 6.—256K DRAM's, uncased: U.S. producers' end-of-period inventories, 1983, 1984, January–September 1984, and January–September 1985

Item	1983	1984	January–September—	
			1984	1985
End-of-period inventories—1,000 units—	***	***	***	***
Ratio of inventories to production percent—	***	***	***	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 7.—256K DRAM's, cased: U.S. producers' end-of-period inventories, 1983, 1984, January–September 1984, and January–September 1985

Item	1983	1984	January–September—	
			1984	1985
End-of-period inventories:				
Made from U.S.–produced uncased DRAM and assembled in the United States 1,000 units—	***	***	***	***
Made from U.S.–produced uncased DRAM and assembled in third countries 1,000 units—	***	***	***	***
Made from Japanese–produced uncased DRAM and assembled in the United States—1,000 units—	***	***	***	***
Total—do—	***	***	***	***
Ratio of total end-of-period inven- tories to total shipments—percent—	***	***	***	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 8.—Average number of production and related workers employed in U.S. establishments producing 256K and above DRAM's, at which wafer fabrication is performed, hours worked by such workers, wages paid, total compensation paid, and average hourly compensation paid, 1983, 1984, January–September 1984, and January–September 1985

Item	1983	1984	January–September—	
			1984	1985
Average number of production and related workers producing 256K and above DRAM's	***	***	***	2,828
Hours worked by production and related workers producing 256K and above DRAM's—1,000 hours—	***	***	***	4,177
Wages paid to production and related workers producing 256K and above DRAM's—1,000 dollars—	***	***	***	56,284
Total compensation paid to production and related workers producing 256K and above DRAM's—1,000 dollars—	***	***	***	72,404
Average hourly compensation paid to production and related workers producing 256K and above DRAM's—per hour—	***	***	***	<u>1/</u> \$17.33

1/ If data submitted by \* \* \* were excluded, average hourly compensation paid to such workers would total to \* \* \*.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 9.—Average number of production and related workers employed in U.S. establishments producing 256K and above DRAM's, at which wafer fabrication is not performed, hours worked by such workers, wages paid, total compensation paid, and average hourly compensation paid, 1984, January–September 1984, and January–September 1985

Item	1984	January–September—	
		1984	1985
Average number of production and related workers producing 256K and above DRAM's	***	***	***
Hours worked by production and related workers producing 256K and above DRAM's—1,000 hours—	***	***	***
Wages paid to production and related workers producing 256K and above DRAM's—1,000 dollars—	***	***	***
Total compensation paid to production and related workers producing 256K and above DRAM's—1,000 dollars—	***	***	***
Average hourly compensation paid to production and related workers producing 256K and above DRAM's—per hour—	***	***	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Similarly, wages paid and total compensation paid to workers engaged in the production of 256K and above DRAM's at all U.S. establishments reporting increased during the periods covered. For those firms that perform wafer fabrication in the United States, average hourly compensation paid to production and related workers producing 256K and above DRAM's increased by \* \* \* percent from 1983 to 1984. Average hourly compensation paid to such workers increased again during January–September 1985, compared with average hourly compensation paid during the corresponding period of 1984. For firms that do not perform wafer fabrication in the United States, average hourly compensation paid to production and related workers producing 256K and above DRAM's declined by \* \* \* percent during January–September 1985, compared with the hourly compensation paid during January–September 1984. Average hourly compensation paid to such workers at U.S. establishments that perform wafer fabrication was \* \* \* the level paid to workers at firms that do not perform U.S. wafer fabrication.

Financial experience of U.S. producers

\*\*\* U.S.-owned firms that perform wafer fabrication of DRAM's in the United States (producing uncased DRAM's), and \*\*\* Japanese-owned firms, \*\*\*, that do not perform wafer fabrication but conduct assembly and/or testing and marking operations in the United States, provided income-and-loss data on their operations relating to the development and/or sale of cased 256K and above DRAM's.

Operations on 256K and above DRAM's.—The data reported by each individual firm, which together accounted for \*\*\* percent of U.S. production of cased DRAM's in January–September 1985, are presented in table 10.

For DRAM's of 256K and above, as shown in table 10, trade sales did not start until the last quarter of 1984. Hence there is no trend of sales and profitability during the complete period of the investigation. \*\*\* U.S.-owned firms reported operating losses in each period of the investigation. These losses reflect the heavy startup costs and research and development expenses incurred by each of the U.S.-owned firms for the development and preparation of production of 256K and above DRAM's. No U.S.-owned firm has reached a volume required to recoup all of its initiation costs during the period covered under the investigation. During the interim period ended September 30, 1985, operating losses of \*\*\* of the U.S.-owned firms increased sharply, compared with such losses during the corresponding period of 1984. \*\*\*, one of the Japanese-owned firms, showed a \*\*\* operating income margin in 1983 and 1984, and then reported \*\*\* operating losses in interim 1985. Because of the diverse experience of each firm, there is no aggregate data developed in this industry to make a meaningful comparison. Hence, the financial experience of each reporting firm is discussed below.

\* \* \* \* \*

Overall DRAM operations.—Income-and-loss data on overall DRAM operations of \*\*\* U.S.-owned firms are presented in table 11. \*\*\* did not provide data on all DRAM operations and \*\*\* only supplied data on all operations of its U.S. establishment. \*\*\* provided no data. Aggregate net sales of all DRAM's jumped by \*\*\* percent, from \*\*\* in 1982 to \*\*\* in 1984. Such sales dropped by \*\*\* percent to \*\*\* during the interim period of 1985, compared with \*\*\* during the corresponding period of 1984.

For overall DRAM operations, the firms reporting sustained an operating loss of \*\*\*, equivalent to \*\*\* percent of net sales, in 1982. Such losses dropped to \*\*\*, equivalent to \*\*\* percent of net sales, in 1983. In 1984, the responding producers earned an aggregate operating income of \*\*\*, or \*\*\* percent of net sales. During the interim period ended September 30, 1985, the industry experienced an operating loss — \*\*\*, equivalent to \*\*\* percent of sales, compared with a \*\*\* operating income of \*\*\*, or \*\*\* percent of net sales, during the corresponding period of 1984. Net income or loss before income taxes followed the trend for operating income or



Table 10.—Income and loss experience of U.S. producers relating to their operations on 256K and above DRAM's at least some portion of which was produced in their U.S. establishments, by firms of specified ownership, accounting years 1982-84, and interim periods ended Sept. 30, 1984, and Sept. 30, 1985

\* \* \* \* \*

Table 11.—Income and loss experience of \* \* \* U.S. producers <sup>1/</sup> on the overall DRAM operations of the establishments within which 256K or above DRAM's are produced, accounting years 1982-84, and interim periods ended Sept. 30, 1984, and Sept. 30, 1985

\* \* \* \* \*

loss. All \* \* \* firms responding reported net losses in interim 1985, whereas \* \* \* firms sustained such losses in 1982, \* \* \* firms in 1983, and \* \* \* firms in 1984.

Capital expenditures.—\* \* \* firms provided data on capital expenditures for all DRAM's produced at least in part in their U.S. establishments and \* \* \* firms supplied such data for 256K and above DRAM's (table 12). Such capital expenditures for 256K and above DRAM's rose from \* \* \* in 1982 to \* \* \* in 1984 and from \* \* \* during January-September 1984 to \* \* \* during the corresponding period of 1985. Capital expenditures for all DRAM's increased from \$60.2 million in 1982 to \$436.4 million in 1984 and then declined to \$251.1 million during January-September 1985, compared with \$260.8 million during January-September 1984. The majority of the equipment is used interchangeably for both 64K DRAM and 256K DRAM production. Most of the capital expenditures were incurred by U.S.-owned firms.

Investment in property, plant, and equipment.—\* \* \* firms supplied data concerning their investment in productive facilities for all DRAM's, and \* \* \* firms provided such data for 256K and above DRAM's. As shown in table 12, their aggregate investment in such facilities for 256K and above DRAM's, valued at cost, increased from \* \* \* in 1982 to \* \* \* in 1984, and from \* \* \* as of September 30, 1984, to \* \* \* as of September 30, 1985. The book value of such facilities followed a trend similar to that of original cost. Aggregate investment for all DRAM facilities, valued at cost, grew from \$188.6 million in 1982 to \$568.3 million in 1984, and from \$499.6 million as of September 30, 1984, to \$808.6 million as of September 30, 1985. Most of these investments were made by U.S.-owned firms, but the trend of investments made by Japanese-owned firms is the same as that for U.S.-owned firms.

Research and development.—\* \* \* firms provided research and development expenses related to the production of 256K and above DRAM's. \* \* \*. Research and development expenses increased from \* \* \* in 1982 to \$45.2 million in 1984 and from \$29.3 million during January-September 1984 to \$35.2 million during the corresponding period of 1985. Almost all of such expenses were incurred by U.S.-owned firms. \* \* \* reported a \* \* \* of research and development in the United States. Japanese-owned firms' research and development expenses are generally incurred by their parent companies in Japan.

Table 12.--256K and above DRAM's: Capital expenditures; investment in property, plant, and equipment; and research and development expenses, by specified ownership, pre-1982, 1982-84, January-September 1984, and January-September 1985

(In thousands of dollars)								
Item	Capital expenditures		Investment in property, plant, and equipment <sup>1/</sup>				Research and development related to 256K and above DRAM's	
	All DRAM's	256K and above DRAM's	All DRAM's		256K and above DRAM's			
			Original cost	Book value	Original cost	Book value		
Pre-1982								
U.S.-owned firms-----	***	***	***	***	***	***	***	***
1982:								
U.S.-owned firms-----	***	***	***	***	***	***	***	***
Japanese-owned firms-----	***	***	***	***	***	***	***	***
Total-----	60,245	***	188,607	125,124	***	***	***	***
1983:								
U.S.-owned firms-----	***	***	***	***	***	***	***	***
Japanese-owned firms-----	***	***	***	***	***	***	***	***
Total-----	118,063	***	290,944	198,630	***	***	***	14,735
1984:								
U.S.-owned firms-----	***	***	***	***	***	***	***	***
Japanese-owned firms-----	***	***	***	***	***	***	***	***
Total-----	436,390	***	568,256	463,792	***	***	***	45,152
January-September 1984:								
U.S.-owned firms-----	***	***	***	***	***	***	***	***
Japanese-owned firms-----	***	***	***	***	***	***	***	***
Total-----	260,818	***	499,580	378,695	***	***	***	29,341
January-September 1985:								
U.S.-owned firms-----	***	***	***	***	***	***	***	***
Japanese-owned firms-----	***	***	***	***	***	***	***	***
Total-----	251,110	***	808,584	640,899	***	***	***	35,227

<sup>1/</sup> Investments for interim periods are as of Sept. 30, 1984, and Sept. 30, 1985.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

### Consideration of Alleged Threat of Material Injury

Among the relevant economic factors that may contribute to the threat of material injury to the domestic industry are the ability of producers in Japan to increase the level of exports of 256K and above DRAM's to the United States and the likelihood that they will do so, any substantial increases in inventories of imports of Japanese 256K and above DRAM's in the United States, and any rapid increase in penetration of the U.S. market by the imports.

