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**UNITED STATES TARIFF COMMISSION**

**ANTIFRICTION BALLS AND BALL BEARINGS,  
INCLUDING BALL BEARINGS WITH INTEGRAL  
SHAFTS, AND PARTS THEREOF**

**Report to the President  
on Investigation No. TEA-I-27  
Under Section 301(b) (1) of the Trade Expansion Act of 1962**



**TC Publication 597  
Washington, D. C.  
July 1973**

**UNITED STATES TARIFF COMMISSION**

**Catherine Bedell, *Chairman***

**Joseph O. Parker, *Vice Chairman***

**Will E. Leonard, Jr.**

**George M. Moore**

**J. Banks Young**

**Italo H. Ablondi**

**Kenneth R. Mason, *Secretary***

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**Address all communications to  
United States Tariff Commission  
Washington, D. C. 20436**

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Note.--The whole of the Commission's report to the President may not be made public since it contains certain information that could result in the disclosure of the operations of an individual concern. This published report is the same as the report to the President, except that the above-mentioned information has been omitted. Such omissions are indicated by asterisks.



REPORT TO THE PRESIDENT

U.S. Tariff Commission,  
July 30, 1973.

To the President:

In accordance with section 301(f)(1) of the Trade Expansion Act of 1962 (76 Stat. 885), the U.S. Tariff Commission herein reports the results of an investigation made under section 301(b) of that act, relating to antifriction balls, ball bearings, and parts thereof.

The investigation to which this report relates was undertaken to determine whether--

antifriction balls, ball bearings, including bearings with integral shafts, and parts thereof, provided for in items 680.30 to 680.36, inclusive, of the Tariff Schedules of the United States

are, as a result in major part of concessions granted thereon under trade agreements, being imported into the United States in such increased quantities as to cause, or threaten to cause, serious injury to the domestic industry or industries producing like or directly competitive products.

The investigation was instituted on January 31, 1973, upon petition filed by the Anti-Friction Bearing Manufacturers Association, Inc., on behalf of its member companies. Public notices of the institution of the investigation and of a public hearing to be held in connection therewith were given in the Federal Register of February 5, 1973 (38 F.R. 3358) and of March 5, 1973 (38 F.R. 5955). The hearing was held May 1-3, 1973, and all interested parties were afforded opportunity to be present, to produce evidence, and to be heard. A transcript of the

hearing and copies of briefs submitted by interested parties in connection with the investigation are attached.

The information for this report was obtained from domestic producers, importers, the Commission's files, and other Government agencies.

Findings of the Commission 1/

The Commission finds (Commissioner Young dissenting in part)--

(1) that ball bearings, including such bearings with integral shafts, provided for in items 680.33 and 680.35 of the Tariff Schedules of the United States (TSUS) (except ball bearings, radial, having an outside diameter of under 9 millimeters) are, as a result in major part of concessions granted thereon under trade agreements, being imported in such increased quantities as to cause serious injury to the domestic industry or industries producing like or directly competitive products; and

(2) that, in order to prevent serious injury, the rates of duty in rate column numbered 1 of items 680.33 and 680.35 of the TSUS must be increased to 12 percent ad valorem and to 3.4 cents per pound plus 15 percent ad valorem, respectively.

The Commission further finds (Commissioner Young dissenting in part) that antifriction balls provided for in item 680.30 and ball bearings, radial, having an outside diameter of under 9 millimeters, provided for in item 680.35 of the Tariff Schedules of the United States are not, as a result in major part of concessions granted thereon under trade agreements, being imported into the United States in such increased quantities as to cause, or threaten to cause, serious injury to the domestic industry or industries providing like or directly competitive products.

The Commission makes no finding (Commissioner Young dissenting) whether antifriction balls provided for in item 680.31, ball bearings, including such bearings with integral shafts, provided for in items 680.34 and 680.36, and parts provided for in 680.35 of the Tariff Schedules

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1/ Commissioners Leonard and Ablondi did not participate in the decision.

of the United States are, as a result in major part of concessions granted thereon under trade agreements, being imported into the United States in such increased quantities as to cause, or threaten to cause, serious injury to the domestic industry or industries producing like or directly competitive products.

Commissioner Young finds--

(1) that antifriction balls provided for in item 680.31 and ball bearings, including such bearings with integral shafts, and parts thereof, provided for in items 680.34, 680.35, and 680.36 of the Tariff Schedules of the United States are, as a result in major part of concessions granted thereon under trade agreements, being imported in such increased quantities as to cause serious injury to the domestic industry or industries producing like or directly competitive products; and

(2) that, in order to prevent serious injury--

(a) the rate of duty in rate column numbered 1 of item

680.31 must be increased to 4 cents per pound plus 12.5 percent ad valorem, that of item 680.34, to 12 percent ad valorem, and that of item 680.36, to 3.4 cents per pound plus 15 percent ad valorem;

(b) the rates of duty in rate column numbered 1 of item

680.35 must be 1.7 cents per pound plus 7.5 percent ad valorem for articles entered in each calendar year within the quota quantities specified below and 10 cents per pound plus 45 percent ad valorem for articles entered in each calendar year in excess of such quota quantities--



<u>TSUSA item</u>	<u>Description</u>	<u>Quota quantity</u>
	Ball bearings, other than such bearings with integral shafts:	
	Ball bearings, radial, having an outside diameter of:	
680.3504	Under 9 mm -----	4.0 million units
680.3508	9 mm. and over but not over 30 mm -----	38.3 million units
680.3512	Over 30 mm but not over 52 mm -----	44.4 million units
680.3516	Over 52 mm -----	12.9 million units
680.3522	Ball bearings, other than radial-----	1.4 million units
680.3526	Parts of ball bearings-----	1.3 million pounds

and (c) the quota quantities specified above in each calendar year subsequent to the first full calendar year that the quota is in effect should be adjusted to amounts for each quota quantity that would be equivalent to the same share of U.S. consumption in the preceding calendar year as in 1970.

Commissioner Young further finds that antifriction balls provided for in item 680.30 and ball bearings with integral shafts provided for in item 680.33 of the Tariff Schedules of the United States are not, as a result in major part of concessions granted thereon under trade agreements, being imported into the United States in such increased quantities as to cause, or threaten to cause, serious injury to the domestic industry or industries producing like or directly competitive products.

Views of Chairman Bedell, Vice Chairman Parker,  
and Commissioner Moore

On January 31, 1973, the U.S. Tariff Commission instituted investigation No. TEA-I-27 following a petition filed by the Anti-Friction Bearing Manufacturers Association, Inc., on behalf of its member companies, requesting relief under section 301(b)(1) of the Trade Expansion Act of 1962 (TEA). The petition alleged that anti-friction balls, ball bearings, including those with integral shafts, and parts thereof, are being imported into the United States in such increased quantities as to cause, or threaten to cause, serious injury to the U.S. industry that produces like or directly competitive articles.

The statute imposes four criteria each of which must be met before an affirmative determination can be made:

1. Imports must be increasing;
2. The increased imports must be in major part the result of concessions granted under trade agreements;
3. The industry producing the like or directly competitive product must be suffering serious injury or be threatened with serious injury; and
4. The increased imports must be the major factor in causing or threatening to cause serious injury.

For the reasons hereinafter set forth, we have determined that, as a result in major part of concessions granted under trade agreements, ball bearings including those with integral shafts (except miniature bearings less than 9 mm in outside diameter) are being imported into the United States in such increased quantities as to cause, or threaten to cause, serious injury to the domestic industry producing ball bearings which are like or directly competitive with the imported

### Increased imports

The value of total imports of ball bearings has increased each year since 1956. Although quantity data are not available for periods prior to 1969, it is reasonable to believe that total imports of ball bearings in terms of quantity has likewise increased each year. The value of imports of such bearings has more than doubled since 1969, increasing from \$43 million in 1969 to \$88 million in 1972. During January-April 1973, the value of such imports was 53 per cent larger than in the corresponding period of 1972. By 1972, imports of such bearings, in terms of quantity, were the equivalent of about 35 percent of United States consumption. Virtually all imports are like or directly competitive with ball bearings produced by the United States industry. Hence, we conclude that the first criterion is satisfied with respect to ball bearings other than those in the miniature sizes which we will treat with later.

### In major part

The second requirement of the statute is that the increased imports must have resulted in major part from trade-agreement concessions. The rate of duty applicable to ball bearings other than with integral shafts has been reduced from an ad valorem equivalent of 49.2 per cent in 1930 to an ad valorem equivalent of 8.2 per cent in 1972. The rate of duty applicable to ball bearings with integral shafts was reduced from 35 per cent in 1930 to 6 per cent in 1972. The absolute amount of the reduction in both rates is

equivalent to about 5 times the current rate of duty. Following a three-stage tariff reduction during 1956-58, imports more than tripled in 1959 and continued to rise each year thereafter. While the rate of duty was reduced by 50 per cent from 1968 to 1972, the value of imports more than doubled.

The trade-agreement concessions obviously greatly aided the competitive position of imported ball bearings, and imports clearly have responded to this incentive. Lower labor and material costs, plus other advantages provided by governmental action, have no doubt been important considerations affecting the export of ball bearings to the United States by the principal foreign producers. The United States industry, however, has been able to command a substantial premium over imports and is continuing to do so even though the quality of foreign bearings has gained wider acceptance in recent years. The further duty reductions of 50 percent in the Kennedy Round obviously proved too great a handicap to the United States industry on top of the trade agreement concessions which had already taken place. The heavy rise in imports from 1968 to 1972 was the result.

#### Serious injury

The third requirement of the statute is that the domestic industry producing ball bearings must be seriously injured or threatened with serious injury. It is clear, we believe, that this third requirement has been met. As imports increased rapidly in recent years, the economic condition of the United States industry deteriorated. A number of production facilities shut down. Some were consolidated.

Domestic production fell below levels that prevailed in 1968 and 1969. The domestic share of the market declined even though total consumption was expanding. Employment is down substantially. Net operating profit for the industry declined steadily and was reduced to about half the 1969 level which is unacceptable for this capital intensive industry.

In the light of these factors, it is abundantly clear that the domestic industry has suffered serious injury.

#### Major factor

The final requirement of the statute is that concession-generated increased imports must have been the major factor causing or threatening to cause serious injury to the domestic ball bearing industry. The direct causal relationship between increased imports of ball bearings and the serious injury to the domestic industry is clearly evident. The deterioration in the economic health of the domestic industry in recent years has coincided with, and resulted from, the growing penetration by imported ball bearings in the U.S. market.

Imported ball bearings undersell comparable domestic articles by wide margins which have enabled imports to increase their penetration in the U.S. market from 26 per cent to 36 per cent during the period 1968-72. The lower priced imports and the more extensive use of foreign ball bearings resulting from the increased market penetration have suppressed prices of domestic producers as they sought to hold on to their market share. This price suppression soon reflected itself in deteriorating profits. The domestic companies which reduced

their prices the most in an effort to meet import competition suffered losses of profits far greater than the average for the industry. Although the United States consumption increased, the domestic industry was not able to share in this enlarged market. Its market share declined as imports doubled from 1968 to 1972 and profits sharply declined. The decline in employment also reflects the serious deterioration in the domestic industry caused by imports.

Without question, imports induced by the continued reductions in duties were the major factor causing the serious injury.

#### Recommended remedy

It is our view that an increase in the Column 1 rates of duty for ball bearings, including such bearings with integral shafts, but excluding ball bearings having an outside diameter of under 9 mm, provided for in items 680.33 and 680.35 of the Tariff Schedules of the United States to 12 per cent ad valorem and to 3.4 cents per pound plus 15 per cent ad valorem, respectively, is necessary to prevent or remedy the serious injury found herein. <sup>1/</sup> This recommendation has the effect of eliminating the 50 per cent reduction in the rates of duties

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<sup>1/</sup> We note that Section 352 of the Trade Expansion Act of 1962 authorizes the President to negotiate international agreements to limit exports from foreign countries and imports into the United States whenever he determines that such action would be more appropriate than the remedy authorized under Section 351(a)(1).

for such articles made pursuant to the Kennedy Round negotiations and would reestablish the rates of duty which were in effect immediately prior thereof. This would double the rates of duty currently in effect. The doubling of the rates of duty currently in effect, together with changes in currency valuations which have recently taken effect, will, in our judgment, substantially improve the competitive position of the domestic industry and will be adequate to remedy the serious injury which we have found to exist.

#### Negative determinations

With respect to antifriction balls and miniature bearings less than 9 mm in outside diameter, our determination is in the negative because in our opinion these articles are not being imported in such increased quantities as to cause, or threaten to cause, serious injury to the domestic industry producing like or directly competitive articles. The quantity of U.S. imports of antifriction balls has declined in recent years. In 1971, imports of antifriction balls were at the lowest level during the 1968-72 period; in 1972, imports were less than they were in 1968 or 1969. U.S. imports of miniature bearings were less in 1972 than they were in either 1969 or 1970.

The domestic producers engaged in the manufacture of miniature bearings have maintained a profit posture considerably superior to that of the industry as a whole. For them, the percent of net operating profit to net sales was almost twice that of the domestic ball bearing industry.

Therefore, we find that antifriction balls and miniature ball bearings less than 9 mm in outside diameter are not, as a result in major part of concessions granted under trade agreements, being imported in such increased quantities as to cause, or threaten to cause, serious injury to the domestic industry or industries producing like or directly competitive products.

No finding

We have made no finding with respect to antifriction balls, ball bearings, and parts entered free of duty from Canada as original equipment for motor vehicles, which is provided by the Automotive Products Trade Act of 1965 (APTA). Imports of such articles, as well as exports of like articles to Canada, are made under the terms of the U.S.-Canadian automotive agreement with respect to which a waiver has been granted under the GATT. Although complete statistical data are not available with respect to such imports and exports, the volume of imports from Canada of these articles under such agreement appears to be more than offset by exports to Canada.



## Views of Commissioner Young

This investigation was instituted on petition of the Anti-Friction Bearing Manufacturers Association, Inc., seeking increased restrictions on imports of ball bearings and antifriction balls under section 301(b) of the Trade Expansion Act of 1962 (TEA). The statute requires that four conditions must be met before an affirmative determination can be made. These conditions are:

- (1) Imports of the articles concerned must be increasing;
- (2) The increased imports must be in major part the result of concessions granted under trade agreements;
- (3) The domestic industry producing like or directly competitive products must be seriously injured, or threatened with serious injury; and
- (4) The increased imports resulting in major part from trade-agreement concessions must be the major factor causing, or threatening to cause, the serious injury.

In the present case, I find that ball bearings and parts thereof imported under item 680.35 <sup>1/</sup> and antifriction balls and ball bearings (including those with integral shafts) and parts thereof which are Canadian articles and original equipment for motor vehicles imported under items 680.31, 680.34, and 680.36 meet the statutory requirements. To the contrary, I find that antifriction balls and ball bearings with integral shafts imported under items 680.30 and 680.33 do not meet the statutory requirements because the second condition is not satisfied.

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<sup>1/</sup> My colleagues have made a negative determination with respect to ball bearings having a diameter of less than 9 millimeters classified under item 680.35, while I have made an affirmative determination. In view of the limited data available with respect to bearings of different sizes I found it possible to make a determination only for ball bearings as a whole.

## Affirmative Determinations

Increased imports

The statute specifies that the articles under investigation must be imported in increased quantities. In the instant case, the official statistics have not reported the quantity of imports of the products concerned in units over an extended period so that a meaningful data series in terms of quantity is not available. The value data that are reported, however, clearly indicate that the quantity of imports of the articles for which affirmative findings have been made has increased. The value of U.S. imports of the products concerned has been as follows:

Ball bearings and parts including antifriction balls:  
Imports for consumption, by TSUS item numbers,  
1964-72

(In thousands of dollars)

Year	Item 680.31	Item 680.34	Item 680.35	Item 680.36
1964	1/	1/	18,452	1/
1965	I/	I/	23,629	I/
1966	58	839	32,202	203
1967	195	875	35,877	403
1968	387	1,295	39,152	591
1969	425	1,503	43,621	1,368
1970	433	2,163	49,220	1,315
1971	395	1,537	55,641	997
1972	505	2,173	83,637	5,088

1/ Not reported separately prior to December 20, 1965.

In major part

Ball bearings and parts (item 680.35).—The second condition that must be met for an affirmative determination to be made is that the increased imports must be in major part the result of concessions granted

under trade agreements. In reaching a conclusion respecting this condition, the nature of the industry concerned and the predominant competitive factors in the marketplace must be taken into consideration.

Worldwide, the ball bearing industry is capital intensive, utilizing highly skilled labor. The time required to build a ball bearing plant and to achieve production is substantial. Moreover, the sizable financial investment involved necessitates thorough, long-term market projections. Given these conditions, a prospective market supplier generally requires a lengthy lead time before attempting to attain a significant position in a new market.

Ball bearings have become such highly standardized products that a relatively few sizes of radial bearings represent a substantial share of the U.S. market. In general, the cost of ball bearings is a small element of the total cost of manufacturing an article of which ball bearings are a part. Since bearings are not repaired when worn out, but are instead replaced, service does not generally play a controlling role in the buying decision. Rather, quality and price are the determining factors. At least in recent years, most consumers have accepted the quality of imported ball bearings to be the equivalent of domestic bearings. Hence, in the mind of the consumer, price has become the principal determinant of whether to buy foreign or domestic bearings.

In 1930, before any trade-agreement concessions, the ad valorem equivalent of the U.S. rate of duty applicable to ball bearings (except those with integral shafts) and parts (except antifriction balls) was

approximately 50 percent. Although the duty was reduced moderately in 1935, the first major reduction occurred in 1950 to carry out a concession granted in the General Agreement on Tariffs and Trade; the ad valorem equivalent of the rate in that year was about 20 percent. Minor trade-agreement reductions occurred in 1956, 1957, and 1958.

As indicated above, a substantial period is required to complete the market analysis and financial planning necessary for a decision to expand production facilities for ball bearings and for the actual construction of the facilities and training of workers. Reflecting these factors, there was a considerable lag in time between the duty reductions applicable to ball bearings and increased imports. Thus, the first substantial increase in imports of ball bearings occurred in 1959. Since then, however, as a result of the substantial earlier reductions in duty and those which occurred in the years 1956, 1957, and 1958, imports of ball bearings have increased relentlessly. Kennedy-Round concessions, which further reduced the duty by 8 percentage points, resulting in a current rate equivalent to about one-sixth of the statutory rate, added further encouragement to imports.