The available data concerning the production and capacity of Japanese producers of 256K and above DRAM's are presented in the section of this report entitled "The Industry in Japan." The available data concerning U.S. importers' inventories of 256K DRAM's from Japan are presented in table 13. There were no end-of-period inventories of uncased or cased DRAM's with densities over 256K imported from Japan during January 1982-September 1985.

There were no end-of-period inventories of uncased 256K DRAM's imported from Japan from 1982 to 1984, as shown in table 13. As of September 30, 1985, end-of-period inventories of imports from Japan of uncased 256K DRAM's amounted to \* \* \* units.

There were no end-of-period inventories of cased 256K DRAM's imported from Japan in 1982. Importers' end-of-period inventories increased from \* \* \* units in 1983 to \* \* \* units in 1984. Inventories of cased 256K DRAM's imported from Japan increased to \* \* \* units, as of September 30, 1985, compared with inventories of \* \* \* units, as of September 30, 1984.

A discussion on the level of shipments of uncased and cased 256K and above DRAM's imported from Japan and the market share of shipments of cased 256K DRAM's is presented in the section of this report concerning the causal relationship between imports allegedly sold at LTFV and the alleged material injury or threat thereof.

### Consideration of the Material Retardation of Establishment

The available data concerning the material retardation of the establishment of an industry in the United States are presented in the section of this report entitled "Consideration of Alleged Material Injury." The section of this report on producers provides a brief description of each firm and the nature and extent of its operations relating to 256K and above DRAM's.

### Consideration of the Causal Relationship Between Imports Allegedly Sold at LTFV and the Alleged Material Injury or Threat Thereof

#### U.S. imports from Japan

Data on U.S. imports from Japan were compiled from responses to the Commission's questionnaires. Table 14 presents U.S. shipments of uncased 256K DRAM's imported from Japan. Imports from Japan of uncased 256K DRAM's were not shipped in 1982 and 1983. \* \* \*. In 1985, \* \* \* shipped \* \* \* units imported from Japan of uncased 256K DRAM's in the United States.

Table 13.—256K DRAM's, uncased and cased: U.S. importers' inventories of 256K DRAM's produced in Japan, as of Dec. 31 of 1983 and 1984, and Sept. 30 of 1984 and 1985

(In thousands of units)

Item	1983	1984	January–September—	
			1984	1985
Uncased	***	***	***	***
Cased	***	***	***	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 14.—256K DRAM's, uncased: U.S. shipments <sup>1/</sup> of imports from Japan, by importer, 1984, January–September 1984, and January–September 1985

(In thousands of units)

Importer	1984	January–September—	
		1984	1985
***	***	***	***
Total	***	***	***

<sup>1/</sup> Includes intra- and intercompany transfers.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

There were virtually no U.S. shipments of imports from Japan of cased 256K DRAM's in 1982 (table 15). In the following year, \* \* \* accounted for \* \* \* percent of the 358,000 units of cased 256K DRAM's imported from Japan that were shipped in the United States. U.S. shipments of cased 256K DRAM's continued to increase in 1984, to 10.6 million units, and shipments of such imports in the United States more than quadrupled during January–September 1985, compared with shipments during the corresponding period of 1984. Of the 28.0 million units shipped during January–September 1985, \* \* \* accounted for \* \* \* percent of the total.

Table 15.—256K DRAM's, cased: U.S. shipments 1/ of imports from Japan, by importer, 1982-84, January-September 1984, and January-September 1985

(In thousands of units)

Importer	1982	1983	1984	January-September—	
				1984	1985
FMI	***	***	***	***	***
HAL	***	***	***	***	***
HISUS	***	***	***	***	***
MELA	***	***	***	***	***
NEC	***	***	***	***	***
Nissei	***	***	***	***	***
Oki	***	***	***	***	***
Panasonic	***	***	***	***	***
TI	***	***	***	***	***
Toshiba	***	***	***	***	***
Total	***	358.0	10,610.8	6,338.3	27,996.5

1/ Includes intra- and intercompany transfers.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

#### U.S. market shares of shipments

Table 16 presents the market shares of shipments of cased 256K DRAM's on the basis of the country of origin of the uncased DRAM used to make the cased product and the country in which the 256K DRAM is assembled. As shown, cased 256K DRAM's made from uncased DRAM's produced and assembled in the United States accounted for \* \* \* of the \* \* \* units consumed in 1982. In 1983, when consumption of cased 256K DRAM's increased to \* \* \* units, shipments of cased 256K DRAM's produced and assembled in Japan accounted for \* \* \* percent of consumption. In 1984, the ratio of these shipments of cased 256K DRAM's imported from Japan declined to \* \* \* percent of consumption. The share held by shipments of cased 256K DRAM's imported from Japan fell to \* \* \* percent during January-September 1985, compared with the \* \* \* share during January-September 1984. The decline occurred because of the increases in the shares accounted for by shipments of cased 256K DRAM's made from uncased DRAM's produced in Japan and assembled both in the United States and in third countries. The share of shipments of cased 256K DRAM's produced and assembled in the United States declined to \* \* \* percent during January-September 1985, compared with the \* \* \* share during the corresponding period of 1984.

Table 16.—256K DRAM's, cased: U.S. market shares of shipments, 1/  
1982-84, January-September 1984, and January-September 1985

(In percent)

Item	1982	1983	1984	January-September—	
				1984	1985
Made from uncased 256K DRAM's produced and assembled in the United States—	***	***	***	***	***
Made from uncased 256K DRAM's produced in the United States and assembled in third countries—	***	***	***	***	***
Made from uncased 256K DRAM's produced in Japan and assembled in the United States—	***	***	***	***	***
Made from uncased 256K DRAM's produced and assembled in Japan—	***	***	***	***	***
Made from uncased 256K DRAM's produced in Japan and assembled in third countries—	***	***	***	***	***

1/ Includes intra- and intercompany transfers.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Since uncased 256K DRAM's are imported from Japan for assembly in the United States, shipments of cased 256K DRAM's produced from imports from Japan of uncased 256K DRAM's serve to measure the actual impact of imports from Japan of uncased 256K DRAM's. As shown, these cased 256K DRAM's, which were first shipped during January-September 1985, held a \*\*\*-percent share of U.S. consumption during that period.

## Prices

As noted in the "Channels of Distribution" section of this report, DRAM's are sold through three channels of distribution: (1) on a long-term contract basis to OEM's and on a shorter term scheduled delivery basis to board stuffers, (2) to authorized distributors, and (3) to spot-market purchasers. These three channels reflect different pricing policies and different sized purchases and purchasers. 1/ In order to compare domestic and import price trends and measure margins of underselling (or overselling) by imports from Japan, the Commission asked domestic producers and importers to supply data on price quotations made to OEM's to supply 256K DRAM's for the three largest quantity contracts awarded, at least in part, to their respective firms during October-December 1983 or January-May 1984 for scheduled delivery in 1984 and based on extended or new contracts for scheduled delivery through December 1985. Separate price-quote data on 256K DRAM's were requested for four different OEM categories of end-use products: (1) office automation equipment, (2) telecommunications equipment, (3) industrial automation equipment, and (4) consumer electronic products. 2/ To capture the pattern of renegotiated prices, monthly data were requested on lowest invoice prices in servicing these contract awards during September 1984-December 1985. 3/ Only importers reported data for sales to OEM's.

Further, the Commission asked domestic producers and importers for the net selling prices of factory direct sales to board stuffers, authorized distributors, and spot-market purchasers. These transaction prices were requested to be the lowest net selling price to each class of customer during September 1984-December 1985. 4/

Trends in prices.—Weighted averages of the prices received in questionnaire responses are the basis for the trend analysis that follows. Domestic producers' selling prices are f.o.b. plant, net of all discounts and allowances. Importers' selling prices are duty-paid prices, ex-dock, port of entry (or importer warehouse), net of all discounts and allowances, and excluding U.S. inland freight.

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1/ Long-term contracts generally are subject to price renegotiations at the purchaser's option. Distributor prices are adjusted on a "meet-competition" basis to enable sales of products in stock at competitive prices without a distributor selling below cost and absorbing a loss.

2/ Includes personal computers.

3/ Most such contracts, it is understood, were extended and renegotiated to extend into 1986.

4/ Monthly data from September 1984-December 1985 were requested in order to track the sharp downturn in prices that began during that time period.

Prices of 256K DRAM's sold to office automation OEM's.—Factory direct sales of imported DRAM's to this class of OEM reflected a sharp price downward trend of 21 percent from October 1984 through December 1984, dropping to a weighted-average price level of \* \* \* (table 17). The decline steepened in 1985, with prices plummeting to \* \* \* by mid-year and sliding to a low of \* \* \* in October, 89 percent below the October 1984 base-period price level of \* \* \*. No domestic prices were submitted.

Prices of 256K DRAM's sold to telecommunications OEM's.—Import prices to this class of OEM showed an even sharper downward trend. In 1984, the unit price dropped from \* \* \* in September to \* \* \* in December, a decline of 37 percent. During 1985, the price plunged to a low of \* \* \* in November, 93 percent below the base-period price level. No domestic prices were submitted.

Prices of 256K DRAM's sold to industrial automation OEM's.—The price trend of sales of imports from Japan to this class of OEM spanned a shorter time period and thus showed a lesser decline. From a level of \* \* \* during February 1985, prices fell to a low of \* \* \* in October 1985, representing a decline of 80 percent. No domestic prices were submitted.

Prices of 256K DRAM's sold to consumer products OEM's.—Sales of imported Japanese DRAM's to this class of OEM followed a sharp downward trend similar to that of prices in sales to office automation OEM's. From a September 1984 base-period price of \* \* \*, prices fell steadily to end the year at \* \* \*, or down by 33 percent. The price decline continued its steep descent in 1985 to a low of \* \* \* in October, 91 percent below the base-period price level. No domestic prices were submitted.

Prices to purchasers in other channels of distribution.—The Commission also asked domestic producers and importers for the lowest monthly net prices of the subject DRAM's sold to circuit board stuffers, distributors, and spot-market customers during September 1984–December 1985. These data are presented in tables 18 and 19. The trend in prices to these classes of customers generally exhibited the same sharp downward trend as analyzed above. The pattern, with some exception, was generally the same for all three classes of purchasers.

The trend in prices for sales of imports from Japan in other channels of distribution showed a steady decline that began in 1984 and continued through 1985 to lows that were less than 10 percent of the base-period price levels. Prices of domestic 256K DRAM's for sales to the three types of purchasers appeared only in mid-1985 and reflected a downward trend during the balance of the subject period. The Japanese presence was strongest in the distributor channel of distribution. Sales of Japanese DRAM's to board stuffers were scant and covered a shorter timespan, but paralleled the trend in other channels.



Table 17.--256K DRAM's (150 ns): Contract award prices <sup>1/</sup> and weighted-average net selling prices for sales of domestic products and for sales of imports from Japan to 4 classes of OEM customers <sup>2/</sup> and indexes of those prices, <sup>2/</sup> by classes and by months, September 1984-November 1985

(Per unit)																
Period	Office automation OEM				Telecommunication OEM				Industrial automation OEM				Consumer products OEM			
	U.S. weighted-average price		Japanese weighted-average price		U.S. weighted-average price		Japanese weighted-average price		U.S. weighted-average price		Japanese weighted-average price		U.S. weighted-average price		Japanese weighted-average price	
	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount
1984:																
September---	-	-	-	-	-	-	100	***	-	-	-	-	-	-	100	***
October---	-	-	100	***	-	-	88	***	-	-	-	-	-	-	96	***
November---	-	-	88	***	-	-	63	***	-	-	-	-	-	-	74	***
December---	-	-	79	***	-	-	63	***	-	-	-	-	-	-	67	***
1985:																
January---	-	-	75	***	-	-	63	***	-	-	-	-	-	-	43	***
February---	-	-	70	***	-	-	36	***	-	-	100	***	-	-	35	***
March---	-	-	47	***	-	-	24	***	-	-	70	***	-	-	28	***
April---	-	-	39	***	-	-	12	***	-	-	55	***	-	-	22	***
May---	-	-	33	***	-	-	13	***	-	-	61	***	-	-	20	***
June---	-	-	22	***	-	-	36	***	-	-	133	***	-	-	19	***
July---	-	-	21	***	-	-	10	***	-	-	38	***	-	-	17	***
August---	-	-	20	***	-	-	9	***	-	-	32	***	-	-	19	***
September---	-	-	16	***	-	-	9	***	-	-	25	***	-	-	11	***
October---	-	-	11	***	-	-	9	***	-	-	20	***	-	-	9	***
November---	-	-	12	***	-	-	7	***	-	-	21	***	-	-	-	-

<sup>1/</sup> Contract award price for scheduled delivery of 256K DRAM's in subsequent months.

<sup>2/</sup> First period with data=100.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 18.--256K DRAM's (150 ns): Weighted-average net selling prices for sales of domestic products and for sales of imports from Japan in quantities of over 10,000 units to 3 classes of customers and indexes of those prices, 1/ by months, September 1984-December 1985

(Per unit)

Period	U.S. producers' price						Japanese importers' price					
	Factory direct sales to board stuffers		Sales to authorized distributors		Spot-market prices		Factory direct sales to board stuffers		Sales to authorized distributors		Spot-market prices	
	Weighted: average: price		Weighted: average: price		Weighted: average: price		Weighted: average: price		Weighted: average: price		Weighted: average: price	
	price	Index	price	Index	price	Index	price	Index	price	Index	price	Index
1984:												
September-----	-	-	-	-	-	-	-	-	-	-	***	100
October-----	-	-	-	-	-	-	-	-	-	-	***	54
November-----	-	-	-	-	-	-	-	-	-	-	***	54
December-----	-	-	-	-	-	-	-	-	***	100	***	51
1985:												
January-----	-	-	-	-	-	-	-	-	-	-	***	30
February-----	-	-	-	-	-	-	-	-	-	-	***	21
March-----	-	-	-	-	-	-	-	-	***	42	***	19
April-----	-	-	-	-	-	-	-	-	***	32	***	15
May-----	-	-	-	-	-	-	-	-	***	23	***	12
June-----	-	-	-	-	-	-	-	-	***	19	***	10
July-----	-	-	-	-	-	-	***	100	***	18	***	10
August-----	***	100	***	100	***	100	***	91	***	15	***	12
September-----	***	97	***	65	***	84	-	-	-	-	***	8
October-----	-	-	***	56	***	47	***	40	***	11	***	23
November-----	-	-	-	-	***	47	***	36	***	11	***	6
December-----	-	-	***	78	-	-	-	-	***	12	-	-

1/ First period with data=100.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 19.--256K DRAM's (150 ns): Weighted-average net selling prices for sales of domestic products and for sales of imports from Japan in quantities of 10,000 units or less to 3 classes of customers and indexes of those prices, 1/ by months, September 1984-December 1985

(Per unit)												
Period	U.S. producers' price						Japanese importers' price					
	Factory direct sales to board stuffers		Sales to authorized distributors		Spot-market prices		Factory direct sales to board stuffers		Sales to authorized distributors		Spot-market prices	
	Weighted average price		Weighted average price		Weighted average price		Weighted average price		Weighted average price		Weighted average price	
	price	Index	price	Index	price	Index	price	Index	price	Index	price	Index
1984:												
September-----	-	-	-	-	-	-	-	-	***	100	***	100
October-----	-	-	-	-	-	-	-	-	***	64	***	67
November-----	-	-	-	-	-	-	-	-	***	72	***	71
December-----	-	-	-	-	-	-	-	-	***	62	***	65
1985:												
January-----	-	-	-	-	-	-	-	-	***	43	***	35
February-----	-	-	-	-	-	-	-	-	***	32	***	36
March-----	-	-	-	-	-	-	-	-	***	28	***	27
April-----	-	-	-	-	-	-	-	-	***	23	***	18
May-----	-	-	-	-	-	-	***	100	***	14	***	17
June-----	-	-	***	100	-	-	***	104	***	13	***	15
July-----	-	-	***	70	-	-	-	-	***	9	***	13
August-----	-	-	***	61	-	-	***	100	***	9	***	12
September-----	***	100	***	92	***	100	***	65	***	7	***	11
October-----	-	-	***	54	***	84	-	-	***	7	***	9
November-----	-	-	***	47	-	-	***	64	***	7	***	8
December-----	-	-	***	34	-	-	-	-	***	9	***	8

1/ First period with data=100.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Margins of underselling

Monthly comparisons of the weighted-average net selling prices reported for sales of DRAM's to circuit board stuffers, to distributors, and to spot-market customers provided the basis for the analysis of margins of underselling or (overselling). Although there were instances of overselling as well as underselling of DRAM's imported from Japan, the general pattern was one of more underselling in the distributor market but more overselling in the spot market.

256K DRAM's sold direct to circuit board stuffers.—Two monthly comparisons of prices for sales of the subject DRAM's to board stuffers revealed one instance of underselling and one of overselling by the imported Japanese DRAM's. The margin of underselling was 46 percent \* \* \* and the margin of overselling was 49 percent \* \* \* (table 20).

256K DRAM's sold to distributors.—Price data enabled 10 comparisons of monthly weighted-average net selling prices of DRAM's sold to distributors, of which 7 were in quantities of 10,000 units or less. Imported Japanese DRAM's undersold the domestic product in 5 of these comparisons by margins that ranged from 4.1 to 47.2 percent, or from \* \* \* to \* \* \* per unit (table 21). Margins of overselling ranged from 1.0 to 63.8 percent, or from \* \* \* to \* \* \*.

256K DRAM's sold in the spot market.—Two monthly comparisons of spot-market sales in quantities of 10,000 units or less and four in quantities of over 10,000 units showed that imported Japanese DRAM's oversold the domestic product in five instances. Margins of overselling ranged from 3.4 to 440.7 percent; or from \* \* \* to \* \* \* per unit (table 22).

Lost sales

The Commission, in its questionnaire, asked domestic producers to provide specific instances of lost sales of 256K DRAM's to competing product imported from Japan. \* \* \* submitted \* \* \* allegations involving \* \* \* purchasers and \* \* \* provided \* \* \* alleged lost sales, naming \* \* \* purchasers. These alleged lost sales represented a possible sales volume of \* \* \* units and sales revenue of \* \* \*.

\* \* \* named \* \* \* as the purchaser in an alleged lost sale for 256K DRAM's in \* \* \* 1985. \* \* \* allegedly rejected \* \* \* offer price of \* \* \* per device on the \* \* \* unit order in favor of a competing quote of \* \* \* for product imported from Japan. \* \* \* acknowledged rejecting the domestic price and awarding the sale to \* \* \*.

\* \* \* noted that \* \* \* has certified \* \* \* firms as approved vendors of 256K DRAM's—\* \* \*. He added that the quality of the 256K DRAM's produced by these firms is equal, making price the deciding factor. Since \* \* \* 1985, said \* \* \*, Japanese prices of 256K DRAM's have moved up to more than \* \* \* per unit. \* \* \* vendors will not accept orders for future scheduled delivery at a fixed price; price quotes are for c.o.d. sales or terms are for a single delivery only. The upturn in price and expected price increases are the basis for this vendor policy.