In considering other factors which may have caused increased imports, it is necessary to examine the countries from which imports to the United States originated. By far, the predominant supplier has been and still is Japan, which has recently accounted for about two-thirds of total U.S. imports; the remaining one-third have come from a dozen or more countries. The Japanese government has not established any special incentive program which would assist the Japanese manufacturers to exploit the U.S. market

for ball bearings. Styling, sales promotion, and advertising play little part in market sales; Japanese bearings, as indicated above, have been of equal quality to U.S. bearings. Thus, penetration of the U.S. market by the Japanese was achieved almost exclusively through price competition. Japanese suppliers have been able to price their bearings below those produced in the United States because of the substantial reduction in the duty and their lower cost of production which has been characterized predominantly by significantly lower wage rates than in the United States. The reduction in the duty per bearing for the leading models of ball bearings, however, was greater than the difference in the U.S. and Japanese unit labor costs.

Accordingly, I have concluded that the increased imports of ball bearings and parts which entered under item 680.35 were the result in major part of duty reductions made to carry out trade-agreement concessions.

Ball bearings and parts imported from Canada under APTA.--I have also made an affirmative determination in connection with the other three TSUS items, namely, 680.31, 680.34, and 680.36, which involve duty-free imports from Canada of antifriction balls and ball bearings for use as original equipment in the production of motor vehicles, as provided by the Automotive Products Trade Act of 1965 (APTA). The APTA specifies that such duty-free treatment should be considered a trade-agreement concession for purposes of section 301 of the Trade Expansion Act of 1962. The free entry was effective for the first time in 1965, prior to which the ad valorem duty (or ad valorem equivalent of the duty) on imports of such articles from Canada was 17.5, 12.0, and 16.2 percent, respectively,

under items 680.30, 680.33, and 680.35. In light of the similarity in economies between Canada and the United States, particularly with reference to the ball bearing industry, the abrupt elimination of duties had the result which might be expected. Except for the year, 1971, imports of the products involved, namely, antifriction balls, integral shaft bearings, and ball bearings and parts, increased dramatically on a year-by-year basis from 1966 through 1972. Based on information obtained in the investigation, I have determined, therefore, that such increased imports were the result in major part of the duty-free concession granted these products under APTA.

#### Serious injury

The domestic industry producing articles like or directly competitive with those being imported under the TSUS items for which I have found affirmatively is suffering serious injury; thus, the third condition established by the statute is met. The injury is evidenced by declining profits, a declining share of the U.S. market, and decreasing employment.

Net operating profits before taxes for firms accounting for nearly three-fourths of sales by U.S. producers declined from about 13 percent of net sales in 1968 to less than 6 percent in 1971 on their ball bearing operations; the ratio remained at about the 1971 level in 1972 despite a buoyant demand and a sharp increase in production in the latter year. Such a sharp decline in profits, while serious for any industry, is especially significant for a capital intensive industry such as that producing ball

bearings. The continuation of the low profit margins, and losses for some firms, over any lengthy period would be of serious consequence.

During recent years, the share of the market that the domestic producers have been able to retain has been seriously dwindling. For example, they supplied less than two-thirds of U.S. consumption of ball bearings in 1972 compared with three-fourths in 1968, and considerably higher shares earlier. Excluding the captive portion of the domestic output which isn't sold in the marketplace, the domestic producers supplied only a little more than half of the bearings marketed in the United States in 1972 while they had accounted for two-thirds in 1968. The declining share was reflected in reduced output in most years, the year 1972 being the major exception because of exceptionally strong demand in that year. Indicative of the seriousness of the injury, profits did not rebound. Largely because of the reduced output, employment in the industry has declined, being nearly a fifth smaller in 1972 than in 1968.

#### Major factor

Finally, the fourth criterion that must be met requires that the increased imports must be the major factor causing the serious injury. No doubt the slowdown in the U.S. economy during 1970 and 1971 and increased costs have adversely affected the domestic producers. However, the steady growth of imports of ball bearings from Japan, Canada,

and other sources, coupled with the underselling of domestic bearings (particularly by the Japanese), indicates that the major cause of injury has been the increased imports. Because of the underpricing, which was so great in some instances that Japanese bearings sold for as little as half the price of comparable domestic bearings, the domestic industry has not operated with a viable profit level or maintained a stable share of the market. The erosion of profits and decline in employment in recent years corresponded with the sharp increase in import penetration. The phenomena were not independent of one another; clearly, the injury sustained by the U.S. industry has been a direct consequence of the increased imports.

Contrary to my colleagues, I have determined that the imports of parts of ball bearings, along with the imports of ball bearings, have been the major factor causing serious injury to the domestic industry. U.S. imports of parts, which, as noted above, have expanded greatly in the past 5 years, constitute a significant part of the import trade that is of consequence in this case. Imports of parts accounted for 8 percent of the aggregate imports of ball bearings and parts under item 680.35 in 1972--not an inconsequential proportion. Such parts are assembled into ball bearings in the United States (virtually no U.S. material being added), and then enter the domestic market in competition with bearings wholly produced in this country. Such parts, therefore, represent a significant part of the import problem at the heart of this case.



Remedy

Section 301(e) of the TEA provides as follows:

Should the Tariff Commission find with respect to any article, as the result of its investigation, the serious injury or threat thereof described in subsection (b), it shall find the amount of the increase in, or imposition of, any duty or other import restriction on such article which is necessary to prevent or remedy such injury and shall include such finding in its report to the President.

Ball bearings and parts (item 680.35).-- The domestic ball bearing industry has experienced a relentlessly growing loss of its markets to imports for the past 14 years. Through periods of recurring economic recessions and boom, the value of imports of ball bearings and parts has been greater each year than in the preceding years. Imports now account for more than a third of U.S. consumption by quantity and almost one-fourth by value. The rate of import growth has been rather uniform, except for two years--1966 just prior to the Kennedy-round concessions and 1972 when the final stage of such concessions was placed in effect--in which imports increased phenomenally. Both years were characterized by an unusually high level of business activity generally across the entire economy with the resulting sharp increase in demand for ball bearings.

An examination of the principal sources of imports reveals clearly that the U.S. market has been virtually wide open to Japanese imports for the past 14 years. The other principal supplier, Canada, has become an important factor in the U.S. market since 1965 when duty-free treatment was accorded Canadian ball bearings which are to be used in the production of motor vehicles in the United States.

Japanese bearings accounted for one-half of the total value of imports by 1962 and two-thirds by 1968. As might be expected, Japanese ball bearings are priced substantially below U.S. produced bearings in the most popular models. During the entire period of the staging of the Kennedy-round concessions (1968-72), the price in the United States of domestically produced ball bearings very substantially exceeded the price of bearings imported from Japan. The price advantage of the more important Japanese bearings involved in my affirmative determination was more than the amount by which the statutory (1930) duty exceeds the present duty. Stated differently, had the statutory rate of duty been in effect during each of the years 1968-72 and been fully reflected in the U.S. price of Japanese bearings, most of the Japanese bearings would still have been priced below the equivalent U.S. bearings. For the period July 1969 through December 1971, the most popular imported Japanese bearing, if priced to reflect fully the 1930 duty rate, would have been priced 15 percent below the comparable U.S. bearing.

The foregoing information obtained in connection with this investigation leads me to the inescapable conclusion that if the pre-Kennedy-round rate of duty were imposed, as recommended by my colleagues, as the remedy required to prevent serious injury to the industry, such a level of duty would virtually assure the perpetuation of serious injury to this industry with no relief in sight. Such a modest increase in duty would amount, on the average, to the equivalent of only about one-sixth of the price advantage held by the Japanese in the U.S. ball bearing market. If this recommended duty increase were fully reflected in the Japanese

price, Japanese suppliers would retain the great bulk of the 30-to-50 percent price advantage which it held in the U.S. market in 1968-72. The exceptionally strong position the Japanese have attained in the U.S. market, supplying bearings equal in quality to U.S. bearings and providing satisfactory delivery and service, would almost certainly mean continued substantial growth of imports unless virtually the entire price disparity were eliminated.

In the absence of the latest U.S. currency devaluation, the statutory rate of duty which I find is necessary as the remedy would not have given complete price equality. A combination of these two factors, however, would likely achieve that result.

If the statutory duty rate were imposed on all imports of ball bearings and parts provided for by item 680.35, it is recognized that too sharp a cutback in imports would likely result. To alleviate this, it is proposed that the higher rate apply only to those imports (on a size-category basis) which exceed the level of imports attained in 1970, the year before the injury to the ball bearing industry reached serious proportions.

The remedy additionally provides that the level of imports above which the higher rate of duty would apply would be adjusted annually to reflect changes in total U.S. consumption of ball bearings, so that foreign suppliers as a whole could supply an amount equivalent to the share of the U.S. market they had in 1970 at the current level of duty. But any imports above an amount equivalent to the 1970 share of the U.S. market would have to be entered at the higher rate of duty.

Finally, I have found that increased rates of duty on over-quota imports must be imposed on imports of parts of ball bearings. This finding is necessary since I have concluded that imports of parts, as well as imports of ball bearings, are the major cause of serious injury to the domestic industry. I would note, moreover, that any significant restriction of imports of ball bearings might not be effective unless imports of parts were also limited. As indicated earlier in this statement, imported parts are assembled into ball bearings in the United States, and enter commerce as bearings (rather than repair parts). Thus, if imports of ball bearings but not imports of parts were restricted to carry out the purposes of the statute, as my colleagues propose, the import restriction on ball bearings would likely stimulate imports of parts for assembly. Then, to the extent that bearings assembled from such parts supply the U.S. market, the domestic operations would amount only to an assembly operation.

As I analyze the U.S. market conditions which have prevailed and which I envisage will continue to prevail in the ball bearing industry, anything short of the remedy I propose would, in my judgment, result in a level of imports which would continue to cause serious injury to the U.S. ball bearing industry.

Ball bearings and parts imported from Canada under APTA.--Imports under TSUS items 680.31, 680.34, and 680.36 cover anti-friction balls, integral shaft bearings, and ball bearings and parts from Canada, if such products are used in the production of motor vehicles. As described earlier, such imports have entered the United States duty free beginning in 1965 pursuant to APTA and such duty-free status is declared to be as

a trade-agreement concession under that act. Accordingly, prior to 1965 all imports from Canada were subject to duty. Primarily because of the similarity of production costs in Canada and the United States, imports of bearings from Canada did not increase significantly prior to 1965. Subsequent thereto in response to the duty-free concession, imports expanded sharply. This was the primary basis for my conclusion that the pre-Kennedy-round rates of duty are necessary as a remedy to prevent serious injury.

#### Negative determinations

In connection with antifriction balls and integral shaft bearings which entered under item 680.30 and 680.33, I have determined that the increased imports, if any, are not the result in major part of trade-agreement concessions, i.e., the second of the four points cited above has not been met. Accordingly, a negative determination is required with respect to these articles.

Unlike other ball bearings, dutiable imports of antifriction balls and integral shaft bearings (i.e., those that enter under the items shown above) did not reach a significant level until the mid-60's and even then the level of imports was modest. In the case of antifriction balls, the imports during each of the years in which the Kennedy-round concessions were staged (except for 1972) were less than the imports during the preceding year. In the case of integral shaft bearings, imports both increased and decreased during recent years, the trade-agreement concessions apparently having no discernible effect. Accordingly, I have determined that the increased imports, if any, entered under these two items were not the result in major part of trade-agreement concessions.



## INFORMATION OBTAINED IN THE INVESTIGATION

## Description of Articles Under Investigation

The primary function of antifriction bearings is to reduce the friction between a revolving part and a fixed part in mechanical devices. Bearings are essential components of practically every industrial and military device.

Antifriction bearings may be classified in two broad categories: ball bearings and roller bearings. The principal differences are in the rolling elements (balls or rollers), in their respective abilities to carry loads, and in their respective costs.

Generally, ball and roller bearings are not interchangeable because each type has characteristics which make it the better choice for a certain application. The original selection is made to assure maximum bearing performance; therefore, a replacement would generally be made with the same type of bearing. The load-carrying ability of a bearing is largely determined by the contact between the rolling element and the raceway (the groove in which the rolling element moves). In a ball bearing this contact is initially only point contact, but it increases to area contact as the load is applied to the bearing and the ball tends to deform slightly. In a roller bearing the initial contact between the roller and the raceway is line contact, but this too increases as the load is applied to the bearing. When the roller deforms under load, the contact area becomes elliptical. The contact area of a roller bearing is much greater than that of a ball bearing; therefore, the roller bearing accommodates much

greater loads. Conversely, the heat developed within a bearing is related to the load contact area and for this reason a ball bearing can usually be run at higher speeds than a roller bearing. Ball bearings are highly versatile and are adaptable to a wide range of loads, speeds, temperatures, and environments. Roller bearings are not so adaptable and, therefore, are more limited in their use.

Ball bearings generally consist of two hardened steel rings separated by balls rolling in grooves in the rings. The balls are usually spaced by a cage or retainer. A bearing is usually a self-contained unit. Ball bearings may also contain shields, seals, or snap rings to fit particular applications. Shields are metal plates which are attached to the outer ring and have an inside diameter slightly larger than the inner ring. Shields protect the bearings from foreign materials and retain lubricants. Seals are closures similar to shields but generally have rubbing contact with the inner ring. Their main function is to retain lubricants. Snap rings allow flush mounting against the machined face of a through-bored housing, permitting positive location of the bearing.

Oil and grease serve to reduce friction between moving parts, to dissipate heat caused by elastic deformation and sliding friction at contact areas, and to prevent rust and corrosion. Oil is usually the most effective lubrication and provides longer life than grease. Retention and sealing problems are more difficult, however. Grease lubrication is most effectively done by the bearing manufacturer at the time of assembly, when the bearing can be adequately cleaned and



the correct amount of grease inserted. Bearings with integral seals to retain lubricants and exclude contaminants are ideally designed for grease lubrication.

Ball bearings may be radial or thrust, or they may contain integral shafts. They may also be classified as single-row, double-row, self-aligning, angular-contact, and so forth. Most ball bearings produced domestically or abroad are radial ball bearings. Integral shaft bearings are most commonly used in automotive water pumps. Ball bearings are produced in sizes which range from units of 6 or more feet in diameter to units not much bigger than the head of a pin. Generally, ball bearings with an outside diameter (OD) of 9 millimeters (mm) or less are referred to as miniature bearings.

Miniature bearings are used in such items as aircraft and missile guidance systems, servo-mechanisms, computers, office machinery, measuring and counting devices, laboratory apparatus, and dental drills. Bearings with an OD of 9 mm or more but less than 30 mm are generally referred to as instrument-size bearings. They are used in electric motors, portable power tools, computers, accounting machines, household vacuum cleaners, exhaust fans, teletype apparatus, photographic and reproducing machines, and floor washers and polishers.

Bearings in OD sizes ranging from over 30 to 52 mm are used in the following products: alternators and generators for cars, trucks, tanks, tractors, and so forth, automotive cooling fans, automotive air-conditioning clutches and compressors, household and commercial laundry equipment, electric motors, fans, blowers, compressors,

bench-type power tools, machine tools, speed reducers and other mechanical power transmission devices, textile equipment, therapeutic equipment, farm machinery and implements, lawnmowers, garden tractors, and small internal combustion motors such as those used on lawnmowers, snowmobiles, and outboard motors.

Bearings with an OD of 52 mm or more are used in auto and truck propeller shafts, transmissions for all types of civilian and military self-propelled vehicles, winches and hoists, farm machinery and implements, pumps and compressors, fans and blowers, industrial refrigeration and air conditioning, industrial trucks, forklifts, food-preparation machinery, mechanical measuring and pumping devices, printing presses, papermill accessory equipment, steel rod and steel wire mill equipment, woodworking machinery, welding apparatus, and textile equipment.

Ball bearings may be ground or unground. Ground or precision ball bearings are manufactured to meet very definite size and quality standards. They are made to various grades of precision. Dimensions and tolerances for precision bearings are established by the Annular Bearing Engineers Committee (ABEC) of the Anti-Friction Bearing Manufacturers Association, Inc. (AFBMA). The committee maintains universal standards for dimensions and tolerances used in the manufacture of ball bearings. The International Organization for Standardization has established standards which are similar to the ABEC standards. Representatives from bearing-manufacturing companies, both domestic and foreign, sit in on the regular meetings of these

standard control groups. Both domestic and foreign companies manufacture bearings to ABEC standards for the U.S. market. The precision grades are ABEC 1, 3, 5, 7, or 9. The ABEC 1 grade is the normal or standard grade, with the precision increasing as the ABEC numbers increase. ABEC 9 grade bearings are the most precise dimensionally. The great bulk of the imports, as well as of domestic production, are produced to ABEC 1 quality. While ABEC 1 grade is suitable for most applications, higher precision grades are used when greater running accuracy, lower vibration, and lower noise levels are required. Some typical ball bearing applications with respect to ABEC tolerance grade are listed on the following page.

<u>Industry</u>	<u>Ball bearings used in--</u>	<u>ABEC tolerance grade normally used</u>
Home appliances	Vacuum cleaners, washers, dryers, mixers, polishers.	1
General industrial	Fans, blowers, pumps, ovens, compressors, gearboxes.	1
	Electric motors, generators.	1 & 3
Material handling	Conveyor systems, forklift trucks.	1
Power tools	Drills, woodworking saws (circular, bench, saber, chain), sanders, lawnmowers, power garden equipment.	1
Agriculture	Farm machinery (tractors, combines, feed mixers, silo unloaders, fertilizer spreaders, hay balers, etc.)	1
Office equipment	Reproducing machines, printers, cash registers, check sorters.	1
	Computers.	1, 5, & 7
Automotive	Transmissions, alternators, water pumps, wheels.	1
Aerospace	Jet engines and accessories, air-frame controls, instruments, navigational instruments.	5 & 7
		1 3, 5, & 7 5, 7, & 9
Machine tools	Spindles, lead screws.	7 & 9

Unground ball bearings consist of hardened but not ground ball races (raceways) which are generally assembled with a full complement of ground and polished balls. Unground ball bearings are measured in inches rather than in millimeters. Although relatively inexpensive, all conform to definite standards of specification and quality. The usual material for unground ball bearings is low-

carbon steel. The ball races are case hardened. The races and other parts are often supplied with a cadmium, zinc, nickel, or chrome-plated finish for corrosion resistance or for decorative purposes.