Table 20.—256K DRAM's (150 ns) sold factory direct to circuit board stuffers: Average margins by which imports of Japanese DRAM's undersold or oversold 1/ U.S.-produced DRAM's based on weighted-average net selling prices, 2/ by sizes of sales and by months, September 1984-December 1985

(Per unit)				
Period	10,000 units or less		Over 10,000 units	
	Amount	Percent	Amount	Percent
1984:	-	-	-	-
September	-	-	-	-
October	-	-	-	-
November	-	-	-	-
December	-	-	-	-
1985:	-	-	-	-
January	-	-	-	-
February	-	-	-	-
March	-	-	-	-
April	-	-	-	-
May	-	-	-	-
June	-	-	-	-
July	-	-	-	-
August	-	-	***	-49.3
September	***	45.8	-	-
October	-	-	-	-
November	-	-	-	-
December	-	-	-	-

1/ Overselling is shown with a negative (-) sign.

2/ Margins are calculated from unrounded weighted-average prices.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 21.—256K DRAM's (150 ns) sold factory direct to authorized distributors: Average margins by which imports of Japanese DRAM's undersold or oversold 1/ U.S.-produced DRAM's based on weighted-average net selling prices, 2/ by sizes of sales and by months, September 1984-December 1985

Period	(Per unit)			
	10,000 units or less		Over 10,000 units	
	Amount	Percent	Amount	Percent
1984:	-	-	-	-
September	-	-	-	-
October	-	-	-	-
November	-	-	-	-
December	-	-	-	-
1985:	-	-	-	-
January	-	-	-	-
February	-	-	-	-
March	-	-	-	-
April	-	-	-	-
May	-	-	-	-
June	***	15.8	-	-
July	***	16.3	-	-
August	***	-1.0	***	0
September	***	47.2	-	-
October	***	10.9	***	-34.1
November	***	4.1	-	-
December	***	-63.8	***	-3.1

1/ Overselling is shown with a negative (-) sign.

2/ Margins are calculated from unrounded weighted-average prices.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 22.—256K DRAM's (150 ns) sold factory direct in the spot market:  
 Average margins by which imports of Japanese DRAM's undersold or oversold 1/  
 U.S.-produced DRAM's based on weighted-average net selling prices, 2/ by  
 sizes of sales and by months, September 1984-December 1985

(Per unit)				
Period	10,000 units or less		Over 10,000 units	
	Amount	Percent	Amount	Percent
1984:	-	-	-	-
September	-	-	-	-
October	-	-	-	-
November	-	-	-	-
December	-	-	-	-
1985:	-	-	-	-
January	-	-	-	-
February	-	-	-	-
March	-	-	-	-
April	-	-	-	-
May	-	-	-	-
June	-	-	-	-
July	-	-	-	-
August	-	-	***	-32.6
September	***	-3.4	***	.8
October	***	-3.1	***	-440.7
November	-	-	***	-37.9
December	-	-	-	-

1/ Overselling is shown with a negative (-) sign.

2/ Margins are calculated from unrounded weighted-average prices.

Source: Compiled from data submitted in response to questionnaires of the  
 U.S. International Trade Commission.

\* \* \* was cited by \* \* \* in an alleged lost sale for \* \* \* 256K DRAM's in \* \* \* 1985. \* \* \* allegedly opted for Japanese product offered at \* \* \* per unit rather than domestic DRAM's quoted at \* \* \* per unit. \* \* \* stated that \* \* \*. According to \* \* \*, the firm is not yet using 256K DRAM's in any of its products. Although there is a product at the research and development stage that will incorporate 256K DRAM's, to date there have been no bids nor contracts for 256K DRAM's let by the firm's purchasing department. The product that will incorporate 256K DRAM's is so far only at the pilot stage of testing. When \* \* \* ultimately purchases DRAM's, it will look at various sources, qualify the product, and then buy strictly on the bases of availability and cost. The past pattern of sourcing reflects a mix of domestic and imported Japanese DRAM's.

Another alleged lost sale provided by \* \* \* identified \* \* \*. \* \* \* responded to the Commission staff's inquiry. \* \* \* alleged that \* \* \* rejected an offer price of \* \* \* per device for an order of \* \* \* 256K DRAM's in \* \* \* 1985 and accepted a quote of \* \* \* for competing product imported from Japan. \* \* \* verified purchasing the Japanese product but could not recall the specific Japanese source. \* \* \* buys directly from manufacturers and through distributors such as \* \* \*, which offer imported Japanese DRAM's. The product, therefore, could have been bought from \* \* \*. Purchases are frequent and requests for quotes and offer prices are a day-in, day-out occurrence. \* \* \* volume runs from \* \* \* to \* \* \* 256K DRAM's per month. In some cases, \* \* \* noted, \* \* \* will specify whose product should be used. This requires specific sourcing of the DRAM's from that Japanese (or domestic) producer. \* \* \* primary concern, however, is that it must be competitive with other \* \* \*. Price, therefore, is the key criterion.

\* \* \* cited \* \* \* in an alleged lost sale for \* \* \* 256K DRAM's in \* \* \* 1985. \* \* \* allegedly bid \* \* \* per unit but was rejected in competing with an offered price of \* \* \* for imported Japanese product. \* \* \* checked the firm's records and provided the following facts. The request for quotes issued by \* \* \* was in response to \* \* \*. The quantity of 256K DRAM's required could have been as low as \* \* \* units or, depending on the market's response to the \* \* \* product, as high as \* \* \*. According to \* \* \*, \* \* \* had only \* \* \* Japanese producers (\* \* \*) certified to supply 256K DRAM's for the \* \* \* product. One other, \* \* \*, was in the process of qualification and near to completing that certification program. Consequently, \* \* \* invited \* \* \* to quote on this potential requirement for 256K DRAM's. \* \* \*, however, was not in the bid competition according to \* \* \*. At that time, \* \* \* file on \* \* \* showed preliminary specifications on a \* \* \* 256K DRAM but \* \* \* had not received samples and \* \* \* was not on \* \* \* approved vendor list. \* \* \*, with a quote of \* \* \* per unit, was the lowest bidder on this RFQ and was awarded the contract. \* \* \* quoted \* \* \* and \* \* \* offered 256K DRAM's ranging in price from \* \* \* to \* \* \* per unit, depending on the quantity involved. \* \* \* was not asked to quote. According to \* \* \*, when a dumping charge came in mid-year, \* \* \* withdrew its bid despite a firm contract and used the U.S. Government action as its excuse. This put \* \* \* on the spot, \* \* \* emphasized, and made the company vulnerable to a loss because of its subcontract bid to \* \* \*. Fortunately, said \* \* \*, \* \* \* did not win the



contract award at that time. Since then, \* \* \* has built \* \* \*. \* \* \*. For this production, \* \* \*. \* \* \* added that as for \* \* \*, \* \* \* had a quote of \* \* \* from \* \* \* on \* \* \*, for a large subcontract that would require \* \* \* 256K DRAM's. This potential contract is still in process and there has been as yet no award to supply 256K DRAM's.

\* \* \* named \* \* \* in an alleged lost sale for \* \* \* 256K DRAM's in \* \* \* 1985. This firm allegedly purchased product imported from Japan at an offer price of \* \* \* per unit, rejecting a quote of \* \* \* from \* \* \*. \* \* \* affirmed the purchase. According to \* \* \*, \* \* \* was high on this RFQ, as was \* \* \* that also was not able to deliver. Consequently, \* \* \* bought a mix of \* \* \* DRAM's through \* \* \* a supplier that specializes in DRAM's. The price of Japanese 256K DRAM's later went as low as \* \* \* until recently, when the Japanese producers increased the price to \* \* \*. \* \* \* noted that \* \* \* from \* \* \* on \* \* \*, at \* \* \* per unit. Products of all sources are working well, said \* \* \*. Price is the deciding factor.

\* \* \*. This firm was identified in an alleged lost sale of \* \* \* 256K DRAM's in \* \* \* 1985. \* \* \* allegedly rejected a \* \* \* quote of \* \* \* per device in favor of a price of \* \* \* for competing product imported from Japan. \* \* \* acknowledged the purchase of the product imported from Japan. The product was purchased through \* \* \*. \* \* \* said that there is no problem of returns when dealing with \* \* \*. \* \* \* also sources \* \* \* 256K DRAM's from \* \* \*. Currently, the price of 256K DRAM's is \* \* \*. \* \* \* explained that there are fewer sources for 256K DRAM's than there were for 64K DRAM's. Moreover, when U.S. producers bowed out of the DRAM market, this pushed up the price of 64K DRAM's as production lines shut down. This, in turn, impacted on the price of 256K DRAM's. The prices are set in the Orient by the Japanese said \* \* \*. As for volume, \* \* \* buys and sells \* \* \* to \* \* \* 256K DRAM's per month.

\* \* \* was named by \* \* \* in an alleged lost sale in \* \* \* 1985. \* \* \* quote of \* \* \* per unit for an order of \* \* \* 256K DRAM's allegedly was rejected in favor of a Japanese offer price of \* \* \* per unit for competing imported product. \* \* \* confirmed buying the Japanese DRAM's but noted that the alleged quantity was \* \* \*. That amount would have served an 18-month- to 2-year-supply need. There was some inquiry that involved \* \* \*, said \* \* \*, but it was casual and not initiated by \* \* \*. The firm is purchasing its 256K DRAM's from "certified sources" but the purchases are made through distributors such as \* \* \*. The product has been purchased from \* \* \* primarily but, currently, the source is \* \* \* on a \* \* \* deal at \* \* \* per unit for a quantity of roughly \* \* \* units per month through \* \* \*. There have been no meaningful quality problems with the 256K DRAM's in the last \* \* \* months. Price stability in tandem with dependable supply are the key factors in this firm's purchasing decisions at this time of a market price upturn.

\* \* \* named \* \* \* as the purchasing firm in an alleged lost sale involving \* \* \* 256K DRAM's in \* \* \* 1985. \* \* \* offer price of \* \* \* per unit was allegedly rejected and a Japanese offer price of \* \* \* was accepted

by \* \* \*. \* \* \* confirmed buying the Japanese product and offered the circumstances relating to this decision. Although \* \* \*, \* \* \* did consider \* \* \* product in this purchasing requirement for 256K DRAM's. \* \* \* offered the units at \* \* \* per device. As a result, \* \* \* took about \* \* \* units as a sample to qualify the \* \* \* part for the intended usage. The \* \* \* test products had a \* \* \*-percent failure rate on memory. It was determined that this was a product design problem and ultimately, after this qualification process dragged on for \* \* \*, \* \* \* did not continue although by then \* \* \* believed the \* \* \* part could be used. Meanwhile, \* \* \* needed an ongoing supply of 256K DRAM's. It placed orders with \* \* \* at \* \* \* and with \* \* \* at a price of about \* \* \* (a yen price of \* \* \* at an exchange rate of about \* \* \* yen/\$US). Currently, \* \* \* is buying Japanese 256K DRAM's at \* \* \* yen, a price that amounts to about \* \* \* at today's exchange rate. As for 1 megabit DRAM's, \* \* \* stated that \* \* \* is talking to all producers and has received samples from \* \* \*. Ongoing talks involve \* \* \*, but \* \* \* has no samples from these latter firms.

\* \* \* identified \* \* \* in another alleged lost sale for \* \* \* 256K DRAM's in \* \* \* 1985. The \* \* \* offer price of \* \* \* allegedly was rejected in favor of a competing offer price of \* \* \* for DRAM's imported from Japan. \* \* \* acknowledged buying Japanese DRAM's but not at the price alleged by \* \* \*. \* \* \* stated that his firm receives specs from all major sources and then solicits quotes. In this case, he went to distributor channels of supply as well as factory direct channels for quotes. He received the following offer prices:

\* \* \* \* \* \* \*

The lowest distributor quote was on \* \* \* DRAM's offered by \* \* \*. The "letter of intent to buy" went to \* \* \* through the distributors. The order \* \* \* was placed in \* \* \* 1985 for delivery as needed beginning in \* \* \* as production ramped up. \* \* \* offer was not considered because \* \* \* is not an authorized distributor. The direct offer price of \* \* \* was also not included for consideration. \* \* \* explained that \* \* \*. Holding unused inventory even at the low \* \* \* price would cost too much. \* \* \*. There are provisions for price adjustments monthly "on the downside only," said \* \* \*. \* \* \* expects a source to quote a price that the vendor can hold for one year.

\* \* \* also named \* \* \* in an alleged lost sale for \* \* \* 256K DRAM's in \* \* \* 1985. This firm allegedly opted for imported Japanese DRAM's offered at \* \* \* per device rather than accepting \* \* \* quote of \* \* \*. \* \* \* verified the purchase and confirmed that the import prices were in that range in \* \* \*. He explained that he has bought 256K DRAM's from \* \* \* regularly. Although \* \* \* buys from \* \* \* other domestic producer \* \* \* also sources 256K DRAM's from \* \* \* which offer imported Japanese DRAM's. All the 256K DRAM's purchased, regardless of source, have been of very acceptable quality. Incoming test failure has been insignificant (\* \* \*). \* \* \* added that the failure rate is so low that he does not bother returning the few devices for credit.

\*\*\* named \*\*\* in \*\*\* alleged lost sales, \*\*\* in \*\*\* 1985 and \*\*\* in \*\*\* 1985. \*\*\* alleged that \*\*\* rejected \*\*\* quote of \*\*\* on an order for \*\*\* 256K DRAM's in favor of an offer price of \*\*\* for competing product imported from Japan. The \*\*\* quote, \*\*\* per unit for \*\*\* 256K DRAM's, also was allegedly rejected for an offer price of \*\*\* for Japanese DRAM's. \*\*\* denied buying any 256K DRAM's in 1985 and provided the following facts.

\*\*\* had excess inventory of 256K DRAM's in 1985 carried over from 1984 purchases. Scheduled deliveries for 1985 based on 1984 open orders were put on hold. These orders had 30-day price renegotiation clauses. Consequently, \*\*\* asked for periodic price quotes from its Japanese sources and from \*\*\* on 256K DRAM's to "keep abreast of the market." \*\*\* did not place any new orders or release any purchase orders based on the old contracts. \*\*\* are qualified sources for 256K DRAM's and have quoted prices. \*\*\* has not qualified, pending ability to supply. \*\*\*, because of its late entry, is not in the picture as a source. The alleged competing prices reported by \*\*\* are fairly accurate. However, the Japanese prices in \*\*\* climbed from \*\*\* to \*\*\* after the preliminary finding in the 64K DRAM investigation and the rise in the value of the yen against the U.S. dollar. The Japanese offered \*\*\* 256K DRAM's at \*\*\* per device and at the time notified \*\*\* of the impending price increase. \*\*\* stated that \*\*\* had been his primary source in the past. \*\*\* inventory was at a normal level despite the price advantage of "taking a position" by ordering from \*\*\* or other firms in \*\*\*, and company policy would not permit an order. Moreover, he added, \*\*\* also has a backlog of finished goods inventory. As to 1 megabit DRAM's, \*\*\* stated that the firm is "already at the design stage" and has had samples since \*\*\* 1985. These are in the test application stage. There will be no formal qualification of vendors until there are \*\*\* sources which offer production parts.

\*\*\* was cited by \*\*\* in another lost sale for \*\*\* 256K DRAM's that occurred in \*\*\* 1985. Allegedly, \*\*\* rejected a \*\*\* quote of \*\*\* in favor of a competing quote of \*\*\* for product imported from Japan. \*\*\* acknowledged buying the Japanese DRAM's and stated that the domestic quote was as alleged. \*\*\* would not reveal the exact price paid for the imported Japanese DRAM's nor would he identify the specific Japanese source without a written request from the Commission. He did confirm that the Japanese price was "less than \*\*\* and higher than \*\*\*." He also revealed that Japanese firms qualified by \*\*\* as sources include \*\*\*. \*\*\* also is qualified, said \*\*\*.

With respect to 1 megabit DRAM's, \*\*\* confirmed that \*\*\*. \*\*\* was under a mandate not to reveal the names of the Japanese producers involved but said \*\*\* was "working with" \*\*\* domestic producers, \*\*\*. \*\*\* has received \*\*\* for future scheduled supply but would not provide these prices without a written questionnaire from the Commission.

\*\*\* also identified \*\*\* in an alleged lost sale for \*\*\* 256K DRAM's in \*\*\* 1985 and in another alleged lost sale involving \*\*\* 256K DRAM's in \*\*\* 1985. \*\*\* allegedly opted for a Japanese offer of \*\*\* in the \*\*\* instance rather than the \*\*\* quote of \*\*\*. In the second instance, \*\*\* allegedly rejected a \*\*\* price of \*\*\* for a \*\*\* quote for 256K DRAM's

imported from Japan. \* \* \* checked the records and confirmed buying the Japanese DRAM's in both instances. The alleged competing prices were accurate, according to \* \* \*. \* \* \* Japanese producers are qualified. At first, \* \* \* could only get 256K DRAM's from Japan. \* \* \* is not yet fully qualified with \* \* \*. Had \* \* \* been more competitive, \* \* \* would have "put them in the qualification process" without delay. \* \* \* summarized that \* \* \*. Commenting on the crossover to a density of 1 megabit, \* \* \* emphasized that if \* \* \* and other U.S. producers do not get into the 1 megabit scene early on, they will face the same problem of having the market pre-empted by Japanese producers that will already be qualified. \* \* \* is at the "sampling stage" of moving into 1 megabit usage.

### Lost revenue

The Commission also requested domestic producers to provide specific instances in which they had to reduce their offer prices to prospective purchasers of 256K DRAM's in order to avoid losing sales to competing product imported from Japan offered at lower prices. \* \* \* provided \* \* \* instances of alleged lost revenue involving \* \* \* purchasers. \* \* \* submitted \* \* \* allegations naming \* \* \* different purchasers. The Commission staff investigated \* \* \* of the allegations, which involved \* \* \* purchasers.

\* \* \* named \* \* \* as the purchaser of \* \* \* 256K DRAM's in \* \* \* 1985, alleging lost revenue in this transaction. \* \* \* alleged it had to reduce its initial offer price of \* \* \* per unit to \* \* \* to meet a competing quote for imported Japanese DRAM's. \* \* \* confirmed the facts as alleged. \* \* \* has \* \* \* producers certified as acceptable sources for 256K DRAM's. They are \* \* \*. \* \* \* obtains quotes from a number of sources before awarding a contract. The order in question was scheduled for delivery over a period of \* \* \* months, but demand pushed up production of this \* \* \* and the usage of the 256K DRAM's took only \* \* \* weeks. A second order was awarded to \* \* \* but at a price of \* \* \* per unit. That price is good until \* \* \*. Meanwhile, the Japanese product price has climbed to \* \* \* per device. \* \* \* volume requirements for 256K DRAM's was conservatively estimated at \* \* \* units. \* \* \* is also using some Japanese imported 256K DRAM's. Failure rate from all sources is zero. The use of 1 megabit DRAM's is at the sampling stage for \* \* \*. \* \* \* have provided samples as a first step in the certification process.

\* \* \* was cited by \* \* \* in an alleged instance of lost revenue involving a sale of \* \* \* 256K DRAM's in \* \* \* 1985. \* \* \* allegedly reduced its initial quote of \* \* \* per unit to \* \* \* in face of competing offer prices at that level for DRAM's imported from Japan. \* \* \* acknowledged the purchase of the \* \* \* DRAM's after \* \* \* reduced its price. \* \* \* was competing against \* \* \*. \* \* \* noted that \* \* \* reduced its initial quote "but without urging" from \* \* \*. The Japanese offer prices "were well known in the market at that time." Prices being quoted ranged from \* \* \* to \* \* \*. The order given to \* \* \* was for \* \* \* shipments, \* \* \* units for \* \* \* delivery and \* \* \* units for \* \* \* delivery. The \* \* \* delivery price has been renegotiated up to \* \* \* per unit because of the upturn in prices in the market that occurred in December. \* \* \* is using the 256K DRAM's in \* \* \*. \* \* \* has not yet begun a serious move to 1 megabit DRAM's but has received samples from \* \* \*.