Tolerances of unground ball bearings are much greater than those of precision bearings. For this reason, press fits are not feasible for mounting unground bearings, but press fits are not usually necessary because such bearings do not operate at high speeds. These bearings are designed to satisfy specific applications and offer substantial cost savings when (1) operating speeds are less than 2,500 revolutions per minute, (2) loads are not great, (3) noise is not critical, (4) accuracy of rotation is not important, and (5) internal play of several thousandths of an inch is not critical.

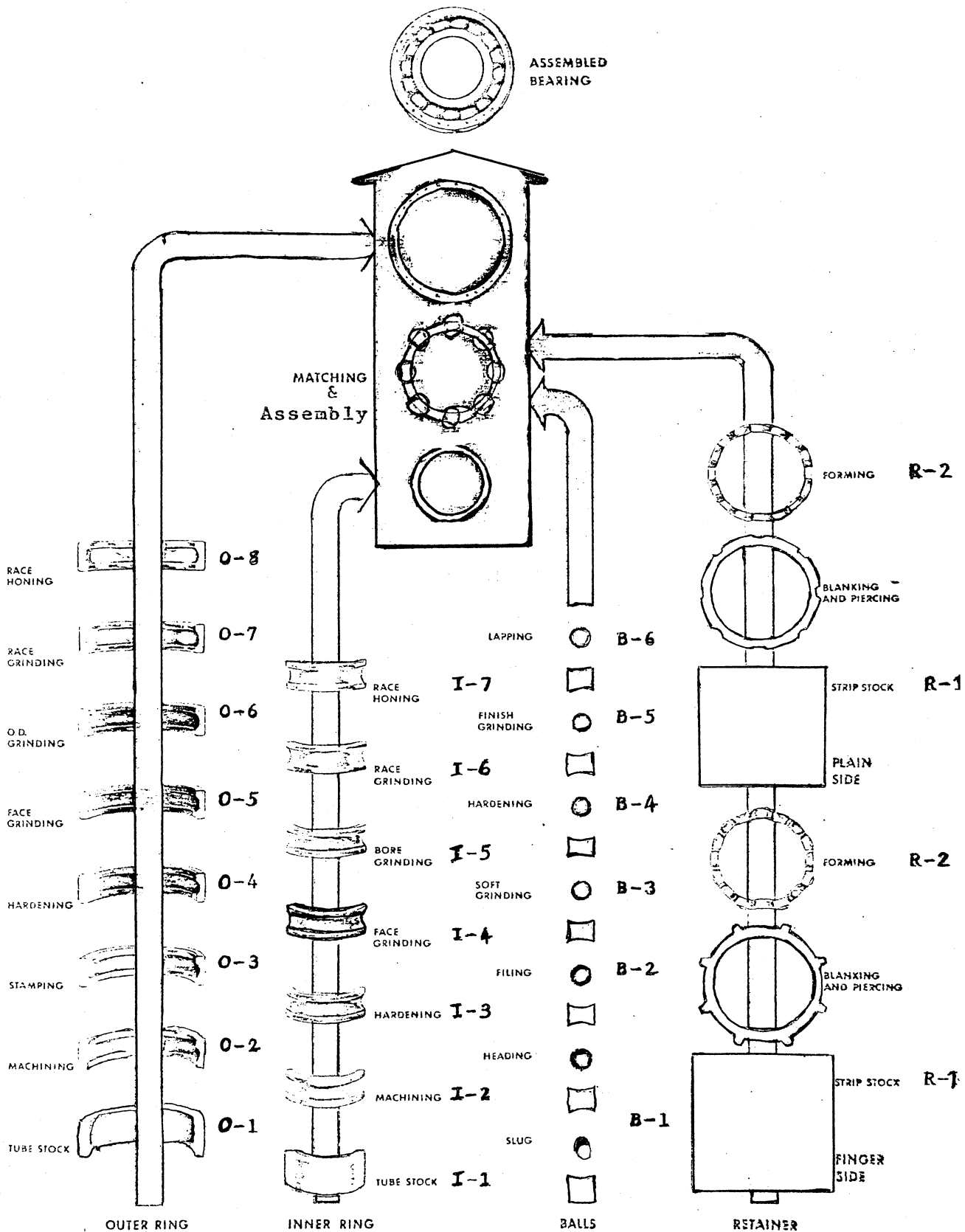
Unground ball bearings are used on industrial trucks, lawnmowers, wheelbarrows, children's vehicles, and baby carriages. In these applications unground bearings meet the requirements for load, speed, accuracy, and noise levels. They are also used on heavy building doors, freezer doors, and safe doors where operation is intermittent and movement is slow. Heating, ventilating, and air-conditioning dampers often use unground bearings, as do carriage rollers for typewriters and bookkeeping machines, cam followers for checkwriters, circuit breakers or printing machines, guide rollers in card-sorting equipment, and roll-end bearings on duplicating machines. Filing-cabinet drawers roll on unground bearings, and similar bearings are used as rollers for trays in dishwashers and refrigerators.

Imports of unground ball bearings are negligible. Generally, U.S. companies that produce principally unground ball bearings do not produce ground ball bearings.

The various steps in the manufacture of the various components of ball bearings are shown in the diagram on the following page. Unground ball bearings differ from ground (precision) ball bearings in that the inner and outer races are not ground or honed but generally formed or turned, heat treated, and then assembled. In the manufacture of unground bearings, manufacturing steps 0-5, 0-7, 0-8, I-4, I-5, I-6, and I-7 are not performed.

Balls used in precision ball bearings are of alloy steel, while those in unground bearings are generally of carbon steel. The bulk of alloy steel balls consumed in the United States are used in antifriction bearings or in some special bearing device such as recirculating ball bushings, and in recirculating ball splines used in the steering columns of automobiles. Balls are manufactured in a wide variety of alloys such as stainless steel, brass, silicon, and molybdenum for a multitude of specialized applications.

# STEPS IN THE MANUFACTURE OF A BALL BEARING



The various grades of balls, the available-size range, and the diameter tolerance per ball are shown below:

<u>Grade</u>	<u>Available-size range</u> <u>(inches)</u>	<u>Diameter</u> <u>tolerance</u> <u>per ball</u> <u>(inches)</u>
3-----	1/32 - 1	0.000003
5-----	1/32 - 1-1/2	.000005
10-----	1/32 - 1-1/2	.000010
15-----	17/32 - 1-1/2	.000015
25-----	1/32 - 1-1/2	.000025
50-----	1/32 - 2-7/8	.00005
100-----	3 - 4-1/2	.0001
200-----	1/32 - 2-7/8	.0002
300-----	3 - 4-1/2	.0003
500-----	1-11/32 - 4-1/2	.0005
1000-----	1/32 - 4-1/2	.001

A particular ABEC bearing grade requires a certain precision and surface finish with respect to the balls. For ABEC 1 ball bearings, one would normally use grade 25 balls in bearings up to 1-3/8 inches in OD, grade 50 balls in those up to 2-7/8 inches in OD, and grade 100 balls in those over 2-7/8 inches in OD. ABEC 5 and ABEC 7 grades of ball bearings require grade 10 balls. Miniature precision ball bearings of various ABEC qualities require either grade 3 or grade 5 balls. Generally, unground ball bearings utilize grade 500 balls, and hardware items such as garage-door rollers use grade 1000 balls.



## U.S. Tariff Treatment

The ball bearings and parts thereof covered by this investigation are provided for in items 680.30 to 680.36, inclusive, of the Tariff Schedules of the United States (TSUS).

Ball bearings except those with integral shafts, and parts except antifriction balls are currently dutiable at 1.7 cents per pound plus 7.5 percent ad valorem under TSUS item 680.35. The ball bearings and parts covered in item 680.35 were originally dutiable at 10 cents per pound plus 45 percent ad valorem under the Tariff Act of 1930. Duty reductions and the effective dates of such reductions are shown in the following table.

Ball bearings (except those with integral shafts) and parts (except antifriction balls): U.S. rate of duty in 1930 and changes through 1972

(Cents per pound; percent ad valorem)

Effective date	Rate of duty	Authority
June 18, 1930----	10¢ + 45%	Tariff Act of 1930.
Aug. 5, 1935----	8¢ + 35%	Trade agreement with Sweden.
Apr. 30, 1950----	4¢ + 17.5%	GATT concession.
June 30, 1956----	3.8¢ + 16.5%	Do.
June 30, 1957----	3.6¢ + 15.5%	Do.
June 30, 1958----	3.4¢ + 15%	Do.
Aug. 31, 1963----	3.4¢ + 15%	Adoption of TSUS (item 680.35).
Jan. 1, 1968----	3¢ + 13.5%	GATT concession.
Jan. 1, 1969----	2¢ + 12%	Do.
Jan. 1, 1970----	2¢ + 10.5%	Do.
Jan. 1, 1971----	2¢ + 9%	Do.
Jan. 1, 1972----	1.7¢ + 7.5%	Do.

Note.--A surcharge of 10 percent ad valorem was applicable to certain imported articles, including ball bearings and parts under item 680.35, from Aug. 16 to Dec. 19, 1971. During that period the aggregate duty applicable to such articles was 2 cents per pound plus 19 percent ad valorem. The surcharge was imposed by Presidential Proclamation No. 4074 and removed by Presidential Proclamation No. 4098.

Antifriction balls, one of the principal parts of ball bearings, are currently dutiable under TSUS item 680.30 at 2 cents per pound plus 6 percent ad valorem. This rate, which became effective on January 1, 1972, reflects the final stage of the five-stage reductions resulting from concessions granted by the United States in the Kennedy Round under the General Agreement on Tariffs and Trade (GATT). Antifriction balls were originally dutiable under the Tariff Act of 1930 at 10 cents per pound plus 45 percent ad valorem. Duty reductions and the effective dates of such reductions are shown in the following table.

Antifriction balls: U.S. rate of duty in 1930  
and changes through 1972

(Cents per pound; percent ad valorem)

Effective date	Rate of duty	Authority
June 18, 1930-----	10¢ + 45%	: Tariff Act of 1930.
Aug. 5, 1935-----	8¢ + 35%	: Trade agreement with Sweden.
Jan. 1, 1939-----	8¢ + 25%	: Trade agreement with the : United Kingdom.
Jan. 1, 1948-----	4¢ + 25%	: GATT concession.
Apr. 30, 1950-----	4¢ + 12.5%	: Do.
Aug. 31, 1963-----	4¢ + 12.5%	: Adoption of TSUS (item 680.30).
Jan. 1, 1968-----	3.5¢ + 11%	: GATT concession.
Jan. 1, 1969-----	3¢ + 10%	: Do.
Jan. 1, 1970-----	2.8¢ + 8.5%	: Do.
Jan. 1, 1971-----	2.4¢ + 7%	: Do.
Jan. 1, 1972-----	2¢ + 6%	: Do.

Note.--A surcharge of 10 percent ad valorem was applicable to certain imported articles, including antifriction balls, from Aug. 16 to Dec. 19, 1971. During that period the aggregate duty applicable to antifriction balls was 2.4 cents per pound plus 17 percent ad valorem. The surcharge was imposed by Presidential Proclamation No. 4074 and removed by Presidential Proclamation No. 4098.

Ball bearings with integral shafts (TSUS item 680.33) were designated as item 680.34 by Public Law 89-241, sections 2(a), 36(d), October 7, 1965 (79 Stat. 933, 940), effective December 7, 1965. Item 680.34 was redesignated as item 680.33 pursuant to Public Law 89-283. These changes were entered into force December 20, 1965, by Presidential Proclamation No. 3682, October 21, 1965, with respect to articles entered on or after January 18, 1965.

The initial rate established for ball bearings with integral shafts was 12 percent ad valorem. Prior to the creation of the specific provision (item 680.33) for ball bearings with integral shafts, the Bureau of Customs had classified such articles under the TSUS as part of other products such as pumps, automobiles, or motorboats. Most of the ball bearings with integral shafts were classified as parts of pumps under item 660.90, dutiable at the rate of 12 percent. Item 660.90 (which had been in effect since the inception of the TSUS in August 31, 1963) was derived from a number of provisions under the old tariff schedules, including paragraph numbers 353, 360, 369, 370, and 372. The rates under these provisions varied considerably. The 12-percent rate of duty for pumps and parts of pumps reflected a weighted average of both higher and lower rates previously prevailing.

The 12-percent rate of duty applicable to ball bearings with integral shafts was reduced in five stages pursuant to the Kennedy Round. From August 16 to December 19, 1971, the rate was 17 percent as a result of the 10-percent surcharge which was in effect during that period. The current 6-percent rate has been in effect since January 1, 1972.

TSUS items 680.31, 680.34, and 680.36 were also created pursuant to Public Law 89-283 and put into effect by Presidential Proclamation No. 3682, October 21, 1965, with respect to articles entered on or after January 18, 1965. All articles imported under items 680.31, 680.34, and 680.36 are Canadian articles for original motor-vehicles equipment and are entered free of duty.

The ad valorem equivalents of the rates of duty in effect in each of the years 1964-72, based on imports entered during each of those years, were as follows:

Ball bearings and parts, including antifriction balls: Ad valorem equivalents of duty rates effective in the years shown, by TSUS item numbers, 1964-72 1/

Year	Item 680.30	Item 680.33	Item 680.35
1964-----	18.0	-	16.3
1965-----	17.5	12.0	16.2
1966-----	17.7	12.0	16.2
1967-----	17.6	12.0	16.4
1968-----	15.4	10.5	14.9
1969-----	13.6	9.5	12.9
1970-----	11.7	8.0	11.4
1971-----	9.7	7.0	9.9
1972-----	8.3	6.0	8.2

1/ Calculated only with respect to ball bearings and parts thereof, including antifriction balls; although item 680.30 contains rollers and item 680.35 contains roller bearings, those products were excluded in the calculations.

The ad valorem equivalents of the rates of duty in effect in each of the years 1964-72, based on imports entered during 1972, were as follows:

Ball bearings and parts, including antifriction balls: Ad valorem equivalents of duty rates effective in the years shown, by TSUS item numbers, 1964-72 1/ 2/

Year	Item 680.30	Item 680.33	Item 680.35
1964-----	17.1	-	16.4
1965-----	17.1	12.0	16.4
1966-----	17.1	12.0	16.4
1967-----	17.1	12.0	16.4
1968-----	15.0	10.5	14.7
1969-----	13.4	9.5	12.8
1970-----	11.7	8.0	11.3
1971-----	9.7	7.0	9.8
1972-----	8.3	6.0	8.2

1/ Calculated only with respect to ball bearings and parts thereof including antifriction balls; although item 680.30 contains rollers and item 680.35 contains roller bearings, those products were excluded in the calculations.

2/ Based on imports entered in 1972.

## Ground Ball Bearings

U.S. producers

Ground or precision ball bearings are manufactured by about 30 different producers in about 15 States; the majority of the producers are concentrated in the north central and northeastern United States.

A few companies dominate in the production of ground ball bearings. For the most part these companies are subsidiaries or subdivisions of larger corporations. New Departure, a division of General Motors Corp.; SKF Industries, Inc., a wholly owned subsidiary of Aktie Bolaget Svenska Kullager Fabriken (ABSKF), Gothenburg, Sweden; and Fafnir Bearing Co., a division of Textron, Inc., together accounted for \* \* \* [more than half] of total U.S. production in 1972. Marlin Rockwell, division of TRW, Inc.; Federal Mogul Corp.; FAG Bearing Co., a wholly owned subsidiary of FAG Kugel Fischer Georg Schaefer and Corp., Schweinfurt, West Germany; Hoover-NSK; and Ford Motor Co. were also important producers in 1972. \* \* \* the above eight companies \* \* \* together \* \* \* accounted for about 83 percent of total U.S. production [in 1972].

\* \* \*. In \* \* \* [1972], captive shipments by nine U.S. manufacturers accounted for about one-fourth of total U.S. producers' shipments.

Most of the leading domestic companies also produce roller bearings, but not with the same equipment and usually not in the same facility. The production of ball bearings requires specialized equipment that is not readily convertible to the manufacture of other products. Hence, plants producing ball bearings do not generally produce other products. Production facilities in the ball bearing industry are capital intensive and require highly skilled labor.

The U.S. industry produces over 50,000 different ball bearing variations; none of the U.S. companies manufacture ball bearings in all the sizes and types. For example, none of the industry's principal manufacturers produce miniature bearings (those with an OD of less than 9 mm). In 1972 such ball bearings were produced by six companies--Schatz Manufacturing Co., New Hampshire Ball Bearing Co., MPB Corp., NMB (America), Inc., a wholly owned subsidiary of Nippon Miniature Bearing Corp. (Japan), Barden Corp., and Kubar Co. Other producers concentrate in other specialized categories. Nine companies manufacture ball bearings with integral shafts; New Departure and Hoover--NSK are among the principal producers. \* \* \*

Sixteen domestic companies produced instrument-size ball bearings (9 to 30 mm OD) in 1972; a far larger number produced ball bearings with an OD of over 30 mm. 1/

Although most domestic producers must manufacture many different types and sizes of bearings for competitive reasons, they seek to manufacture and sell bearings which are adaptable to high production runs, with machine changeover and retooling kept to a minimum. Some importers have concentrated on the marketing of a relatively limited number of high-volume sizes. For instance, the No. 6203 bearing has numerous uses in the automotive and electric-motor markets. It has been estimated that perhaps one-fourth of all bearings consumed in the United States are 6203 bearings. 2/

NTN Bearing Co., a wholly owned subsidiary of Toyo Bearing Co. of Japan, constructed a modern, highly automated assembly plant at Schiller Park, Ill., in 1971. \* \* \*

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1/ The AFBMA reports that MPB Corp. closed its Charleston, N.H., plant in 1969; New Hampshire Ball Bearing Co. closed its Laconia, N.H., plant in 1971; Federal Mogul Corp. ceased production at its Microtech Division in El Monte, Calif., in 1965; and New Departure ceased production of instrument bearings in the late 1960's.

2/ It should be noted, however, that the No. 6203 bearing has as many as 380 variations.