\*\*\* was named by \*\*\* in another allegation of lost revenue involving a sale of \*\*\* 256K DRAM's in \*\*\* 1985. \*\*\* alleged that it had to reduce its initial offer price of \*\*\* to \*\*\* in order to win the sale against competing imported Japanese product.

\*\*\* affirmed the purchase of the \*\*\* devices at the alleged reduced price. \*\*\* has purchased 256K DRAM's from \*\*\*. \*\*\* has not purchased these devices from \*\*\* as of yet, although the firm's research and development division has verbally stated that the \*\*\* part is qualified. Approval on paper of the \*\*\* part has not yet been received by the purchasing department, however. The order for the \*\*\* product was placed in \*\*\* through \*\*\*. There have been \*\*\* shipments so far. \*\*\*. Consequently, \*\*\* has switched sources to \*\*\*, purchasing through a distributor, \*\*\*. Although \*\*\* has a \*\*\* order for future shipments at a price of \*\*\*, \*\*\* thinks \*\*\* will have to pay \*\*\* per device as 1986 progresses. \*\*\* is looking at 1 megabit DRAM's, and talking to \*\*\*, but has not been provided with samples of a part that the firm would want.

\*\*\* was identified by \*\*\* as the purchaser of \*\*\* 256K DRAM's in \*\*\* 1985, a transaction allegedly involving lost revenue. \*\*\* gave \*\*\* the order after the latter firm reduced its initial quote of \*\*\* per unit to \*\*\* in meeting a competing offer price for product imported from Japan. \*\*\* confirmed the purchase at the stated reduced price. \*\*\* was in competition with \*\*\*. According to \*\*\*, \*\*\* made its first shipment of \*\*\* units in \*\*\* at \*\*\*, then balked at shipping the next \*\*\* units at that price because the market price had turned up. \*\*\* finally did ship at the \*\*\* price. In \*\*\*, \*\*\* had made some spot purchases of \*\*\* 256K DRAM's from brokers such as \*\*\* at a price of \*\*\*, but supply at that price was hard to get. \*\*\* is now buying 256K DRAM's from \*\*\* and from \*\*\* at under \*\*\*. The domestic units are of good quality and there have been no problems. \*\*\* is unable to get any commitment for forward price past the end of \*\*\*. The firm's 256K requirement amounts to about \*\*\* units per month. \*\*\* is at the final stage of certification of \*\*\* sources for 1 megabit DRAM's, \*\*\*. This process took about \*\*\* months. The new product is at the \*\*\* level of development and this \*\*\* will be released "in a couple of weeks."

\*\*\* named \*\*\* in another instance of lost revenue involving a sale in \*\*\* 1985. \*\*\* allegedly won an anticipated annual requirement order for \*\*\* 256K DRAM's after it reduced its offer price from \*\*\* to \*\*\*. \*\*\* confirmed the facts as alleged. \*\*\* bought an initial sample order of \*\*\* units at \*\*\* per unit. The latest purchase order release was at \*\*\* for a quantity of \*\*\* units to be shipped as needed. \*\*\* stated that at present he is giving \*\*\* all of \*\*\* business.

Another instance of alleged lost revenue cited \*\*\* as a purchaser of \*\*\* 256K DRAM's in \*\*\* 1985 after \*\*\* reduced its offer price from \*\*\* to \*\*\* in order to meet competing prices for 256K DRAM's imported from Japan. \*\*\* confirmed buying 256K DRAM's from \*\*\* but noted that the alleged quantity covered \*\*\* orders. The \*\*\* order for \*\*\* units was placed in \*\*\* at a price of \*\*\* per device. \*\*\* shipped about \*\*\* units, then refused to ship the balance. The order was placed with a \*\*\*-day notification for price change. \*\*\* had not met that condition at

the time it refused to ship the balance. At \* \* \* complaint and insistence, higher level executives at \* \* \* agreed to honor the \* \* \* price and shipped the order. A \* \* \* order for \* \* \* units for 1986 was placed prior to this dispute at a price of \* \* \* per unit. This contract is not being met by \* \* \*. This purchaser/vendor conflict resulted from the move by Japanese sources to a price of \* \* \* in \* \* \*.

\* \* \* emphasized that the factor driving price in the DRAM market in 1985 was and is the grey-market suppliers buying in Japan in \* \* \* unit lots, then flying the product to the United States and offering it at prices lower than the regular Japanese marketing subsidiaries such as \* \* \*. \* \* \* said there are some \* \* \* brokers using this method of buying in Japan and selling in the U.S. market. They funnel hundreds of thousands of DRAM's per week into the market, much of it so-called "excess distributor inventory" of Japanese domestic product.

\* \* \* was identified as the purchaser in another instance of alleged lost revenue in \* \* \* 1985. \* \* \* received an order for \* \* \* 256K DRAM's from \* \* \* after allegedly reducing its initial offer price of \* \* \* to \* \* \* per device to meet the Japanese competition quoting at the latter price level. \* \* \* confirmed the purchase from \* \* \* at the price alleged. \* \* \* was competing against \* \* \*. \* \* \* was not asked to quote, said \* \* \*, since \* \* \* is usually "out of the ball park" in terms of price. \* \* \* currently is giving most of his business to \* \* \*. As for price in the next few months, \* \* \* expects that "256K DRAM's will firm up at about \* \* \* to \* \* \* per unit."

\* \* \* was also identified by \* \* \* in an instance of lost revenue involving a sale of \* \* \* 256K DRAM's in \* \* \* 1985. Faced with lower competing prices for DRAM's imported from Japan, \* \* \* allegedly reduced its price from \* \* \* per device to \* \* \* and received the order. \* \* \* stated that \* \* \* had reduced its price on various occasions to meet market price competition from other sources \* \* \* uses. \* \* \* emphasized that \* \* \* is "called regularly by grey-market brokers." The firm has what it calls \* \* \* to record recent quotes. \* \* \* uses these quotes as leverage when he is tapping alternative sources for offer prices prior to placing an order. It is this system that necessitates price adjustments to initial quotes by competing sources. \* \* \* names \* \* \* grey-market sources for Japanese 256K DRAM's that he has used—\* \* \*.

\* \* \* cited \* \* \* in \* \* \* instances of lost revenue that occurred in \* \* \* 1985 and involved sales of \* \* \* 256K DRAM's, respectively. \* \* \* prices in these respective instances allegedly were reduced from \* \* \* to \* \* \* per unit, then from \* \* \* to \* \* \*, and finally from \* \* \* to \* \* \* in order to meet competing offer prices for Japanese DRAM's during this \* \* \*-month period. \* \* \* acknowledged buying the \* \* \* DRAM's at reduced prices. Prices declined from \* \* \* to \* \* \* during the preceding time from an open order for \* \* \* DRAM's offered by \* \* \*. \* \* \* came into the picture as an alternate source at that time. \* \* \* emphasized that \* \* \* buys at market price and competing Japanese offers necessitated the price reductions by \* \* \*. \* \* \* stated that \* \* \* through its \* \* \* is currently buying 256K DRAM's directly from \* \* \* for \* \* \*.

\*\*\* was cited by \*\*\* in \*\*\* instances of lost revenue. These sales occurred in \*\*\* 1985 and involved respective quantities of \*\*\* 256K DRAM's. \*\*\* alleged that it had to reduce its prices in those respective sales from \*\*\* to \*\*\* per device, from \*\*\* to \*\*\*, and from \*\*\* to \*\*\* in order to save the sales in face of competing prices for Japanese DRAM's. \*\*\* roughly confirmed the facts as alleged. \*\*\* was competing with price quotes from \*\*\*. The \*\*\* 1985 quote was for an order that was placed in \*\*\*. The \*\*\* price quotes resulted in orders placed in \*\*\* at reduced, but slightly higher prices than alleged by \*\*\*. The \*\*\* order was placed by \*\*\* and was for \*\*\* 256K DRAM's at a price of \*\*\* per device. \*\*\* stated that to date \*\*\* is not into the crossover to 1 megabit DRAM's.

#### Exchange rates

Table 23 presents nominal- and real-exchange-rate indexes for U.S. dollars per Japanese yen. The real-exchange-rate index that is displayed represents the nominal-exchange-rate index adjusted for the difference in the relative inflation rates between the United States and Japan. As shown in the table, the nominal value of the Japanese yen depreciated against the nominal value of the U.S. dollar by 2.2 percent between January-March 1982 and July-September 1985. The real (inflation-adjusted) index, however, shows that the Japanese yen actually depreciated by 7.9 percent during that period. 1/

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1/ By November 1985 the yen had appreciated approximately 23 percent in nominal terms against the U.S. dollar. Producers of DRAM's late in 1985 adjusted prices upward by roughly an equivalent amount.

Table 23.—Indexes of nominal and real exchange rates between the U.S. dollar and the Japanese yen, by quarters, January 1982–September 1985

(January–March 1982=100)		
Period	Japanese yen per U.S. dollar (nominal rate)	Japanese yen per U.S. dollar (real rate)
1982:		
January–March	100.0	100.0
April–June	95.6	95.8
July–September	90.2	90.9
October–December	89.9	90.4
1983:		
January–March	99.0	97.6
April–June	98.3	95.6
July–September	96.3	92.9
October–December	99.7	95.1
1984:		
January–March	101.1	95.6
April–June	101.7	95.4
July–September	95.9	90.9
October–December	94.9	89.9
1985:		
January–March	90.6	86.4
April–June	93.0	88.1
July–September	97.8	92.1

Source: International Financial Statistics, International Monetary Fund, November 1985.



APPENDIX A

COMMERCE'S NOTICE OF INITIATION

**DEPARTMENT OF COMMERCE**

International Trade Administration  
(A-688-605)

**Dynamic Random Access Memory Semiconductors of 256 Kilobits and Above From Japan; Initiation of Antidumping Duty Investigation**

**AGENCY:** International Trade Administration/Import Administration, Commerce.

**ACTION:** Notice.

**SUMMARY:** On the basis of information developed by the U.S. Department of Commerce, the Department is initiating an antidumping duty investigation to determine whether Japanese dynamic random access memory semiconductors having a memory capacity of 256 kilobits and above are being, or are likely to be, sold in the United States at less than fair value. We are notifying the U.S. International Trade Commission of this action so that it may determine whether imports of this product are materially injuring, or threatening to materially injure, a U.S. industry, or are materially retarding establishment of a U.S. industry. The ITC will make its preliminary determination on or before January 31, 1986. If this investigation proceeds normally, we will make our preliminary determination on or before May 27, 1986.

**EFFECTIVE DATE:** December 17, 1985.

**FOR FURTHER INFORMATION CONTACT:** William L. Matthews, Office of Compliance, Import Administration, International Trade Administration, U.S. Department of Commerce, 14th & Constitution Avenue, N.W., Washington, D.C. 20230; (202) 377-3601.

**SUPPLEMENTARY INFORMATION:**

**Initiation**

On the basis of information available to the Department of Commerce ("the Department"), we are initiating an antidumping duty investigation, under section 732(a) of the Tariff Act of 1930, as amended ("the Act"), to determine whether Japanese dynamic random access memory semiconductors

(DRAMs) having a memory capacity of 256 kilobits and above are being, or are likely to be, sold in the United States at less than fair value.

We have evidence indicating that the United States price of this merchandise is less than the foreign market value of such or similar merchandise. We also have evidence that these imports may be having an injurious effect upon the U.S. industry. That information indicates growing import penetration and declining import prices. These imports may be causing depressed conditions in the U.S. industry such as suppressed prices and profits.

If this investigation proceeds normally, we will make our preliminary determination on or before May 27, 1986. As part of that investigation, we will examine the likelihood of sales below the cost of production.

**United States Price and Foreign Market Value**

We based our estimate of the United States price upon bid and price quotes obtained from U.S. industry sources.

We examined Japanese bids, price quotes and cost data obtained from industry and public sources and calculated that sales were made at prices below the cost of production. We therefore estimated foreign market value based on constructed value, adding the statutory minimum for profit.

Based on our comparisons we have estimated that a dumping margin of 33 percent may exist for exports during the period from June through October 1985.

**Scope of Investigation**

The merchandise covered by this investigation are Japanese DRAMs having a memory capacity of 256 kilobits and above, of both the N-channel and the complementary metal oxide semiconductor type, whether in the form of processed wafers, unmounted die, mounted die, or assembled devices. Finished DRAMs of 256 kilobits and above are currently classifiable under items 687.7443 and 687.7444 of the Tariff Schedules of the United States Annotated. Unassembled DRAMs, including processed wafers and mounted and unmounted die, are currently classifiable under item 687.7405 of the Tariff Schedules of the United States Annotated.

Processed wafers and die produced in Japan and assembled into finished DRAMs in another country prior to importation into the U.S. from the other country are tentatively included in the scope of the investigation. In the course of this proceeding we will determine

whether to continue to include these indirect imports in the scope of this investigation. We invite comments from those not involved in the proceeding, as well as from parties to this proceeding, on this issue. We request that such comments be submitted prior to February 17, 1986.

**Notification of ITC**

Section 732(d) of the Act requires us to notify the International Trade Commission ("ITC") of this action and to provide it with the information we used in reaching our decision to initiate. The Department will also allow the ITC access to all privileged and proprietary information in our files, provided it conforms that it will not disclose such information either publicly or under an administrative protective order without the consent of the Deputy Assistant Secretary for Import Administration.

**Preliminary Determination of ITC**

The ITC will determine by January 31, 1986, whether there is a reasonable indication that imports of Japanese DRAMs of 256 kilobits and above are materially injuring, or threatening to materially injure, a United States industry, or are materially retarding establishment of a U.S. industry. If its determination is negative, the investigation will terminate; otherwise, it will proceed according to the statutory procedures.

Dated: December 6, 1985.

Gilbert B. Kaplan,

Deputy Assistant Secretary for Import Administration.

[FR Doc. 85-28757 Filed 12-17-85; 11:06 am]

BILLING CODE 3510-06-0

APPENDIX B

COMMISSION'S NOTICE OF INSTITUTION

(Investigation No. 731-TA-300  
(Preliminary))

**Dynamic Random Access Memory  
Semiconductors (DRAM's) of 256  
Kilobits and Above From Japan;  
Antidumping Investigation**

[Editorial Note.—The following document  
should have appeared in the issue of  
Tuesday, December 17, 1985.]

**AGENCY:** International Trade  
Commission.

**ACTION:** Institution of a preliminary  
antidumping investigation and  
scheduling of a conference to be held in  
connection with the investigation.

**SUMMARY:** The Commission hereby gives  
notice of the institution of preliminary  
antidumping investigation No. 731-TA-  
300 (Preliminary) under section 733(a) of  
the Tariff Act of 1930 (19 U.S.C.  
1673b(a)) to determine whether there is  
a reasonable indication that an industry  
in the United States is materially  
injured, or is threatened with material  
injury, or the establishment of an  
industry in the United States is  
materially retarded, by reason of  
imports from Japan of dynamic random  
access memory semiconductors  
(DRAM's) having a memory capacity of  
256 kilobits and above, of both the N-  
channel and the complementary metal  
oxide semiconductor type, whether in  
the form of processed wafers,  
unmounted die, mounted die, or  
assembled devices, as provided for in  
item 687.74 of the Tariff Schedules of the  
United States, which are alleged to be  
sold in the United States at less than fair  
value. As provided in section 733(a), the  
Commission must complete preliminary  
antidumping investigations in 45 days,  
or in this case by January 27, 1986.

For further information concerning the  
conduct of this investigation and rules of  
general application, consult the  
Commission's Rules of Practice and  
Procedure, part 207, subparts A and B  
(19 CFR part 207), and Part 201, Subparts  
A through E (19 CFR part 201).

**EFFECTIVE DATE:** December 11, 1985.

**FOR FURTHER INFORMATION CONTACT:**  
Irene Hersher (202-523-4016), Office of  
Investigations, U.S. International Trade  
Commission, 701 E Street NW.,  
Washington, DC 20436. Hearing-  
impaired individuals are advised that  
information on this matter can be  
obtained by contacting the  
Commission's TDD terminal on 202-724-  
6002.

**SUPPLEMENTARY INFORMATION:**

**Background**

This investigation is being instituted  
in response to notification from the  
Department of Commerce that it is self-  
initiating an antidumping investigation  
on the subject products.

**Participation in the Investigation**

Persons wishing to participate in this  
investigation as parties must file an  
entry of appearance with the Secretary  
to the Commission, as provided in  
§ 201.11 of the Commission's rules (19  
CFR 201.11), not later than seven (7)  
days after publication of this notice in  
the Federal Register. Any entry of  
appearance filed after this date will be  
referred to the Chairwoman, who will  
determine whether to accept the late  
entry for good cause shown by the  
person desiring to file the entry.

**Service List**

Pursuant to § 201.11(d) of the  
Commission's rules (19 CFR 201.11(d)),  
the Secretary will prepare a service list  
containing the names and addresses of  
all persons, or their representatives,  
who are parties to this investigation  
upon the expiration of the period for  
filing entries of appearance. In  
accordance with §§ 201.18(c) and 207.3  
of the rules (19 CFR 201.18(c) and 207.3),  
each document filed by a party to the  
investigation must be served on all other  
parties to the investigation (as identified  
by the service list), and a certificate of  
service must accompany the document.  
The Secretary will not accept a  
document for filing without a certificate  
of service.

**Conference**

A conference is scheduled in  
connection with this investigation for  
9:30 a.m. on January 3, 1986, at the U.S.  
International Trade Commission  
Building, 701 E Street NW., Washington,  
DC. Parties wishing to participate in the  
conference should contact Lynn  
Featherstone (202-523-0242) not later  
than December 31, 1985, to arrange for  
their appearance. Parties in support of  
the imposition of antidumping duties in  
this investigation and parties in  
opposition to the imposition of such

duties will each be collectively allocated one hour within which to make an oral presentation at the conference.

**Written submissions**

Any person may submit to the Commission on or before January 7, 1986, a written statement of information pertinent to the subject of the investigation, as provided in § 207.15 of the Commission's rules (19 CFR 207.15). A signed original and fourteen (14) copies of each submission must be filed with the Secretary to the Commission in accordance with section 201.8 of the rules (19 CFR 201.8). All written submissions except for confidential business data will be available for public inspection during regular business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary to the Commission.

Any business information for which confidential treatment is desired must be submitted separately. The envelope and all pages of such submissions must be clearly labeled "Confidential Business Information." Confidential submissions and requests for confidential treatment must conform with the requirements of section 201.6 of the Commission's rules (19 CFR 201.6).

**Authority:** This investigation is being conducted under authority of the Tariff Act of 1930, title VII. This notice is published pursuant to § 207.12 of the Commission's rules (19 CFR 207.12).

By order of the Commission.

Issued: December 12, 1985.

**Kenneth R. Mason,**

*Secretary.*

[FR Doc. 85-29834 Filed 12-16-85; 8:45 am]

BILLING CODE 7020-02-M

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APPENDIX C

COMMISSION'S NOTICE OF RESCHEDULING OF THE CONFERENCE

contacting the Commission's TDD terminal on 202-724-0002.

**SUPPLEMENTARY INFORMATION:** On December 11, 1985, the Commission instituted the subject investigation and established a schedule for its conduct. Subsequently, a number of parties to the investigation requested that the conference to be held in connection with the investigation be rescheduled from January 3, 1986, to January 6, 1986. That request has been granted.

The Commission's new schedule for the investigation is as follows: the conference will be held in room 331 of the U.S. International Trade Commission Building at 9:30 a.m. on January 6, 1986, and the deadline for filing all written submissions, including post-conference briefs, is January 6, 1986.

For further information concerning this investigation see the Commission's notice of investigation and the Commission's Rules of Practice and Procedure, part 207, subparts A and B (19 CFR part 207); and part 201, subparts A through E (19 CFR part 201).

**AUTHORITY:** This investigation is being conducted under authority of the Tariff Act of 1930, title VII. This notice is published pursuant to section 207.12 of the Commission's rules (19 CFR 207.12).

By order of the Commission.

Issued: December 20, 1985.