Other Japanese companies currently produce or plan to produce soon in the United States. Hoover, a domestic company of long standing, has this year announced a joint venture with NSK, a Japanese producer. Koyo Seiko, one of the largest Japanese producers of ball bearings and one of the largest exporters of bearings and parts to the United States, announced recently that it will begin construction of a \$10 million ball bearing plant at Orangeburg, S.C., within the next year. NMB (America), previously mentioned as one of the leading U.S. producers of miniature bearings, is also a Japanese-owned company.

#### Importers importing from Japan

The bulk of ball bearings and parts thereof imported from Japan are brought in by wholly owned subsidiaries of Japanese manufacturers and by large Japanese trading companies. The five Japanese producers (and their U.S. affiliates) who account for almost all of the sales to the United States from Japan are Toyo Bearing Co. (NTN Bearing Corp. of America, Des Plaines, Ill.), Koyo Seiko (American Koyo, Cleveland, Ohio), Nippon Seiko K. K. (NSK Corp., New York, N.Y.), Fujikoshi (NACHI American Co., Ltd., Maywood, N.J.), and Nippon Miniature Bearing Corp. (NMB (America), Chatsworth, Calif.). Each of the aforementioned firms except NMB imports roller bearings in addition to a full line of ball bearings. NMB concentrates on the miniature and instrument sizes of ball bearings.

In addition to importing for resale, \* \* \* [ball bearings are imported directly for use in the manufacture of other articles].

Three of the Japanese manufacturers have invested in U.S. establishments for the manufacture or assembly of ball bearings. In 1971 NMB bought a bearing plant in Chatsworth, Calif., from SKF Industries, a U.S. producer, and began manufacturing miniature bearings soon thereafter under the name NMB (America), Inc. NMB (America) is currently a member of AFBMA, the U.S. producers' trade association. Also in 1971, Toyo Bearing completed a facility in Schiller Park, Ill., and began assembly there in July of that year. Nippon Seiko K.K., \* \* \* [in March of 1973 entered into] a joint-venture operation with the Hoover [Ball and Bearing Co., a U.S. producer of ball bearings. The new company,] known as Hoover-NSK Bearings, Inc., has assumed operation of the Hoover Bearing Division's plants in Ann Arbor, Mich., and Wayne, N.J. \* \* \*. Hoover has been and continues to be a minority stockholder in Nippon Seiko K.K., the parent company.

Each of the U.S.-based establishments into which Japanese capital has been invested plans to increase production from its present level.

In addition, a fourth Japanese producer, Koyo Seiko, plans the construction of a manufacturing facility in South Carolina within the next year.

#### Importers importing from Canada and Europe

Much of the importing from Canada and European countries is done by U.S. producers of ball bearings, \* \* \* [particularly those domestic producers owned by or affiliated with foreign corporations].

In addition to the firms cited above, Landis and Gyr, an importer of Swiss miniature bearings, and RHP, an importer of a full line of British bearings, are important suppliers of European ball bearings.

#### U.S. consumption

Because ground ball bearings are so widely used in many types of machinery and equipment, their consumption is closely related to the level of industrial output and economic activity in general. Apparent U.S. consumption of ball bearings declined in both 1970 and 1971 but was larger in 1972 than in any other year in the 5-year period 1968-72 (table 1). During 1968-72, apparent consumption of ball

bearings fluctuated from a low of 330.1 million units, valued at \$433.7 million, in 1971 to a high of 397.4 million units, valued at \$535.2 million, in 1972. Apparent consumption increased from 350.4 million units in 1968 to 359.2 million units in 1969, but then declined to 333.2 million units in 1970. Growth in consumption was supplied by increased imports. Aggregate producers' shipments (including captive and exports shipments) were less in 1972 than in either 1968 or 1969.

Data on apparent U.S. consumption of ball bearings, by types and sizes, are not available for years prior to 1969. Consumption of all types and sizes of ball bearings was higher in 1972 than in any of the preceding 4 years. The U.S. economy in general and automobile production in particular were at a high level in 1972. Consumption of ball bearings with integral shafts, used principally in the automotive industry, increased each year, rising from 25.8 million units in 1969 to 32.9 million units in 1972. Apparent U.S. consumption of miniature and instrument-size ball bearings was only slightly higher in 1972, than in 1969. Consumption of these bearings declined sharply in 1970 and 1971, reflecting a lessening of demand by the aerospace industry, but rebounded strongly in 1972. Consumption of ball bearings over 30 mm in outside diameter generally declined in 1970 and 1971, but increased sharply in 1972. For a complete size-by-size breakdown of apparent U.S. consumption, see table 2.

U.S. production

U.S. production of ground ball bearings reached a peak of 272.9 million units in 1969. After declining to 237.0 million units in 1970 and to 216.3 million units in 1971, domestic production increased to 262.9 million units in 1972 (table 3). Defense and aerospace requirements, which were somewhat less in 1970 and 1971 than in previous years, were responsible for a considerable portion of the decline. Instrument-size ball bearings (9 to 30 mm), which are used extensively in the aerospace industry, declined from 61.9 million units in 1968 to 40.6 million units in 1971. Production of these bearings increased to 49.1 million in 1972. The production of integral shaft bearings increased by about 25 percent from 1968 to 1972; however, the production of other types and sizes of ball bearings in 1972 were about the same as or less than in 1968 or 1969. For example, production of ball bearings from 30 to 52 mm (the most popular size category, accounting for about a third of total U.S. production) was about 3 million units less in 1972 than in 1968.

Aggregate producers' shipments

Aggregate producers' shipments <sup>1/</sup> (domestic shipments plus captive shipments plus exports) of ball bearings followed the same general trend as U.S. production during the 1968-72 period. Producers' shipments ranged from 222.5 million units, valued at \$403.4 million, in

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<sup>1/</sup> Producers' shipments exceeded U.S. production in each of the years 1968-72 because some domestic producers included in their domestic shipments quantities which they had imported.

1971 to 275.4 million units, valued at \$486.7 million, in 1969 (table 1). Producers' shipments in 1972 amounted to 267.8 million units, valued at \$481.1 million. The quantity and value of producers' shipments in January-April 1973 increased by 18 and 22 percent, respectively, over the corresponding figures for January-April 1972.

Domestic shipments by U.S. producers, excluding captive and export shipments, declined steadily from 200.2 million units in 1968 to 159.8 million units in 1971 (table 4). While domestic shipments increased almost 20 percent in 1972, they were less in that year than they had been in either 1968 or 1969. During January-April 1973, domestic shipments were about 20 percent larger than during January-April 1972. Domestic shipments of radial ball bearings in two size categories, 9 to 30 mm and 30 to 52 mm, declined the most during the 5-year period, while shipments of ball bearings with integral shafts had the largest increase.

The following table shows the percentage of domestic sales (excluding captive shipments) to each type of customer in 1969 and 1972:

Ground ball bearings: Percentage distribution of domestic sales (excluding captive shipments), by types of customers, 1969 and 1972

Type of customer	1969	1972
Original equipment:		
Automotive-----	13.9	16.0
Farm machinery-----	7.6	9.5
Aerospace-----	18.0	10.5
Construction machinery-----	5.7	5.5
Machine tools-----	3.0	2.4
Appliances-----	1.0	1.3
Electric motors-----	4.7	4.1
Other electrical-----	3.2	3.6
Other-----	16.7	16.9
Replacement market-----	26.2	30.2
Total-----	100.0	100.0

Source: Compiled from reports submitted to the U.S. Tariff Commission by the domestic producers.

The replacement market, by far the largest single market for the domestic ball bearing industry, accounts for about 30 percent of domestic sales. The leading types of original-equipment customers are automotive, aerospace, and farm machinery, in the order named. In 1969, about 18 percent of total sales went to aerospace customers; in 1972, only 10 percent.

Captive shipments (interplant transfers for own use) have accounted for about one-fourth of aggregate producers' shipments annually. Such shipments, by types and sizes, are shown in the following table:

Ground ball bearings: U.S. producers' captive shipments,  
by types and sizes, 1968-72

(In thousands of units)

Year	Integral shaft	Radial				All other	Total
		Less than 9 mm	9 mm and over, but not over 30 mm	Over 30 mm, but not over 52 mm	Over 52 mm		
1968-----	7,227	25	8,767	22,544	19,409	55	58,207
1969-----	8,515	43	10,334	23,678	20,936	56	63,562
1970-----	7,586	23	9,763	19,333	16,178	52	52,935
1971-----	7,394	96	8,607	18,118	14,845	48	49,108
1972-----	8,713	743	10,245	23,167	19,469	57	62,394

Source: Compiled from reports submitted to the U.S. Tariff Commission by the domestic producers.

The ratio of captive shipments of ball bearings to producers' total shipments, by types and sizes, is shown below for the year 1972:

<u>Type or size</u>	<u>Percent</u>
Integral shaft-----	34.6
Radial:	
Less than 9 mm-----	7.5
9 mm and over, but not over 30 mm-----	19.8
Over 30 mm, but not over 52 mm-----	26.8
Over 52 mm-----	27.2
All other-----	.2
Total-----	23.3



Inventories

Inventories held by producers and importers on December 31 in each of the years 1967-72 are shown in the following table:

Ground ball bearings: Inventories held by domestic producers and importers on Dec. 31 of 1967-72

(In millions of units)

Year ending Dec. 31--	Producers' inventories	Importers' inventories
1967-----	20.8	18.3
1968-----	23.6	21.7
1969-----	24.3	25.4
1970-----	26.8	33.8
1971-----	25.3	36.9
1972-----	23.0	53.2

Source: Compiled from data submitted to the U.S. Tariff Commission by the domestic producers and importers of ground ball bearings.

Producers' inventories have fluctuated in recent years from 20.8 million units on December 31, 1967, to 26.8 million units on December 31, 1970. On the average, inventories held by producers were considerably less than 1 month's supply. Importers' inventories have traditionally been somewhat higher in terms of months of supply. Importers' inventories have increased in each of the last 5 years, from 18.3 million units on December 31, 1967, to 53.2 million units on December 31, 1972. In 1968, importers carried about a 3 months' supply; by 1972, their inventories amounted to about 4-1/2 months' supply. The large increase in importers' inventories in 1972 occurred primarily because of an anticipation of increases in the cost of importing brought about by currency changes.

U.S. exports

The value of U.S. exports of ball bearings exceeded the value of U.S. imports until 1966. Since 1965 the value of U.S. exports has ranged from \$28.5 million in 1966 to \$33.6 million in 1972. In terms of quantity, U.S. exports of ball bearings fluctuated in 1968-72, within a narrow range, from 13.6 million units in 1971 to 14.8 million units in 1969. 1/ In addition to exports of ball bearings, about 2 million dollars' worth of parts have been exported annually during the last 3 years, representing a decline from the 4 million to 7 million dollars' worth exported annually in the 1965-69 period.

The United States exports ball bearings to many countries, but Canada, Mexico, the United Kingdom, France, and Australia have been the principal markets (table 5). In addition to the exports to these markets, exports of ball bearings to the Netherlands, Brazil, West Germany, and Japan each exceeded \$1 million in 1972.

The product mix of U.S. exports differs considerably from that of domestic shipments or U.S. imports. In recent years, ball bearings other than radial or those with integral shafts (principally aircraft and thrust bearings) have accounted for about 25 percent of annual U.S. exports; such bearings have accounted for only about 10 percent of annual domestic shipments and for less than 3 percent of annual U.S. imports. The number of ball bearings exported during 1968-72 is shown, by types and sizes, in table 6.

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1/ Estimated by the Tariff Commission from reports submitted to it by the domestic producers.

U.S. imports

The value of imports of ball bearings has increased in each of the last 15 years, from \$1.5 million (f.o.b. foreign value) in 1958 to \$87.8 million in 1972 (table 7). 1/ During January-April 1973, imports continued to increase, amounting to \$38.8 million, 53 percent higher than the value for the corresponding period of 1972. Prior to 1969, the quantity of ball bearings imported was not recorded in official statistics of the U.S. Department of Commerce. In 1969, 98.6 million ball bearings were imported; the number increased each year thereafter to 110.0 million units in 1970, 121.2 million in 1971, and 143.9 million units in 1972. For the first 4 months of 1973, imports 2/ amounted to 57.7 million units, compared with 43.0 million units during the corresponding months of 1972.

Imports of parts of ball bearings other than antifriction balls have likewise increased. The value of such imports was not segregated until 1969. The value of imports of parts amounted to \$1.4 million in 1969; it was \$1.2 million in 1970, \$2.3 million in 1971, and \$6.6 million in 1972. \* \* \*. Imports of parts amounted to \$2.1 million during January-April 1973, compared with \$2.3 million during the corresponding months of 1972.

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1/ Following a three-stage tariff reduction (1956-58), imports increased in value from \$1.5 million in 1958 to \$5.1 million in 1959; while the rate of duty was reduced by 50 percent in five stages from 1968 to 1972, the value of imports more than doubled, increasing from \$43.3 million in 1968 to \$87.8 million in 1972. Imports amounted to \$46.9 million in 1969, \$54.3 million in 1970, and \$61.1 million in 1971.

2/ Estimated in part by the Tariff Commission.

With the exception of miniature bearings, U.S. imports of ball bearings of all types and sizes have increased in recent years (table 8). From 1969 to 1972, imports of radial ball bearings over 52 mm increased by 77 percent; those in the 30-to 52-mm category increased by 51 percent, and those in the 9-to-30 mm class, by 28 percent. Imports of miniature bearings declined by 8 percent during the same period. Imports of ball bearings containing integral shafts increased by 57 percent from 1969 to 1972, while all other ball bearings increased by 32 percent. It is apparent from the data compiled that importers are currently increasing their share of the U.S. market in the larger sizes at a more rapid rate than in the smaller sizes, where they had already gained a significant share of the U.S. market.

The average unit value of imported ball bearings has increased each year, from 47 cents in 1968 to 61 cents in 1972. <sup>1/</sup> The percentage of markup over the c.i.f. value (excluding import duties) of imported ball bearings declined from more than 50 percent during the 1968-70 period to 37 percent in 1971 and to 23 percent in 1972.

The ratio of imports to apparent consumption increased from 26.3 percent in 1968 to 36.7 percent in 1971; the ratio was 36.2 percent in 1972 (table 1). The quantity of U.S. producers' shipments and U.S. imports increased by about 20 percent each in 1972. Since imports increased by a larger percentage than domestic shipments during January-April 1973, the ratio of imports to consumption for that 4-month period was probably larger than it was for either 1971 or 1972.

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<sup>1/</sup> A portion of the increase is due to a changing product mix.

The ratio of imports to consumption, excluding captive shipments, was considerably larger than that shown above--ranging from 33.1 percent in 1968 to 45.3 percent in 1971. In 1972, the ratio was 44.9 percent.

Imports have the largest share of the U.S. market in two classes, the 9-to-30-mm category and the 30-to-52-mm size. In 1972, imports supplied 47 percent of the 9-to-30-mm size and 42 percent of the 30-to-52-mm size. The popular 6203 bearing falls within the 30-to-52-mm category; this category accounted for 35 percent of all ball bearings consumed in the United States in 1972. The ratio of imports to consumption in sizes exceeding 52 mm steadily increased from 16 percent in 1969 to 25 percent in 1972. In 1969-72 the ratio of imports to consumption of ball bearings with integral shafts ranged from about 23 percent in 1969 to 31 percent in 1970. The ratio declined to 29 percent in 1971 and to 28 percent in 1972. Because of defense procurement policies, a decline in aerospace requirements, and increasing import prices, the ratio of imports of miniature bearings to apparent U.S. consumption declined from 38 percent in 1970 to 22 percent in 1972.

More than half of all bearings used in the domestic appliance and electric motor industries are supplied by imports. Imports likewise supply a significant share of the noncaptive automotive industry. While imports still represent a very small share of the domestic market in the construction machinery and machine tool industries, from 1969 to 1972 imports used in these industries increased by tenfold and sevenfold, respectively. By contrast, importers' shipments to

the aerospace industry in 1972 were only one-seventh of those shipped in 1969, and shipments by the domestic producers to the aerospace industry in 1972 declined to a little more than half of what they had been in 1969. The importers' share of the domestic replacement market has also been small, only about one-twentieth in 1972.

The following table shows the percentage of importers' sales to each type of customer in 1969 and 1972:

Ground ball bearings: Percentage distribution of importers' sales, by types of customers, 1969 and 1972

Type of customer	1969	1972
Original equipment:		
Automotive-----	13.5	18.2
Farm machinery-----	5.3	5.5
Aerospace-----	4.5	.5
Construction machinery-----	.2	1.0
Machine tools-----	.1	.3
Appliances-----	7.9	9.4
Electric motors-----	25.4	27.2
Other electrical-----	7.8	10.7
Other-----	19.0	16.8
Replacement market-----	16.3	10.4
Total-----	100.0	100.0

While Canada, West Germany, and the United Kingdom have been important sources of U.S. imports, Japan has been the principal source, accounting for more than 50 percent of total imports in each of the years since 1961 (table 7). In 1972, Japan accounted for 65 percent of the value of all U.S. imports of ball bearings. Switzerland, France, Sweden, Austria, and Italy have been of lesser importance as suppliers.

The value of imports for consumption and ad valorem equivalents of duty rates, by TSUS item numbers, are shown in table 8A.

About 10 U.S. producers of ball bearings also import ball bearings to complement or supplement their lines. The table below shows the quantity and value of U.S. producers' imports in 1968-72:

\* \* \* \* \*

A small volume of ball bearings has been imported under TSUSA numbers 807.00 and 806.30, mostly by U.S. producers of ball bearings.

An increasing volume of imports is being imported free of duty from Canada under the provisions of the Automotive Products Trade Act of 1965 (APTA). In recent years, the value of annual imports under APTA has been as follows: 1968, \$2.9 million; 1/ 1969, \$2.9 million; 1/ 1970, \$3.5 million; 1/ 1971, \$4.1 million; and 1972, \$7.3 million.

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1/ Estimated.

## Unground Ball Bearings

U.S. producers

There are about 20 domestic producers of unground ball bearings, of which about half also produce ground ball bearings. SKF Industries and General Bearing Co. are perhaps the most notable of the dual producers. \* \* \*. Kilian Co., Kendale Co., General Bearings Co., Freeway Co., SKF Industries, and Frost Engineered Products, Inc., are other important producers.

U.S. consumption and production

Since there is no significant international trade in unground ball bearings, U.S. consumption parallels U.S. production. Based on responses to the Tariff Commission questionnaire, U.S. production of unground ball bearings followed the same general trend during 1968-72 as production of ground ball bearings. Production of unground ball bearings fluctuated between 95 million units in 1971 and 125 million units in 1969. Production amounted to 116 million units in 1972; however, the value of production was greater in 1972 than in any of the 4 preceding years.



U.S. producers' shipments

The quantity and value of domestic shipments of unground ball bearings are shown in the table below:

Unground ball bearings: Domestic shipments, 1968-72

Year	Quantity	Value
	1,000 units	1,000 dollars
1968-----	119,297	20,363
1969-----	125,343	22,131
1970-----	112,385	21,568
1971-----	95,282	19,197
1972-----	118,016	24,367

Source: Compiled from reports submitted to the U.S. Tariff Commission by the domestic producers of unground ball bearings.

The product mix of an individual company's shipments varied considerably. Some companies specialize in certain types or sizes. On a company-by-company basis, the average unit values varied from less than 10 cents to more than 80 cents. The average unit value of all domestically produced unground ball bearings increased each year, from 17.1 cents in 1968 to 17.6 cents in 1969, 19.2 cents in 1970, 20.1 cents in 1971, and 20.6 cents in 1972. Since domestic producers' prices were not affected by import competition, they have risen steadily in recent years.

U.S. exports and imports

Both U.S. exports and U.S. imports of unground ball bearings are insignificant. \* \* \*

\* \* \* \* \*

## Antifriction Balls

U.S. producers

Approximately 15 firms, comprising about 20 establishments, currently manufacture antifriction balls. <sup>1/</sup> Eight of these firms also manufacture ball bearings, though not necessarily in the same plants in which balls are produced. Most of the firms that produce balls for their own use also produce for the market.

The great bulk of the balls produced by integrated-bearing producers are made of alloy steel. These producers account for roughly two-thirds of the domestic output of balls of alloy steel. Almost all carbon balls are produced by independent firms. Alloy balls, in contrast with carbon balls, are much more precise and costlier to produce. Alloy balls are almost always required for ground bearings, whereas carbon balls can be used in unground bearings.

Four firms--two independent producers of balls. \* \* \* and two integrated-bearing producers \* \* \*--accounted for more than half of all production of alloy balls during the period 1968-72. Two firms, \* \* \*, both of which are independent producers of balls, accounted for about \* \* \* of the carbon balls produced in each year.

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<sup>1/</sup> During the period 1968-72, at least three establishments producing antifriction balls were closed.

### U.S. consumption

A precise measure of consumption of antifriction balls is impossible because the quantity of balls imported as parts of complete ball bearings cannot be assessed.

Apparent consumption of carbon and alloy balls followed different trends from 1968 to 1972 (table 9). (Apparent consumption is slightly understated in table 9.) Consumption of carbon balls declined from 12.1 billion units in 1968 to 10.7 billion units in 1972, whereas consumption of alloy balls increased from 3.7 billion units in 1968 to 4.2 billion units in 1972.

The decline in consumption of carbon balls was due, in part, to a decline in military expenditures after 1969. Significant purchases of carbon balls for defense purposes were made during the U.S. involvement in the Vietnam war. The increase in consumption of alloy balls was most likely due to a growing demand for applications other than ball bearings.

Imports of carbon balls never exceeded 2 percent of consumption in any one year during the period 1968-72. Imports of alloy balls, as a ratio to consumption, ranged from about 14 percent to about 22 percent during that period.

### U.S. production and shipments

Domestic production of all antifriction balls ranged from 10.8 billion units in 1971 to 16.7 billion in 1969, and was 14.3 billion units in 1972 (table 10), according to questionnaire returns. The

decline in total production reflected the decline in the production of carbon steel balls, which accounted for 75 to 80 percent of U.S. production of antifriction balls. (Production of carbon balls is slightly understated for 1968 and 1969 because of plant closings during those years.) Production of alloy balls increased in every year except 1971, rising from 2.9 billion units in 1968 to 3.7 billion units in 1972, representing an increase of 28 percent.

Whereas almost all carbon balls are produced for sale, a significant proportion of alloy balls are produced for captive consumption, although that proportion declined from 45 percent in 1968 to 29 percent in 1972. (For data on captive consumption, see table 11.) Almost all captive production was for use in ball bearings.

Roughly two-thirds of all alloy balls were produced by manufacturers of ball bearings; the other third were produced by independent establishments. Almost all of the production of carbon balls came from independent establishments.

The proportion of domestically produced balls used in ball bearings grew from 47 percent in 1968 to 53 percent in 1972 (for basic data see table 12). The proportion of alloy balls going into ball bearings is believed to be somewhat greater than that of carbon balls.

Shipments of both carbon and alloy balls followed trends similar to those for production. Shipments of carbon balls declined at an irregular rate from 11.6 billion units, valued at \$10.0 million, in

1968 to 10.3 billion units, valued at \$11.5 million, in 1972. Shipments of alloy balls increased from 1.6 billion units, valued at \$14.1 million, in 1968 to 2.5 billion units, valued at \$17.8 million, in 1972 (table 13).

#### U.S. imports

The value of imports of antifriction balls declined from \$4.4 million in 1968 to \$3.4 million in 1971--representing a decline largely due to the drop in U.S. production of ball bearings--and then increased to \$5.6 million in 1972 (table 14). (The official statistics do not break out balls on the basis of units.) Data obtained from questionnaires indicate that three-quarters or more of all the imported balls are alloy.

Japan, the United Kingdom, and Ireland are the three most important foreign sources of balls, accounting for the great bulk of all imports. Nearly three-quarters of the imports in each year of 1968-72 were imported by U.S. producers of ball bearings and anti-friction balls. \* \* \*

#### U.S. exports

U.S. exports of antifriction balls have been small in relation to U.S. imports. The value of exports fluctuated between \$302,000 and \$1.1 million during the period 1968-72 (table 15). The biggest markets for U.S. exports during that period were Canada, the United Kingdom,

and France. Almost all U.S. exports have been of alloy steel;

\* \* \*

U.S. ball bearing producers' sources of balls

About 60 percent of the cost of procuring antifriction balls used in the domestic manufacture of ball bearings in 1972 represented U.S. bearing producers' own production of balls. That proportion remained unchanged from that of 1968 (see basic data in table below). About 25 percent of the procurement cost represented purchases from other U.S. producers, and about 15 percent represented purchases of foreign-made balls. Those percentages also showed little change between 1968 and 1972.

Ball bearings: U.S. ball bearing producers' costs of procuring antifriction balls, by sources, 1968 and 1972 <sup>1/</sup>

(In thousands of dollars)

Item	1968	1972
Balls produced by own firm <sup>2/</sup> -----	14,124	17,071
Balls purchased from other U.S. producers-----	6,012	7,650
Balls purchased from foreign sources-----	3,460	3,898
Total cost of balls used by U.S. ball bearing producers-----	23,596	28,619

<sup>1/</sup> Costs estimated by U.S. producers.

<sup>2/</sup> May be slightly understated because cost of own production probably does not include a profit margin.

Source: Compiled from responses to U.S. Tariff Commission questionnaires; responding firms account for approximately 95 percent of the value of all U.S. production of ball bearings.

### Channels of Distribution

Ball bearings, both imported and domestic, are usually sold either directly to original-equipment manufacturers (OEM) or indirectly to the replacement market through distributors. However, sales to some customers, such as engine and water-pump rebuilders, are often made directly even though these customers are really part of the replacement market. The OEM market is by far the largest market, especially for importers. However, the replacement or "after" market is attractive because of the higher markups on sales to distributors.

Distributors generally do not act as exclusive agents for a single bearing company but often carry the product lines of two or more bearing competitors, as well as products other than bearings. Types of distributors range from wholesalers of general equipment to specialty wholesalers, such as automotive wholesalers.



## Pricing Practices

Prices of ball bearings sold by the larger suppliers to OEM accounts are normally negotiated. Sometimes the seller agrees to supply the customer's requirements at fixed prices for periods as long as a year. Delivery is then spaced according to the customer's needs.

Most of the larger suppliers absorb freight charges unless the shipment is less than a certain minimum, varying from 200 to 500 pounds. However, most shipments made by these suppliers are greater than the minimum required for prepayment of transportation costs. Smaller suppliers sometimes sell f.o.b. point of shipment, requiring the customer to pay transportation costs.

Prices of ball bearings sold to distributors are generally quoted unit list prices. For antifriction balls, the shipper absorbs the low freight charges associated with most shipments. Prices of balls are quoted per thousand balls.

## Prices

Recipients of Commission questionnaires were asked to report their lowest net selling prices (f.o.b. their point of shipment in the United States) during each 6-month period from 1968 to 1972 for five standard models of ball bearings and for two standard sizes of alloy steel balls. Prices were requested for each category of radial bearings in the Tariff Schedules of the United States Annotated and for a bearing with an integral shaft. For each model of bearings, respondents provided prices on sales to the class of customer to which they sold the largest quantity during the 5-year period. Sellers of antifriction balls reported prices on sales to bearing producers only.

The data obtained are presented in the form of weighted averages in tables 16 and 17. All the data are for ground bearings only. All the prices shown for importers represent Japanese-made bearings, except the prices of the miniature-size bearing which include the experience of a Swiss-made bearing.

Ball bearings

Imported Japanese bearings generally undersold comparable domestic bearings by substantial margins throughout 1968-72. The data show that only for a miniature radial bearing and an integral-shaft bearing did prices of domestic bearings compete favorably with those of Japanese bearings. For every comparison of radial bearings over 9 mm--bearings which constitute the great preponderance of the total market--bearings from Japan undersold comparable domestic bearings throughout the period

by margins ranging roughly from 15 to 50 percent. These margins tended to become greatest in 1971 and 1972, when prices of domestic bearings reached their highest points since 1968.

In spite of the extent to which most Japanese bearings undersold domestic bearings and in spite of a slackening demand for ball bearings during 1970 and 1971, prices of domestic bearings generally increased, though somewhat irregularly, throughout the period. The increased prices occurred in contrast to prices of Japanese bearings, which either declined or increased only slightly during the 5-year period. The increase in the prices of U.S. bearings can probably be attributed to sharply increased material and labor costs, which outstripped whatever gains were made in labor productivity. (For a discussion of material and labor costs and labor productivity, see pp. A-58-60.)

The rate of increase in the prices of domestic bearings after 1968, however, did not equal the rate of increase in prices of all durable manufactures and of general purpose machinery and equipment--groups of which ball bearings are a part. The relationship between the prices of high-volume domestic bearings sold to OEM accounts and the prices of broader product groups is shown in the table on the following page.

The trend in the prices of domestic bearings reflected in the text table differs from that which emerges from a study of price indexes over a longer period, 1963-72. Table 18, which shows price indexes published by the Bureau of Labor Statistics (BLS), indicates that the prices of two radial bearings--prices which are believed to represent only U.S.-made bearings--declined over the period 1963-67 and then turned upward

Ball bearings: Price indexes of selected U.S.-made ball bearings sold to OEM customers and BLS price indexes for all durable manufactures and for general purpose machinery and equipment, 1968-72

(Jan.-June 1968 = 100 for ball bearings: 1968 = 100  
for broader product groups)

Period	U.S.-made ball bearings sold to:				All durable manufactures	General purpose machinery and equipment
	OEM customers					
	Model No. 6203	Model No. 6205	Model No. 6206	Model No. 6207		
1968:						
Jan.-June----	100.0	100.0	100.0	100.0	100.0	100.0
July-Dec-----	100.0	100.0	98.9	101.4		
1969:						
Jan.-June----	101.9	103.4	102.3	100.0	104.1	103.7
July-Dec-----	111.3	104.2	106.8	104.2		
1970:						
Jan.-June----	117.0	104.2	101.1	106.2	108.3	110.2
July-Dec-----	117.0	107.6	101.1	106.2		
1971:						
Jan.-June----	126.4	105.0	108.0	112.5	113.2	115.4
July-Dec-----	124.5	107.6	108.0	111.5		
1972:						
Jan.-June----	111.3	100.0	111.4	116.7	117.7	118.5
July-Dec-----	109.4	105.0	110.2	116.7		

Source: Indexes of prices of ball bearings derived from table 16.  
Indexes of broader product groups obtained from table 18.

during the period 1968-72, whereas prices of the broader product groups increased rather consistently over the 10-year period. <sup>1/</sup>

The prices of Japanese bearings generally exhibited little upward movement over the period 1968-72 and did not keep pace with rising costs of importing (p. A-49). Moreover, the effect of currency changes during 1971 and 1972 was not appreciably reflected in the prices of imported Japanese bearings during that period, according to data obtained by questionnaire (see table below). The increase in the prices of these high-volume Japanese bearings was small in relation to the dollar/yen exchange rate, probably because of the intense competition which characterizes the bearing market.

Ball bearings: Weighted averages of lowest prices received by U.S. importers importing from Japan, on sales to OEM accounts in comparison with changes in yen/dollar rate, by 6-month period, 1971 and 1972

6-month period ending--	Price per unit for Model No.--				Dollars per 100 yen
	6203	6205	6206	6207	
June 30, 1971-----	\$0.42	\$0.67	\$0.71	\$0.77	\$0.280
Dec. 31, 1971-----	.42	.63	.71	.79	.318
June 30, 1972-----	.43	.62	.72	.78	.332
June 30, 1972-----	.44	.71	.73	.79	.331

Source: Prices obtained from table 16. Yen/dollar rate obtained from IMF, International Financial Statistics.

<sup>1/</sup> The greater increase shown in the BLS indexes for radial bearings than that shown in the indexes for bearings in the table on p. A-46 can be explained by the fact that different bearings were sampled and/or a smaller sample was used.

Information obtained in the investigation indicates that at least two of the largest importers of Japanese bearings \* \* \* have raised prices materially in 1973 in order to compensate for greater costs caused by the recent devaluation of the dollar and the floating of the yen, which increased the value of 100 yen to about \$0.38 in early 1973. In addition, those two importers have attempted to renegotiate prices of long-term contracts established during 1972 in order to pass on the higher costs which were incurred after the contracts were made.

#### Antifriction balls

Sales prices were requested for two sizes of alloy steel balls-- 17/64-inch and 7/16-inch--which were sold to producers of ball bearings. These two sizes are used in two of the highest volume bearings, models Nos. 6203 and 6207. \* \* \* only [one] importer responding to the questionnaires \* \* \* indicated sales of the 17/64-inch ball \* \* \* and only \* \* \* [two] reported sales of the 7/16-inch ball.

The data show that prices of U.S.-made balls declined unevenly during the period 1968-72 and that prices of imported balls--which remained almost constant--were usually substantially less than those of domestic balls during almost every period reviewed (table 19).

## Cost of Importing Ball Bearings from Japan

The costs of importing high-volume ball bearings from Japan in December 1969 and December 1972 are shown in table 20. The average unit cost <sup>1/</sup> of importing a 6203 model increased from \$.335 to \$.385 between late 1969 and late 1972, an increase of 15 percent. The average unit cost of importing a 6207 model increased from \$.631 to \$.674 during that same period, an increase of about 7 percent.

The major cause of those increases was an increase in the f.o.b. foreign port value, which can be attributed to an increase in the cost of the yen. The yen increased by about 19 percent during the relevant period, the approximate rate by which the foreign value of the 6203 increased but significantly greater than the rate of increase in the foreign value of the 6207.

The burden of the duty, as a percentage of the total cost of importing, decreased for both models during the period studied. The duty declined from 12.5 percent to 9.1 percent in the case of the 6203 and from 11.3 percent to 9.3 percent in the case of the 6207. Ocean freight and insurance, which represents less than 5 percent of the total delivered cost, increased relatively in the case of the 6207, but remained constant in relative terms in the case of the 6203. (For a discussion of ocean freight rates, see p. 64). Wharfage and U.S. inland freight, also a very small element of cost, declined in both cases as a component of the total cost.

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<sup>1/</sup> Cost delivered to importer's warehouse.

Comparison of the Cost of Importing From Japan with a Major  
U.S. Producer's Cost of Production

A comparison of the average unit cost of importing two high-  
volume bearings from Japan in 1972 with \* \* \* [a major U.S.  
producer's] cost of producing these models in that year reveals a  
substantial difference between the cost of importing and \* \* \*  
cost of production, \* \* \* [in favor of imported bearings].

\* \* \*

\* \* \* \* \*



Comparison of 1972 delivered costs of 2 principal models imported from Japan, based on the 1930, 1967, and 1972 rates of duty, with the cost of production of a major U.S. producer 1/

(Cost per unit)

Item	Model No. 6203	Model No. 6207
Invoice value, f.o.b. foreign port---	\$0.336	\$0.572
Ocean freight, insurance, custom- house, brokerage fees, handling charges, and transportation from port of entry to importers' warehouse-----	.014	.039
Duty:		
Based on the 1930 rate <u>2/</u> -----	.164 (48.8%)	.327 (57.2%)
Based on the 1967 rate <u>2/</u> -----	.055 (16.3%)	.097 (17.0%)
Based on the 1972 rate-----	.035 (10.4%)	.063 (11.0%)
Total delivered cost of imports in 1972:		
Based on the 1930 rate of duty-----	.514	.938
Based on the 1967 rate of duty-----	.405	.708
Based on the 1972 rate of duty-----	.385	.674
Production costs of major U.S. producer in 1972-----	* * *	* * *
U.S. producer's manufacturing cost more or (less) than importers' cost:		
Based on the 1930 rate of duty-----	* * *	* * *
Based on the 1967 rate of duty-----	* * *	* * *
Based on the 1972 rate of duty-----	* * *	* * *

1/ Costs shown for imports represent average costs for representative shipments nearest Dec. 31, 1972; \* \* \*.

2/ Ad valorem equivalents of the 1930 and 1967 rates of duty are based upon imports in 1972.

Source: U.S. importers' average costs are derived from table 20.

Costs of Producing Ball Bearings in Japan and  
in the United States

Production **cost** data provided by the Japan Bearing Industrial Association for the years 1969 and 1972 indicate that the average costs of producing two standard high-volume ball bearings in Japan ranged from \* \* \* of the costs of a major U.S. producer, \* \* \*. Although the accounting methods in the two countries probably are not strictly comparable, the data shown below do provide a means of rough comparison. The Japanese data portray the range of the average costs of the four major manufacturers of ball bearings.