**Kenneth E. Mason,**  
*Secretary.*

[FR Doc. 85-30522 Filed 12-24-85; 8:45 am]

BILLING CODE 7030-02-M

[Investigation No. 731-TA-300  
(Preliminary)]

**Dynamic Random Access Memory Semiconductors (DRAM's) of 256 Kilobits and Above From Japan**

**AGENCY:** International Trade Commission.

**ACTION:** Revised schedule for the conference to be held in connection with the subject investigation.

**EFFECTIVE DATE:** December 20, 1985.

**FOR FURTHER INFORMATION CONTACT:**  
Lynn Featherstone (202-523-0242),  
Office of Investigations, U.S.  
International Trade Commission, 701 E  
Street NW., Washington, DC 20436.  
Hearing-impaired individuals may  
obtain information on this matter by



**APPENDIX D**

**LIST OF WITNESSES APPEARING AT THE CONFERENCE**

CALENDAR OF PUBLIC CONFERENCE

Investigation No. 731-TA-300 (Preliminary)

DYNAMIC RANDOM ACCESS MEMORY SEMICONDUCTORS (DRAM's)  
OF 256 KILOBITS AND ABOVE FROM JAPAN

Those listed below appeared at the United States International Trade Commission's conference held in connection with the subject investigation on January 6, 1986, in the Hearing Room of the USITC Building, 701 E Street, NW., Washington, DC.

In support of the imposition of antidumping duties

Covington & Burling—Counsel  
Washington, DC  
on behalf of—

Motorola, Inc.

Steve Sparks, Director, MOS Memory  
Dave Hickson, Office of the General Counsel

Harvey Applebaum) —OF COUNSEL  
Tom Johnson )

Micron Technology, Inc.  
Boise, ID

Larry L. Grant, Vice President and General Counsel

Jones, Day, Reavis & Pogue—Counsel  
Washington, DC  
on behalf of—

Texas Instruments, Inc.

Robert England, Vice President for DRAM Production

Thomas Cullen—OF COUNSEL

Quick, Finan & Associates  
Washington, DC

William F. Finan, Principal

CALENDAR OF PUBLIC CONFERENCE—Continued

In opposition to the imposition of antidumping duties

Coudert Brothers—Counsel  
Washington, DC  
on behalf of—

NEC Corp.  
NEC Electronics, Inc.

Mark D. Herlach—OF COUNSEL

Integrated Circuit Engineering Corp.  
Washington, DC

Richard Skinner, President

Metzger, Shadyac & Schwarz—Counsel  
Washington, DC  
on behalf of—

Hitachi, Ltd.  
Hitachi America, Ltd.  
Hitachi Semiconductor (America), Inc.

William H. Barrett—OF COUNSEL

Fenwick, Davis & West—Counsel  
Washington, DC  
on behalf of—

Fujitsu Microelectronics, Inc.  
Fujitsu, Ltd.

Donald R. Davis )  
L. Daniel O'Neill) —OF COUNSEL

Baker & McKenzie—Counsel  
Washington, DC  
on behalf of—

Mitsubishi Electric Corp.  
Mitsubishi Electronics America, Inc.  
Mitsubishi Semiconductor America, Inc.

Thomas P. Ondeck—OF COUNSEL

CALENDAR OF PUBLIC CONFERENCE—Continued

In opposition to the imposition of antidumping duties—Continued

Mudge, Rose, Guthrie, Alexander & Ferdon—Counsel  
Washington, DC  
on behalf of—

Toshiba Corp.  
Toshiba America, Inc.

David A. Vaughan—OF COUNSEL

APPENDIX E  
DATA RELATING TO ALL DRAM'S

## Data Relating to All DRAM's

In its questionnaires relating to the subject investigation (No. 731-TA-300 (Preliminary)) the Commission requested data on 256K and above DRAM's and, separately, on all DRAM's. Several firms did not supply the requested data on all DRAM's, however, and other firms that produce and/or import 64K DRAM's, but which do not produce and/or import 256K and above DRAM's, provided no information at all in response to the questionnaires. Therefore, to provide the best estimates available on overall DRAM operations, the following tables present information on all DRAM's when such information was reported by questionnaire respondents, information on 256K and above DRAM's when firms reported such information but not information on all DRAM's, and information on 64K DRAM's when firms responded to the questionnaires in the Commission's earlier investigation on that product (inv. No. 731-TA-270 (Preliminary)), but either did not respond to questionnaires in the subject investigation or did not provide data on all DRAM's in those questionnaires.

In addition to being incomplete with respect to information that was supplied in response to Commission questionnaires, the information presented in these tables is also, of course, incomplete to the extent that producers and/or importers did not respond to either of the Commission's questionnaires.

Because the information on 64K DRAM's was obtained in an earlier investigation, interim period data shown for 64K DRAM's are for January-March. Interim period data shown for all DRAM's and for 256K and above DRAM's are for January-September.

Table E-1.—DRAM's, cased: U.S. producers' domestic shipments, shipments of imports from Japan, and apparent U.S. consumption, by types, 1982-84 and interim periods of 1984 and 1985

Item	1982	1983	1984	Interim period <sup>1/</sup> of—	
				1984	1985
U.S. producers' domestic shipments:					
All DRAM's <sup>2/</sup>					
1,000 units—	***	***	***	***	***
64K DRAM's <sup>3/</sup> —do—	***	***	***	***	***
256K DRAM's <sup>4/</sup> —do—	***	***	***	***	***
Total—	45,722	140,752	228,313	121,312	105,745
U.S. shipments of imports from Japan:					
All DRAM's <sup>5/</sup>					
1,000 units—	***	***	***	***	***
64K DRAM's <sup>6/</sup> —do—	***	***	***	***	***
256K DRAM's <sup>7/</sup> —do—	***	***	***	***	***
Total—	20,975	47,436	97,533	50,146	59,943
Apparent U.S. consumption:					
All DRAM's					
1,000 units—	***	***	***	***	***
64K DRAM's—do—	***	***	***	***	***
256K DRAM's—do—	***	***	***	***	***
Total—	66,697	188,188	325,854	171,458	165,688
Ratio of imports from Japan to apparent U.S. consumption—percent—	31.4	25.2	29.9	<sup>9/</sup> 29.2	<sup>9/</sup> 36.2
Ratio of imports from Japan of 256K DRAM's to apparent U.S. consumption of all DRAM's—percent—	***	.2	3.3	<sup>10/</sup> 3.7	<sup>10/</sup> 16.9

<sup>1/</sup> January-March for 64K DRAM's and January-September for other categories.

See note on page A-62.

<sup>2/</sup> Reporting firms are \* \* \*, \* \* \*.

<sup>3/</sup> Reporting firms are \* \* \*.

<sup>4/</sup> Reporting firms are \* \* \*.

<sup>5/</sup> Reporting firms are \* \* \*.

<sup>6/</sup> Reporting firms are \* \* \*.

<sup>7/</sup> Reporting firms are \* \* \*.

<sup>8/</sup> If the January-March data for 64K DRAM's were tripled to approximate data for January-September, the resulting import penetration figures would be 28.7 percent for 1984 and 34.5 percent for 1985.

<sup>9/</sup> If the January-March data for 64K DRAM's were tripled to approximate data for January-September, the resulting import penetration figures would be 2.9 percent for 1984 and 13.9 percent for 1985.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table E-2.—DRAM's: U.S. production, average-for-period capacity, and capacity utilization, by types, 1982-84 and interim periods of 1984 and 1985

Item	1982	1983	1984	Interim period <sup>1/</sup> of—	
				1984	1985
U.S. production:					
All DRAM's <sup>2/</sup>					
1,000 units—	***	***	***	***	***
64K DRAM's <sup>3/</sup> —do—	***	***	***	***	***
256K DRAM's <sup>4/</sup> —do—	***	***	***	***	***
Total—	***	***	287,283	176,588	170,643
Average-for-period capacity:					
All DRAM's <sup>2/</sup>					
1,000 units—	***	***	***	***	***
64K DRAM's <sup>3/</sup> —do—	***	***	***	***	***
256K DRAM's <sup>4/</sup> —do—	***	***	***	***	***
Total—	***	***	299,925	207,233	311,697
Capacity utilization:					
All DRAM's—percent—	***	***	95.8	<sup>5/</sup> 85.2	<sup>5/</sup> 54.7

<sup>1/</sup> January-March for 64K DRAM's and January-September for other categories. See note on page A-62.

<sup>2/</sup> Reporting firms are \* \* \*.

<sup>3/</sup> Reporting firms are \* \* \*.

<sup>4/</sup> Reporting firms are \* \* \*.

<sup>5/</sup> If the January-March data for 64K DRAM's were tripled to approximate data for January-September, the resulting capacity utilization figures would be 86.5 percent for 1984 and 57.4 percent for 1985.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.



Table E-3.—DRAM's: Average number of production and related workers employed in U.S. establishments producing DRAM's, hours worked by such workers, wages paid, and total compensation paid, by types, 1982-84 and interim periods of 1984 and 1985

Item	1982	1983	1984	Interim period 1/ of—	
				1984	1985
Average number of production and related workers producing—					
All DRAM's 2/—	***	***	***	***	***
64K DRAM's 3/—	***	***	***	***	***
256K DRAM's 4/—	***	***	***	***	***
Total—	3,322	4,926	7,681	6,868	7,204
Hours worked by production and related workers producing—					
All DRAM's 2/ 1,000 hours—	***	***	***	***	***
64K DRAM's 3/—do—	***	***	***	***	***
256K DRAM's 4/—do—	***	***	***	***	***
Total—	6,924	10,416	16,260	9,483	10,183
Wages paid to production and related workers producing—					
All DRAM's 2/ 1,000 dollars—	***	***	***	***	***
64K DRAM's 3/—do—	***	***	***	***	***
256K DRAM's 4/—do—	***	***	***	***	***
Total—	64,346	93,845	168,317	106,520	131,080
Total compensation paid to production and related workers producing—					
All DRAM's 2/ 1,000 dollars—	***	***	***	***	***
64K DRAM's 3/—do—	***	***	***	***	***
256K DRAM's 4/—do—	***	***	***	***	***
Total—	77,807	115,013	209,073	131,020	162,723

1/ January-March for 64K DRAM's and January-September for other categories.  
See note on page A-62.

2/ Reporting firms are \* \* \*.

3/ Reporting firms are \* \* \*.

4/ Reporting firms are \* \* \*.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.





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