Ball bearings: Production costs of 4 major manufacturers in Japan, by item, and the full standard manufacturing costs of a major U.S. producer, \* \* \* 1969 and 1972

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## Employment

Employment in the U.S. industry producing ball bearings and parts, including antifriction balls, followed the same general trend as production (table 1). 1/ The number of persons employed in the establishments manufacturing products subject to this investigation declined irregularly from 40,965 in 1968 to 35,547 in 1972, or by 13 percent, according to questionnaire returns from firms which accounted for roughly 95 percent of the value of all U.S. production of the subject items (table 21). The number of production and related workers engaged in the manufacture of the subject products also declined irregularly--from 21,405 in 1968 to 17,007 in 1972, or by 21 percent. \* \* \*

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1/ Well over 90 percent of the persons employed in the U.S. industry producing ball bearings and parts, including antifriction balls, are workers in establishments producing ground ball bearings.

The 21-percent decline between 1968 and 1972 in the number of production and related workers producing ball bearings and parts was considerably greater than the decline in employment experienced during the same period by the industries comprising machinery, excluding electrical, and all durable manufactures. Although the trends were basically the same, the table below shows that the decline in employment in the machinery industry during those years was only 8 percent, and that in the industry producing all durable manufactures was only 6 percent.

Average number of production and related workers engaged in making ball bearings and parts, including antifriction balls, and average number of such workers producing all durable manufactures and machinery, excluding electrical, in the United States, 1968-72

(In thousands)

Year	Production and related workers engaged in making--		
	All durable manufactures	Machinery, excluding electrical	Ball bearings and parts
1968-----	8,457	1,342.5	21.4
1969-----	8,651	1,382.2	21.5
1970-----	8,042	1,322.8	19.8
1971-----	7,598	1,178.4	16.1
1972-----	7,915	1,235.5	17.0

Source: Employment and Earnings, Bureau of Labor Statistics, and table 21.

The number of man-hours worked by production and related workers on all products manufactured in the establishments in which ball bearings and parts were produced declined unevenly from 69.4 million in 1968 to 61.3 million in 1972, or by 12 percent (table 22). The number of man-hours worked by such personnel on the subject products showed a similar

uneven decline from 44.4 million in 1968 to 36.2 million in 1972, or by 19 percent. \* \* \*

#### Employment in antifriction ball establishments

Employment data for six antifriction ball establishments reporting separately--establishments which accounted for roughly 50 percent of the total quantity of balls produced annually--followed a pattern similar to that for the entire industry. The table presented below indicates that the number of persons employed in these establishments 1/ declined from 860 in 1968 to 676 in 1972, or by 21 percent, about the same rate of decline as in the number of production and related workers employed in the production of balls during that period. 2/

The number of man-hours worked by production and related workers on all products in these establishments also showed an irregular decline of 24 percent, compared with a decline of 16 percent in the number of man-hours worked on the subject products.

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1/ The production of antifriction balls accounted for well over 80 percent of the number of man-hours expended annually on products manufactured in these establishments.

2/ These data do not include the experience in 1972 of Waterbury Steel Ball Co., Inc., a small producer \* \* \*. This company closed its plant in June 1972 and did not report employment data for that year.

Antifriction balls: Average number of employees and number of man-hours worked by production and related workers in ball establishments reporting separately, 1968-72

Year	Number of employees		Man-hours worked by production and related workers on--	
	All persons	Production and related workers engaged in the manufacture of anti-friction balls	All products	Antifriction balls
			Thousands	Thousands
1968----	860	686	1,488.5	1,245.8
1969----	892	711	1,581.8	1,439.0
1970----	835	663	1,461.7	1,333.2
1971----	735	582	1,156.2	1,039.2
1972----	676	537	1,130.4	1,052.5

Source: Compiled from responses to U.S. Tariff Commission questionnaires; responding firms account for approximately 50 percent of the annual quantity of U.S. production

### Labor productivity

Indexes of output per man-hour were constructed for production and related workers engaged in the manufacture of ground ball bearings in the United States. The figures shown in the table below were adjusted to exclude man-hours spent on the production of antifriction balls because integrated-bearing producers that sell balls in addition to those produced for their own use were unable to segregate man-hours worked on balls from those worked on bearings. The construction of these indexes implicitly assumes little or no change in the product mix, which appears to be roughly true.



The data shown below indicate that labor productivity in the U.S. ball bearing industry declined slightly from 1968 to 1970, but then increased appreciably in 1971 and 1972. The downturn can be partly explained by some underemployment during 1969 and 1970, which followed years of high domestic production. The upturn in 1971 probably reflects in large part the completion of the reduction in the labor force, which had begun in 1970, and to some extent improvements in mechanization. The productivity gain in 1972 no doubt reflects further improvements in mechanization and higher production levels.

Ball bearings: Indexes of output per man-hour for production and related workers in the U.S. and Japanese ball bearing industries, 1965-72

(1968 = 100)			
Year	: Output per man-hour for production and : related workers employed in the ball : bearing industry in--		
	: United States	:	: Japan
1965-----	1/	:	60.6
1966-----	1/	:	70.2
1967-----	1/	:	76.5
1968-----	100.0	:	100.0
1969-----	98.0	:	111.2
1970-----	97.7	:	137.0
1971-----	109.2	:	138.9
1972-----	121.1	:	1/

1/ Not available.

Source: Japan Yearbook of Labor Statistics, Japan Ministry of Finance, and U.S. Tariff Commission questionnaires.

The data in the table show that productivity gains in the U.S. ball bearing industry were substantially smaller than those in the Japanese industry during the period 1968-71. The rapid growth in productivity in the Japanese industry was partly attributable to a rapidly growing volume of production during that period.

#### Labor and material costs

Labor and material costs increased greatly in the domestic ball bearing industry during the period 1968-72, as shown in the following table. Indexes of labor costs are based upon wages paid and other compensation provided by U.S. producers. The indexes of material costs reflect the wholesale-price index for all steel-mill products, which is a rough indicator of material costs in the U.S. ball bearing industry.

Ball bearings and parts, including antifriction balls: Indexes of labor and material costs in the U.S. industry, 1968-72

(1968=100)		
Year	Labor costs	Material costs
1968-----	100.0	100.0
1969-----	105.7	104.8
1970-----	113.5	111.5
1971-----	121.4	120.0
1972-----	127.8	127.3

Source: Labor costs compiled from responses to U.S. Tariff Commission questionnaires; material costs reflect wholesale price indexes of all steel-mill products in Wholesale Prices and Price Indexes, Bureau of Labor Statistics.

Wage rates

The average hourly cash earnings for production and related workers in the U.S. ball bearing industry are shown below in relation to the average hourly cash earnings for the same type of personnel in the entire Japanese bearing industry and in relation to broader United States industry groups. The data presented in the table do not include fringe benefits, such as retirement allowances or other employer contributions to employee funds.

The data show steadily increasing wage rates for all industries. The greatest growth occurred in the Japanese industry, where the wage rate increased by 70 percent, in terms of yen, between 1968 and 1972. However, the average wage rate in the Japanese industry varied from \* \* \* [about one-fourth to two-fifths] of the rate in the U.S. ball bearing industry. The wage rates in the U.S. ball bearing industry increased from \$3.48 to \$4.27 per hour between 1968 and 1972, representing an increase of 23 percent, which was slightly less than the increase in rates for all durable manufactures and for all machinery, excluding electrical. \* \* \*. Fringe benefits in the U.S. ball bearing industry, as a percent of total labor cost, increased from 14 to 18 percent between 1968 and 1972.

Ball bearings and parts, including antifriction balls: Average hourly cash earnings of production and related workers in the U.S. industry in comparison with average hourly cash earnings of such personnel in broader U.S. industry groups and in the Japanese bearing industry, 1968-72 <sup>1/</sup>

Year	U.S. industries			Japanese bearings industry, including parts <sup>2/</sup>	
	All durable manufactures	All machinery, excluding electrical	Ball bearings, including parts	Yen	Dollars
1968-----	\$3.19	\$3.36	\$3.48	***	***
1969-----	3.38	3.58	3.67	***	***
1970-----	3.55	3.77	3.87	***	***
1971-----	3.79	3.99	4.06	***	***
1972-----	4.05	4.27	4.27	***	***

<sup>1/</sup> Does not include fringe benefits such as retirement allowances and other employer contributions to employee funds. For the Japanese industry, data reflect regular bonuses paid workers but do not include temporary cash payments.

<sup>2/</sup> Includes average hourly cash earnings of employees producing roller bearings. Figures are estimated by the U.S. Embassy in Tokyo. Yen are converted to dollars at the annual average rate.

Source: Employment and Earnings, Bureau of Labor Statistics, responses to U.S. Tariff Commission questionnaires, and information from U.S. Embassy, Tokyo, 1973.

## Regulations Affecting Government Purchases

In 1964 and again in 1969 the Antifriction Bearing Manufacturers Association (AFBMA) has applied to the Office of Emergency Preparedness (OEP) for protection from imports of ball bearings. The first application pertained to all bearings, whereas the latest one focused on all miniature ball bearings and on all instrument ball bearings of ABEC 5 and over. Both times its application was denied. \* \* \*

In April or May 1971, Defense Procurement Circular No. 87 required that, with minor exception, all DOD purchases of miniature and instrument ball bearings be of domestic origin unless not in the Government's interest. [1/] The provisions of that circular were incorporated into sections 1-315.3 and 7-104.38 of an Armed Services Procurement Regulation (ASPR) in November 1971.

In a more recent circular (No. 106, dated December 5, 1972), DOD required that all specialty metals, with certain exceptions, supplied to it or incorporated into articles purchased by it, be of U.S. origin if the contract is for more than \$2,500. Since all ground ball bearings are made of specialty steel, the regulation theoretically should prohibit all DOD purchases of foreign-made ball bearings, regardless of whether or not miniature or instrument ball bearings. This restriction

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1/ For purposes of DOD, the mobilization base includes both the United States and Canada.

was mandated by the DOD Appropriation Act of fiscal year 1973 and has been incorporated into an ASPR. The practical effect of the aforementioned restrictions has been difficult to ascertain because so many DOD contracts involve subcontracting by the original contractor and because ball bearings are such small components of final items of manufacture. Except for direct DOD purchases, the enforcement of these provisions is difficult, if not impossible. \* \* \*

### Ocean-Freight Rates

#### Rates from Japan to the United States

Ocean-freight rates charged by conference carriers on shipments of ball bearings and parts thereof from Japan to United States' ports have increased steadily since 1967. The Japan/Atlantic and Gulf Freight Conference rate from Japan to the Atlantic and gulf ports increased from \$70.50 per short ton (or 40 cubic feet, whichever yields the greater revenue) in late 1967 to \$116.25 in early 1973 (table 23). The Trans-Pacific Freight Conference rate from Japan to the Pacific ports increased from \$51.50 to \$94.00 during the same period (table 24).

Rates established by independent carriers in those same trade areas fluctuated somewhat during the early part of the period 1968-73, but increased without exception since 1971. Much of the recent increase was due to currency adjustments. Rates set by independent carriers were usually considerably lower than those set by the conferences in both trade areas. However, it is believed that most shipments are made via conference carriers.

Rates from West Germany to the United States

Ocean-freight rates on shipments of ball bearings and parts from Bremen and Hamburg, West Germany, to U.S. North Atlantic ports have fluctuated considerably since 1967 (table 25). The conference rate was declared open from January 1968 to January 1971 because member carriers could not agree on a fixed rate. Since then the conference rate has increased irregularly from \$52.20 to \$62.50 per long ton. The rate charged by a major independent carrier, the Meyer Line, declined irregularly from \$85.00 to \$62.50 per long ton during the period 1968-73.

Profit-and-Loss Experience of U.S. Producers of  
Ground Ball Bearings

The data reported in this section represent the profit-and-loss experience of 15 U.S. producers that accounted for about 70 percent of the total sales value, including captive sales, of all ground ball bearings shipped by U.S. producers during the period 1968-72.

Five of the 15 producers manufactured only ball bearings in their establishments in which ground ball bearings were produced. The other 10 producers also manufactured other products. Five of the 10 producers were able to segregate their ball bearing operations from those of other products. For the remaining five producers, net sales of ground ball bearings were sufficiently high  $\frac{1}{--}$  as a percent of total establishment sales--that their total establishment operations can be considered indicative of their ground ball bearing operations.

The accounting year for nine producers ended on December 31, and the accounting year for each of the other six producers ended on January 31 or October 31, or between those dates.

For the most part, bearing manufacturers do not treat their ball bearing and roller bearing operations as separate profit centers. Thus, several other producers of ground ball bearings, including one large producer, were unable to submit usable profit-and-loss data.

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<sup>1/</sup> Net sales of ground ball bearings, as a percentage of total establishment sales, ranged from about 80 percent for one producer, in each of the years 1968-72, to more than 99 percent for another producer for the same period.



Overall operations of the establishments in which ground ball bearings are produced

Total net sales of all products produced in the establishments in which ground ball bearings were produced increased from \$451.0 million in 1968 to \$468.4 million in 1969. They then declined to \$424.7 million in 1971 before increasing sharply to a 5-year high of \$481.5 in 1972 (table 26). Net operating profit declined steadily from \$56.3 million in 1968 to \$23.9 million in 1971 and then increased to \$28.2 million in 1972. As a share of net sales, net operating profits averaged 12.5 percent in 1968, 9.9 percent in 1969, 8.7 percent in 1970, 5.6 percent in 1971, and 5.9 percent in 1972.

Net profit before income taxes followed the same trend as net operating profit--declining steadily from \$54.0 million in 1968 to \$22.0 million in 1971 before increasing to \$26.4 million in 1972. As a share of net sales, net profits before income taxes averaged 12.0 percent in 1968, 9.3 percent in 1969, 8.3 percent in 1970, 5.2 percent in 1971, and 5.5 percent in 1972.

The principal elements of the item "other income or expense, net"--which makes up the difference between net operating profit and net profit before income taxes--were interest income, interest expense, gain or loss on the sale of assets, employee profit-sharing expense, income of subsidiaries, and corporate charges levied as a percentage of capital investment.

Two producers sustained operating and net losses in each of the years 1968-70, and five producers sustained losses in 1971 and 1972. On an individual company basis, one producer sustained a loss in each of the years 1968-72, another in each of the years 1969-72, another in the years 1968, 1971, and 1972, and another in 1971 and 1972. One producer sustained a loss only in 1971 and another only in 1972.

In summary, sales recovered in 1972 from the decline of 1970 and 1971, but profits, although up from the 5-year low of 1971, were still only about half of what they were in 1968.

#### Ground ball bearings

Total net sales of ground ball bearings for the 15 producers increased from \$341.5 million in 1968 to \$357.7 million in 1969 and then declined to \$313.6 million in 1971 before increasing to \$355.5 million in 1972 (table 27). <sup>1/</sup> Net operating profit declined steadily from \$44.7 million in 1968 to \$18.7 million in 1971 and then increased to \$23.4 million in 1972--equal to about 52 percent of the 1968 net operating profit. As a share of net sales, net operating profits averaged 13.1 percent in 1968, 10.3 percent in 1969, 9.4 percent in 1970, 5.9 percent in 1971, and 6.6 percent in 1972.

Net profit before income taxes, following the same trend as net operating profit, declined steadily from \$43.3 million in 1968 to

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<sup>1/</sup> Actually, ground ball bearings accounted for about 93 percent of the sales during the period 1968-72; unground ball bearings, for about 2 percent; antifriction balls, for 1 percent; and other products, for 4 percent (see table 27).

\$17.5 million in 1971 and then increased to \$22.4 million in 1972. As a share of net sales, net profits before income taxes averaged 12.7 percent in 1968, 9.7 percent in 1969, 9.1 percent in 1970, 5.6 percent in 1971, and 6.3 percent in 1972.

During the period 1968-72, profitability varied greatly from one producer to another. Most producers, however, felt the profit pinch in 1971 and 1972. Companies reporting operating losses during the period 1968-72 are shown, unidentified, in the following table:

Companies reporting net operating losses on their ground ball bearing operations, 1968-72

Company	1968	1969	1970	1971	1972
A-----	X	X	X	X	X
B-----		X	X	X	X
C-----	X			X	X
D-----				X	X
Total number of producers reporting losses--	2	2	2	4	4

Source: Compiled from data submitted to the U.S. Tariff Commission by U.S. producers.

All of the companies listed above also sustained net losses before income taxes in each of the years in which they sustained net operating losses. In addition to these companies, one producer reported a small operating profit in 1971 but sustained a net loss after interest expense. The same was true for another company in 1972.

As with the overall establishment data, the principal elements of the item "other income or expense, net" (table 27), which makes up the difference between net operating profit and net profit before income taxes, were interest income and expense, gain or loss on the sale of assets, profit-sharing expense, income of subsidiaries, and corporate charges levied as a percentage of capital investment.

In summary, sales of ground ball bearings recovered in 1972 after declining in 1970 and 1971. However, while profits were up in 1972 compared with those in 1971, they were still about half of what they had been in 1968.

#### Individual company profit-and-loss data

Profit-and-loss data on an **individual** company basis, for both the overall operations of the establishments in which ground ball bearings were produced and for ground ball bearing operations alone, are presented in tables 28 and 29. \* \* \* [Five] producers--Fafnir Bearing Co., Marlin Rockwell, SKF Industries, the New Departure-Hyatt Bearings Division of General Motors Corp. and the Federal Mogul Corp.--dominated the U.S. ground ball bearing industry during the period 1968-72. These \* \* \* [five] producers accounted for about two-thirds of the total sales value, including captive sales, of ground ball bearings shipped by U.S. producers during the period 1968-72. The New Departure-Hyatt Bearings Division of General Motors was not able to furnish profit-and-loss data on its ball bearing operations, but the data for the other

\* \* \* [4] producers on their ground ball bearing operations, in comparison with those of the other \* \* \* [11] producers, are summarized in the following table:

\* \* \* \* \*

As seen in the preceding table, the \* \* \* [4] producers' ground ball bearing operations were, in the aggregate, more profitable in each of the years 1968-72 than those of the other \* \* \* [11] producers. The \* \* \* [4] producers' combined operating profit for 1972 was, however, less than 70 percent of their combined operating profit for 1968.

\* \* \* \* \*

Four producers--Barden, MPB, New Hampshire Ball Bearing, and Schatz--specialize in miniature and instrument-type ground ball bearings. Profit-and-loss data for these 4 producers on their ground ball bearing operations are summarized in the following table along with profit-and-loss data for the other 11 producers of ground ball bearings.

Profit-and-loss experience of 4 producers of miniature and instrument-type ground ball bearings and that of the other 11 producers of ground ball bearings, 1968-72

Item and year	Net sales	Net operating profit	Ratio of net operating profit to net sales
	<u>1,000</u> <u>dollars</u>	<u>1,000</u> <u>dollars</u>	<u>Percent</u>
Producers of miniature and instrument-type ground ball bearings:			
1968-----	52,218	9,212	17.6
1969-----	51,629	6,137	11.9
1970-----	51,184	6,415	12.5
1971-----	43,131	3,153	7.3
1972-----	47,188	5,616	11.9
The other 11 producers:			
1968-----	289,249	35,441	12.3
1969-----	306,077	30,540	10.0
1970-----	294,956	26,249	8.9
1971-----	270,436	15,498	5.7
1972-----	308,320	17,815	5.8

Source: Compiled from data submitted to the U.S. Tariff Commission by U.S. producers.

The 4 producers' miniature and instrument-type ground ball bearing operations combined were more profitable--as a ratio of operating profit to sales--than the ground ball bearing operations of the other 11 producers. \* \* \*

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Profit-and-Loss Experience of U.S. Producers  
of Antifriction Balls

The data reported in this section represent the profit-and-loss experience of four producers that accounted for about 57 percent of the total sales value of all antifriction balls shipped on the open market by U.S. producers during the period 1968-72.

Two of the four producers manufactured only antifriction balls, another manufactured only antifriction balls in its establishment in which such balls were produced, and the fourth producer manufactured other products in addition to antifriction balls in its establishment but was able to segregate its antifriction ball operations from its other operations.

Overall operations of the establishments in which antifriction balls  
are produced

As three of the four producers manufactured only antifriction balls in their establishments in which such balls were produced, the profit-and-loss data for their overall operations reflect predominantly their antifriction ball operations.

During the period 1968-70, sales and profit for the four producers' establishments were rather stable. In 1971, however, both sales and profit declined sharply. Sales returned to their 1968-70 level in 1972, but profit, although up from the break-even point of 1971, was less than half of what it had been in 1968-70. Aggregate net sales ranged from \$20.0 million in 1969 down to \$14.8 million in

1971 (table 30). Net operating profit ranged from \$2.2 million--equal to 11.0 percent of sales--in 1969 down to the break-even point in 1971.

Net profit or loss before income taxes varied little from net operating profit--ranging from a profit equal to 11.0 percent of net sales in 1969 to a loss equal to 0.5 percent of net sales in 1971.

One producer sustained losses in 1970 and 1971, and another sustained losses in 1971 and 1972.

#### Antifriction balls

The four producers' net sales of antifriction balls increased from \$16.8 million in 1968 to \$19.2 million in 1969, declined to \$17.4 million in 1970, and then declined sharply to \$14.2 million in 1971 before increasing to \$18.5 million in 1972 (table 31). Net operating profit or loss, following the same trend as net sales, increased from a profit of \$1.7 million in 1968 to \$2.0 million in 1969, then declined slightly to \$1.9 million in 1970 and sharply to a loss of \$81,000 in 1971, before increasing to a profit of \$728,000 in 1972. Expressed as a share of net sales, net operating profits averaged 10.1 percent in 1968, 10.5 percent in 1969, 10.7 percent in 1970, and 3.9 percent in 1972. The net operating loss was equal to 0.6 percent of sales in 1971.

Net profit or loss before income taxes varied little from net operating profit or loss. Expressed as a share of net sales, it ranged from a profit of 10.7 percent in 1970 to a loss of 1.0 percent in 1971.

One producer sustained both operating and net losses in each of the years 1968-72, and another producer, who made good profits during 1968-70, sustained operating and net losses in both 1971 and 1972.

\* \* \* \* \*



APPENDIX A  
STATISTICAL TABLES



Table 1.--Ground ball bearings: U.S. production, aggregate U.S. producers' shipments, domestic shipments, captive shipments, U.S. exports of domestic merchandise, U.S. imports for consumption, and apparent U.S. consumption, 1968-72

Year	(Quantity in thousands of units; value in thousands of dollars)												
	Production	Aggregate producers' shipments	Domestic shipments	Captive shipments	U.S. exports 2/	U.S. imports 2/	Apparent U.S. consumption	Ratio of imports to--					
								Producers' shipments plus imports minus exports	Domestic shipments plus imports minus exports	U.S. exports 2/	U.S. imports 2/	U.S. consumption	
1968--	272,228	272,582	200,203	58,027	14,352	92,138	350,368				26.3	33.1	
1969--	272,858	275,390	197,019	63,562	14,809	98,621	359,202				27.5	35.1	
1970--	236,974	238,292	170,250	52,935	15,107	110,014	333,199				33.0	41.5	
1971--	216,310	222,486	159,806	49,108	13,572	121,177	330,091				36.7	45.3	
1972--	262,881	267,841	191,067	62,394	14,380	143,920	397,381				36.2	44.9	
								Quantity					
								Value					
1968--	3/ 465,768	339,237	96,536	29,995	43,305	479,078				9.0	12.3		
1969--	3/ 486,736	346,913	109,020	30,803	46,895	502,828				9.3	12.9		
1970--	3/ 459,607	322,071	104,301	33,235	54,339	480,711				11.3	15.8		
1971--	3/ 403,398	288,125	84,464	30,809	61,105	433,694				14.0	19.2		
1972--	3/ 481,112	333,086	114,376	33,650	87,781	535,243				16.4	22.7		

1/ Excludes captive and export shipments.

2/ Estimated in part; includes small quantities of unground ball bearings.

3/ Not available.

Source: Production, aggregate producers' shipments, domestic shipments, and captive shipments compiled from reports submitted to the U.S. Tariff Commission by domestic producers of ball bearings; imports and exports compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 2.--Ground ball bearings: Aggregate U.S. producers' shipments (domestic shipments plus captive shipments plus U.S. exports), U.S. imports for consumption, U.S. exports of domestic merchandise, and apparent U.S. consumption, by types and sizes, 1968-72

(In thousands of units)								
Item	Integral shaft	Radial				Over 52 mm	All other	Total
		Less than 9 mm	9 mm and over, but not over 30 mm	Over 30 mm but not over 52 mm	Over 52 mm			
1968:								
Aggregate producers' shipments---	18,988	8,573	62,702	90,455	71,518	20,346		272,582
U.S. imports-----	1/ 1	1/ 1	1/ 1	1/ 1	1/ 1	1/ 1	2/ 2	92,138
U.S. exports 2/-----	825	440	3,037	3,262	3,431	3,357		14,352
Apparent U.S. consumption-----	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3		350,368
Ratio of imports to apparent consumption-----	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3		26.3
1969:								
Aggregate producers' shipments---	20,987	9,159	60,431	91,160	70,509	23,144		275,390
U.S. imports-----	2/ 5,880	2,916	34,146	39,236	12,842	2,950	4/ 4	98,621
U.S. exports 2/-----	1,097	733	3,127	3,396	3,093	3,363		14,809
Apparent U.S. consumption-----	25,770	11,342	91,450	127,000	80,258	22,731		359,202
Ratio of imports to apparent consumption-----	22.8	25.7	37.3	30.9	16.0	13.0		27.5
1970:								
Aggregate producers' shipment---	20,043	7,225	51,411	75,943	61,738	21,932		238,292
U.S. imports-----	2/ 8,324	3,985	38,278	44,420	12,947	1,442	4/ 4	110,014
U.S. exports 2/-----	1,383	703	2,952	3,679	3,145	3,245		15,107
Apparent U.S. consumption-----	26,984	10,507	86,737	116,684	71,540	20,129		333,199
Ratio of imports to apparent consumption-----	30.8	37.9	44.1	38.1	18.1	7.2		33.0
1971:								
Aggregate producers' shipments---	22,622	6,520	43,025	68,675	61,703	19,941		222,486
U.S. imports-----	2/ 8,719	2,656	37,925	50,894	16,911	2,928	4/ 4	121,177
U.S. exports 2/-----	1,053	625	2,582	3,019	2,980	3,313		13,572
Apparent U.S. consumption-----	30,288	8,551	78,368	116,550	75,634	19,556		330,091
Ratio of imports to apparent consumption-----	28.8	31.1	48.4	43.7	22.4	15.0		36.7
1972:								
Aggregate U.S. producers' shipments-----	25,207	9,873	51,787	86,374	71,501	23,099		267,841
U.S. imports-----	2/ 9,215	2,695	43,720	59,326	22,723	3,884	4/ 4	143,920
U.S. exports 2/-----	1,516	431	2,444	3,220	3,196	3,573		14,380
Apparent U.S. consumption-----	32,906	12,137	93,063	142,480	91,028	23,410		397,381
Ratio of imports to apparent consumption-----	28.0	22.2	47.0	41.6	25.0	16.6		36.2

1/ Official statistics of the U.S. Department of Commerce broken down by sizes of ball bearings were not available for years prior to 1969.

2/ Estimated by the U.S. Tariff Commission.

3/ Not available.

4/ Imports from Canada of 651 thousand units in 1969, 612 thousand units in 1970, 1,144 thousand units in 1971, and 2,357 thousand units in 1972 are included in the total, but not included in the columns by types or sizes since they are not segregated in official statistics.

Note.--Apparent U.S. consumption may be slightly overstated since some of the domestic producers included in their domestic shipments ball bearings which they had imported. The ratios of imports to apparent consumption excluding captive shipments are considerably larger than those shown.



Table 3.--Ground ball bearings: U.S. production, by types and sizes, 1968-72

(In thousands of units)

Year	Integral shaft	Radial				All other	Total
		Less than 9 mm	9 mm and over, but not over 30 mm	Over 30 mm but not over 52 mm	Over 52 mm		
1968-----	18,661	8,378	61,934	93,234	71,229	18,852	272,228
1969-----	20,767	8,285	58,905	90,770	71,635	22,496	272,858
1970-----	19,965	7,126	50,230	78,638	61,148	19,867	236,974
1971-----	21,184	6,011	40,620	71,679	58,379	18,437	216,310
1972-----	23,874	8,353	49,086	90,296	70,027	21,245	262,881

Source: Compiled from reports submitted to the U.S. Tariff Commission by the domestic producers.

Table 4.--Ground ball bearings: Domestic shipments (excluding captive and export shipments), by type and sizes, 1968-72

Year	Integral shaft	Radial				All other	Total
		Less than 9 mm	9 mm and over, but not over 30 mm	Over 30 mm, but not over 52 mm	Over 52 mm		
Quantity (1,000 units)							
1968-----	10,936	8,108	50,898	64,649	48,678	16,934	200,203
1969-----	11,375	8,383	46,970	64,086	46,480	19,725	197,019
1970-----	11,074	6,499	38,696	52,931	42,415	18,635	170,250
1971-----	14,175	5,799	31,836	47,538	43,878	16,580	159,806
1972-----	14,978	8,699	39,098	59,987	48,836	19,469	191,067
Value (1,000 dollars)							
1968-----	10,577	13,287	57,787	66,394	151,189	40,003	339,237
1969-----	11,170	11,599	54,355	67,438	158,590	43,761	346,913
1970-----	11,456	9,258	47,695	60,691	151,970	41,001	322,071
1971-----	13,910	8,030	36,837	53,519	137,407	38,422	288,125
1972-----	14,819	10,748	41,247	61,361	154,204	48,707	333,086

Source: Compiled from data submitted to the U.S. Tariff Commission by the domestic producers.

Table 5.--Ball bearings: U.S. exports of domestic merchandise, by principal markets, 1955-72 1/

Year	(In thousands of dollars)																
	Canada	Mexico	United Kingdom	France	Netherlands	Brazil	West Germany	Japan	Rep. of Korea	Italy	Australia	Belgium-Luxembourg	Rep. of Argentina	South Africa	India	Other	Total
1955	4,716	764	316	390	129	378	26	51	2	108	1,056	114	469	185	277	5,194	12,175
1956	5,565	1,086	652	788	207	589	58	160	3	327	1,463	196	490	595	425	4,168	16,772
1957	5,397	927	503	891	279	1,029	65	348	9	397	1,527	210	578	375	382	4,780	17,697
1958	4,745	947	498	867	300	574	279	155	21	262	1,514	174	407	322	249	4,323	15,637
1959	6,289	1,082	667	774	320	338	260	164	44	211	1,283	171	346	401	131	4,247	16,728
1960	6,092	1,136	1,366	1,265	580	468	535	315	16	385	2,042	208	421	128	-	5,028	19,985
1961	6,205	1,231	1,457	1,904	350	415	880	307	10	547	930	-	474	115	9	5,949	20,783
1962	7,034	1,409	1,834	2,167	220	690	825	298	14	670	1,428	593	369	198	168	5,230	23,147
1963	7,806	1,397	2,052	1,993	216	853	606	345	9	762	1,482	588	433	257	546	5,220	24,565
1964	9,529	1,800	2,722	1,964	310	623	687	490	18	1,013	2,075	603	432	439	617	5,340	28,662
1965	6,918	2,233	2,025	1,657	363	582	574	540	47	928	1,691	567	504	465	852	5,166	25,112
1966	8,512	2,448	2,257	1,815	623	1,136	697	1,118	54	1,180	1,092	462	437	514	350	5,767	28,462
1967	10,460	2,379	2,628	2,017	521	564	713	820	98	981	1,422	495	498	363	490	4,750	29,199
1968	9,493	2,580	2,875	1,605	403	759	948	696	130	1,307	1,825	672	440	242	362	5,658	29,995
1969	9,532	2,737	2,656	1,802	576	1,019	682	940	125	1,057	1,559	761	438	456	223	6,240	30,803
1970	8,804	2,911	3,231	2,790	698	919	1,065	983	400	920	1,326	619	550	395	391	7,233	33,235
1971	8,465	2,715	2,330	2,102	636	800	1,245	702	856	966	1,304	468	558	310	462	6,890	30,809
1972	10,649	2,531	2,447	1,846	1,280	1,235	1,084	1,000	949	926	900	629	380	274	257	7,263	33,650

1/ Includes parts, 1955-64.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 6.--Ground ball bearings: U.S. exports of domestic merchandise, by types and sizes, 1968-72

(In thousands of units)

Year	Integral shaft	Radial				All other	Total
		Less than 9 mm	9 mm and over, but not over 30 mm	Over 30 mm, but not over 52 mm	Over 52 mm		
1968-----	825	440	3,037	3,262	3,431	3,357	14,352
1969-----	1,097	733	3,127	3,396	3,093	3,363	14,809
1970-----	1,383	703	2,952	3,679	3,145	3,245	15,107
1971-----	1,053	625	2,582	3,019	2,980	3,313	13,572
1972-----	1,516	431	2,444	3,220	3,196	3,573	14,380

Source: Estimated from reports submitted to the U.S. Tariff Commission by the domestic producers.

Table 7.--Ball bearings: U.S. imports for consumption, by principal sources, 1955-72

Year	(In thousands of dollars)										Total
	Japan	Canada	West Germany	United Kingdom	Switzerland	France	Sweden	Austria	Italy	Other	
1955	2	807	171	45	123	6	1,151	25	9	7	2,346
1956	3	231	245	56	216	6	269	21	7	3	1,057
1957	16	221	364	71	331	18	119	15	12	7	1,174
1958	17	221	663	113	232	26	156	68	32	1	1,529
1959	1,450	964	1,102	358	333	135	613	124	44	1	5,124
1960	2,314	1,179	1,464	385	522	67	473	211	96	5	6,713
1961	3,172	1,335	1,456	302	503	45	311	153	77	3	7,357
1962	6,257	1,751	2,445	534	641	92	208	305	175	7	12,415
1963	8,571	1,645	2,270	807	478	93	130	253	300	7	14,554
1964	11,563	1,970	2,620	844	455	99	127	257	448	69	18,452
1965	14,668	2,855	3,033	1,311	771	156	165	223	565	20	23,767
1966	22,340	4,559	3,451	2,213	999	102	232	270	760	280	35,206
1967	23,832	5,319	4,351	2,586	1,088	183	1,004	159	350	282	39,153
1968	29,461	5,376	3,965	2,140	939	170	461	198	311	284	43,305
1969	33,956	6,615	2,931	1,827	593	136	147	288	170	232	46,895
1970	37,521	7,547	4,492	2,787	807	240	165	381	143	256	54,339
1971	41,738	8,908	5,253	2,995	593	391	301	352	141	433	61,105
1972	57,121	15,689	8,635	3,492	824	622	456	427	236	279	87,781

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 8.--Ball bearings: U.S. imports for consumption, by types and sizes, 1969-72

Type or size	1969	1970	1971	1972
	Quantity (1,000 units)			
Imports under item 680.36---	<u>1/</u> 651	<u>1/</u> 612	1,144	2,357
Integral shaft <u>1/</u> -----	5,880	8,324	8,719	9,215
Radial:				
Less than 9 mm-----	2,916	3,985	2,656	2,695
9 mm and over, but not over 30 mm-----	34,146	38,278	37,925	43,720
Over 30 mm, but not over 52 mm-----	39,236	44,420	50,894	59,326
Over 52 mm-----	12,842	12,947	16,911	22,723
All other-----	2,950	1,442	2,928	3,884
Total-----	98,621	110,014	121,177	143,920
	Value (1,000 dollars)			
Imports under item 680.36---	<u>1/</u> 1,368	<u>1/</u> 1,315	2,492	5,088
Integral shaft-----	3,276	5,014	5,306	5,621
Radial:				
Less than 9 mm-----	1,762	2,088	1,553	1,627
9 mm and over, but not over 30 mm-----	12,161	13,058	11,569	16,751
Over 30 mm, but not over 52 mm-----	13,873	16,200	18,461	23,988
Over 52 mm-----	11,959	13,649	17,527	28,166
All other-----	2,496	2,015	4,197	6,550
Total-----	46,895	54,339	61,105	87,781

1/ Estimated by the U.S. Tariff Commission.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 8A.--Ball bearings and parts, including antifriction balls: Imports for consumption and ad valorem equivalents of duty rates, by TSUS item numbers, 1964-72 <sup>1/</sup>

Year	Item 680.30		Item 680.33		Item 680.35	
	Value	:Ad valorem: :equivalent:	Value	:Ad valorem: :equivalent:	Value	:Ad valorem: :equivalent
	<u>1,000</u> <u>dollars</u>	<u>Percent</u>	<u>1,000</u> <u>dollars</u>	<u>Percent</u>	<u>1,000</u> <u>dollars</u>	<u>Percent</u>
1964-----	1,382	18.0	<sup>2/</sup>	<sup>2/</sup>	18,452	16.3
1965-----	2,189	17.5	<sup>3/</sup> 106	12.0	23,629	16.2
1966-----	3,167	17.7	1,962	12.0	32,202	16.2
1967-----	4,272	17.6	1,998	12.0	35,877	16.4
1968-----	4,192	15.4	2,267	10.5	39,152	14.9
1969-----	3,608	13.6	1,773	9.5	43,621	12.9
1970-----	3,564	11.7	2,851	8.0	49,220	11.4
1971-----	3,215	9.7	3,769	7.0	55,641	9.0
1972-----	5,344	8.3	3,438	6.0	83,637	8.2
:	:	:	:	:	:	:

<sup>1/</sup> Calculated only with respect to ball bearings and parts thereof, including antifriction balls; although item 680.30 contains rollers and item 680.35 contains roller bearings, those products were excluded in the calculations.

<sup>2/</sup> Item 680.33 was not created until December 1965.

<sup>3/</sup> Includes imports for only a part of December 1965.

Source: Data on imports compiled from official statistics of the U.S. Department of Commerce.

Table 9.--Antifriction balls: U.S. production, imports for consumption, exports of domestic merchandise, and apparent consumption, 1968-72 <sup>1/</sup>

Type and year	U.S. production	Imports	Exports	Apparent consump- tion	Ratio (percent) of imports to con- sumption
	Million balls	Million balls	Million balls	Million balls	Percent
<u>Carbon</u>					
1968-----	11,877	226	3	12,100	2
1969-----	13,679	252	5	13,926	2
1970-----	9,334	178	2	9,510	2
1971-----	8,234	101	4	8,331	1
1972-----	10,584	163	4	10,743	2
<u>Alloy</u>					
1968-----	2,878	826	24	3,680	22
1969-----	3,020	659	48	3,631	18
1970-----	3,138	521	49	3,610	14
1971-----	2,531	420	49	2,902	14
1972-----	3,706	631	93	4,244	15

<sup>1/</sup> Data shown are somewhat understated.

Source: Compiled from responses to U.S. Tariff Commission questionnaires.



Table 10.--Antifriction balls: U.S. production of the reporting establishments, by type, 1968-72

(In millions of balls)

Year	Carbon	Alloy	Total
1968-----	1/ 11,877	2,878	1/ 14,755
1969-----	1/ 13,679	3,020	1/ 16,699
1970-----	9,334	3,138	12,472
1971-----	8,234	2,531	10,765
1972-----	10,584	3,706	14,290

1/ Production of carbon balls is slightly understated.

Source: Compiled from responses to U.S. Tariff Commission questionnaires; responses account for virtually all of U.S. production since 1970.

Table 11.--Antifriction balls: U.S. production of reporting establishments for own use, by type, 1968-72

(In millions of balls)

Year	Carbon	Alloy	Total
1968-----	401	1,299	1,700
1969-----	467	1,220	1,687
1970-----	515	1,105	1,620
1971-----	510	986	1,496
1972-----	324	1,080	1,404

Source: Compiled from responses to U.S. Tariff Commission questionnaires; responding firms are believed to account for virtually all of U.S. production for captive consumption.

Table 12.--Antifriction balls: Distribution of shipments of U.S.-made antifriction balls of reporting establishments, by use, 1968-72 1/

(In million of balls)

Year	Shipments for use in--		
	Ball bearings	Other applications	All applications
1968 <u>2/</u> -----	7,063	7,834	14,897
1969 <u>2/</u> -----	8,089	8,481	16,570
1970-----	5,794	6,438	12,232
1971-----	5,662	5,298	10,960
1972-----	7,502	6,775	14,277

1/ Shipments as used here include interplant transfers for own use.

2/ Shipments are slightly understated.

Source: Compiled from responses to U.S. Tariff Commission questionnaires; responses account for virtually all of U.S. production since 1970.

Table 13.--Antifriction balls: U.S. producers' shipments from reporting establishments, by type, 1968-72 <sup>1/</sup>

Year	Carbon	Alloy	Total
	Quantity (million balls)		
1968-----	<sup>2/</sup> 11,558	1,607	<sup>2/</sup> 13,165
1969-----	<sup>2/</sup> 13,094	1,745	<sup>2/</sup> 14,839
1970-----	8,598	1,969	10,567
1971-----	7,845	1,586	9,431
1972-----	10,302	2,464	12,766
	Value (1,000 dollars)		
1968-----	<sup>2/</sup> 10,041	14,093	<sup>2/</sup> 24,134
1969-----	<sup>2/</sup> 10,809	16,223	<sup>2/</sup> 27,032
1970-----	11,771	15,554	27,325
1971-----	11,172	13,517	24,689
1972-----	11,544	17,850	29,394

<sup>1/</sup> Shipments other than for own consumption.

<sup>2/</sup> Shipments of carbon balls are slightly understated.

Source: Compiled from responses to U.S. Tariff Commission questionnaires; responses account for virtually all of U.S. production since 1970.

Table 14.--Antifriction balls: U.S. imports for consumption,  
by principal sources, 1960-72

(In thousands of dollars)

Year	Japan	Ireland	United Kingdom	West Germany	Canada	All other	Total
1960-----	145	-	22	658	-	63	888
1961-----	126	-	41	503	2	45	717
1962-----	370	-	67	664	3	80	1,184
1963-----	894	-	53	319	36	103	1,405
1964-----	939	81	89	129	62	81	1,381
1965-----	966	500	414	182	20	107	2,189
1966-----	1,430	504	666	378	47	171	3,196
1967-----	1,821	769	822	573	101	283	4,369
1968-----	1,911	907	880	232	201	254	4,385
1969-----	1,103	969	1,269	125	214	141	3,821
1970-----	946	835	1,442	263	220	74	3,780
1971-----	799	797	1,009	283	326	199	3,413
1972-----	1,483	1,383	1,274	899	297	261	5,597

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 15.--Antifriction balls: U.S. exports of domestic merchandise, by principal markets, 1955-72

(In thousands of dollars)

Year	Canada	United Kingdom	France	Mexico	All other	Total
1955-----	183	1	4	19	98	305
1956-----	94	22	10	3	81	310
1957-----	137	3	7	13	105	265
1958-----	112	1	1	17	89	220
1959-----	172	14	17	3	90	296
1960-----	220	156	181	2	103	662
1961-----	176	150	284	6	118	734
1962-----	202	78	111	13	166	570
1963-----	230	64	41	13	223	571
1964-----	234	70	26	15	192	537
1965-----	413	74	27	25	123	662
1966-----	257	101	22	25	78	483
1967-----	199	221	33	9	144	606
1968-----	104	71	29	19	79	302
1969-----	212	102	126	16	183	639
1970-----	339	227	209	20	296	1,091
1971-----	130	278	64	16	<u>1/</u> 507	995
1972-----	810	127	69	33	106	1,145
:	:	:	:	:	:	:

1/ Includes 301 thousand dollars'worth' exported to Australia.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 16.--Ball bearings: Weighted averages of lowest prices received by U.S. producers and importers on sales of representative models to original-equipment manufacturers, by 6-month periods, 1968-72

Period	(Price per unit)											
	Radial/8 mm, model No. MPBS418C3				Radial/22 mm, model No. SKF R8				Imported			
	U.S.-made	Number of responses	Price	Number of responses	U.S.-made	Number of responses	Price	Number of responses	U.S.-made	Number of responses	Price	Number of responses
1968:												
January-June		4	\$.58	***		4	\$.45	***		7	\$.34	4
July-December		4	.63	***		4	.45	***		6	.34	5
1969:												
January-June		4	.66	***		4	.44	***		6	.33	5
July-December		4	.60	***		4	.49	***		5	.34	4
1970:												
January-June		4	.57	***		4	.47	***		7	.32	4
July-December		4	.62	***		4	.48	***		7	.31	4
1971:												
January-June		3	.64	***		3	.54	***		7	.31	6
July-December		3	.55	***		3	.56	***		7	.30	6
1972:												
January-June		4	.57	***		4	.56	***		7	.32	6
July-December		4	.55	***		4	.58	***		7	.31	7

Continued on following page.

Table 16.--Ball bearings: Weighted averages of lowest prices received by U.S. producers and importers on sales of representative models to original-equipment manufacturers, by 6-month periods, 1968-72--Continued

Period	(Price per unit)									
	Radial/40 mm, model No. SKF 6203					Radial/52 mm, model No. SKF 6205				
	U.S.-made		Imported		U.S.-made	U.S.-made		Imported		Imported
	Number of responses	Price	Number of responses	Price	Number of responses	Price	Number of responses	Price	Number of responses	Number of responses
1968:										
January-June	8	\$0.53	7	\$1.19	8	\$0.72	8	\$0.72	8	6
July-December	8	.53	6	1.19	8	.75	8	.75	8	4
1969:										
January-June	8	.54	7	1.23	8	.75	8	.75	8	4
July-December	8	.59	5	1.24	7	.75	7	.75	7	4
1970:										
January-June	8	.62	7	1.24	8	.69	8	.69	8	5
July-December	8	.62	5	1.28	8	.68	8	.68	8	5
1971:										
January-June	7	.67	6	1.25	8	.67	8	.67	8	4
July-December	7	.66	5	1.28	8	.63	8	.63	8	5
1972:										
January-June	6	.59	6	1.19	7	.62	7	.62	7	5
July-December	6	.58	6	1.25	8	.71	8	.71	8	5

Continued on following page.

Table 16.--Ball bearings: Weighted averages of lowest prices received by U.S. producers and importers on sales of representative models to original-equipment manufacturers, by 6-month periods, 1968-72--Continued

Period	(Price per unit)											
	Radial/62 mm, model No. SKF 6206						Radial/72 mm, model No. SKF 6207					
	U.S.-made			Imported			U.S.-made			Imported		
	Price	Number of responses	Price	Number of responses	Price	Number of responses	Price	Number of responses	Price	Number of responses	Price	Number of responses
1968:												
January-June	\$0.88	7	\$0.69	5	\$0.96	9	\$0.80	4				
July-December	.87	7	.69	5	.97	9	.80	4				
1969:												
January-June	.90	7	.69	5	.96	9	***	***				
July-December	.94	7	.71	4	1.00	9	.80	3				
1970:												
January-June	.89	7	.71	4	1.02	9	.81	3				
July-December	.89	6	.71	5	1.02	8	.80	4				
1971:												
January-June	.95	7	.71	5	1.08	8	.77	4				
July-December	.95	8	.71	5	1.07	8	.79	4				
1972:												
January-June	.98	8	.72	5	1.12	8	.78	5				
July-December	.97	8	.73	5	1.12	8	.79	5				

Source: Compiled from responses to U.S. Tariff Commission questionnaires.



Table 17.--Ball bearings: Weighted averages of lowest prices received by U.S. producers and importers on sales of 2 principal models to the replacement market, by 6-month periods, 1968-72

Period	(Price per unit)											
	Radial/72 mm, model No. 6207						Integral shaft, model No. 885118D4					
	Domestic			Imported			Domestic			Imported		
	Price	Number of responses	Price	Number of responses	Price	Number of responses	Price	Number of responses	Price	Number of responses	Price	Number of responses
1968:												
January-June	\$1.33	9	***	***	***	***	***	***	***	***	***	***
July-December	1.36	9	***	***	***	***	***	***	***	***	***	***
1969:												
January-June	1.40	9	***	***	***	***	***	***	***	***	***	***
July-December	1.40	9	***	***	***	***	***	***	***	***	***	***
1970:												
January-June	1.52	9	***	***	\$0.70	3	***	***	***	***	***	***
July-December	1.52	9	***	***	***	***	***	***	***	***	***	***
1971:												
January-June	1.54	9	***	***	.67	4	***	***	***	***	***	***
July-December	1.53	9	***	***	.66	3	***	***	***	***	***	***
1972:												
January-June	1.49	9	***	***	.66	4	***	***	***	***	***	***
July-December	1.52	9	***	***	.65	4	***	***	***	***	***	***

Source: Compiled from responses to U.S. Tariff Commission questionnaires.

Table 18.--Ball bearings and antifriction balls: Price indexes of certain ball bearings and an antifriction ball, together with price indexes of broader product groups, 1963-72

(1968=100)

Year	: Light : radial : ball : bearing : (52 mm)	: Medium : radial : ball : bearing : (80 mm)	: Thrust : ball : bearing	: Alloy : steel : ball	: All durable : manufactures	: General : purpose : machinery : and : equipment
1963-----	131.6	101.6	1/	96.3	90.0	88.7
1964-----	120.7	105.7	1/	96.3	91.5	89.0
1965-----	109.0	93.4	I/	96.3	92.7	89.6
1966-----	101.8	92.5	94.1	96.3	94.7	93.6
1967-----	100.0	93.7	99.3	99.5	96.7	96.9
1968-----	100.0	100.0	100.0	100.0	100.0	100.0
1969-----	101.0	103.8	100.7	98.2	104.1	103.7
1970-----	108.6	111.6	103.2	105.9	108.3	110.2
1971-----	116.9	118.2	107.2	105.2	113.2	115.4
1972-----	118.4	121.3	107.8	108.2	117.7	118.5

1/ Not available.

Source: Wholesale Prices and Price Indexes, Bureau of Labor Statistics.

Table 19.--Antifriction balls: Weighted averages of lowest prices received by U.S. producers and importers on sales of 2 representative alloy steel balls, by 6-month periods, 1968-72

Period	(Price per 1,000 balls)							
	17/64-inch ball				7/16-inch ball			
	Domestic		Imported		Domestic		Imported	
	Price	Number of responses	Price	Number of responses	Price	Number of responses	Price	Number of responses
1968:								
January-June----	\$5.21	3	***	***	\$14.05	5	***	***
July-December---	5.21	4	***	***	14.01	6	***	***
1969:								
January-June----	5.01	6	***	***	13.86	7	***	***
July-December---	4.93	5	***	***	13.44	7	***	***
1970:								
January-June----	4.97	4	***	***	12.38	6	***	***
July-December---	5.13	4	***	***	12.83	6	***	***
1971:								
January-June----	4.86	6	***	***	13.75	7	***	***
July-December---	4.72	6	***	***	13.08	7	***	***
1972:								
January-June----	4.03	5	***	***	13.53	6	***	***
July-December---	4.81	6	***	***	12.38	6	***	***

Source: Compiled from responses to U.S. Tariff Commission questionnaires.

Table 20.--Ball bearings: Simple averages of U.S. importers' costs of importing representative models from Japan on dates nearest Dec. 31, 1969, and Dec. 31, 1972

Item of cost	(Cost per unit)			
	Model No. 6203		Model No. 6207	
	Dec. 31, 1969	Dec. 31, 1972	Dec. 31, 1969	Dec. 31, 1972
Invoice value, f.o.b.				
foreign port-----	\$0.280	\$0.336	\$0.520	\$0.572
Ocean freight and insurance-----	.007	.008	.020	.030
Value, c.i.f., duty excluded-----	.287	.344	.540	.602
Amount of duty-----	.042	.035	.071	.063
Wharfage, cartage, and inland freight-----	.004	.004	.013	.009
Total cost of importing to U.S. importers' warehouses <u>1/</u> --	.335	.385	.631	.674

1/ Totals do not equal sum of components because 1 firm reported small portion of costs as "other."

Source: Compiled from responses to U.S. Tariff Commission questionnaire.

Table 21.--Average number of employees and of production and related workers in the reporting establishments producing ball bearings and parts, including antifriction balls, 1968-72

Year	All employees	Production and related workers engaged in the manufacture of ball bearings and parts, including antifriction balls
1968-----	40,965	21,405
1969-----	41,558	21,502
1970-----	40,185	19,775
1971-----	34,884	16,122
1972-----	35,547	17,007

Source: Compiled from responses to U.S. Tariff Commission questionnaires; responding firms account for approximately 95 percent of the value of all U.S. production of ball bearings and parts.

Table 22.--Man-hours worked by production and related workers in the reporting establishments producing ball bearings and parts, including antifriction balls, 1968-72

Year	All products	Ball bearings and parts, including antifriction balls
1968-----	69,391,142	44,438,962
1969-----	71,222,086	45,641,325
1970-----	65,159,868	40,210,591
1971-----	56,377,406	33,067,433
1972-----	61,316,632	36,161,009

Source: Compiled from responses to U.S. Tariff Commission questionnaires; responding firms account for approximately 95 percent of the value of all U.S. production of ball bearings and parts.

Table 23.--Ocean freight rates set by Japan/Atlantic and Gulf Freight Conference and major independent carriers on shipments of ball bearings and parts thereof from Japan to U.S. gulf and Atlantic coast ports, 1967-73

(Per short ton or 40 cubic feet <sup>1/</sup>)

Month rate became effective	Rate established by--			
	Japan/Atlantic and Gulf Freight Conference	States Marine International, Inc.	Orient Overseas Line	Thai Mercantile Marine, Ltd.
October 1967-----	\$70.50	2/	2/	2/
August 1968-----	70.50	2/	2/	\$51.50
November 1968-----	74.00	2/	2/	51.50
October 1970-----	79.50	2/	2/	51.50
February 1971-----	79.50	2/	2/	78.25
May 1971-----	79.50	\$66.50	2/	66.50
October 1971 <sup>3/</sup> -----	79.50	66.50	2/	66.50
November 1971-----	93.50	66.50	2/	66.50
December 1971-----	93.50	78.25	2/	66.50
January 1972-----	93.50	78.25	2/	79.50
February 1972-----	93.50	78.25	\$80.00	79.50
March 1972-----	93.50	78.25	80.00	87.50
April 1972-----	100.25	78.25	80.00	87.50
May 1972-----	100.25	81.50	80.00	91.50
September 1972-----	100.25	81.50	90.00	91.50
October 1972 <sup>4/</sup> -----	100.25	81.50	90.00	91.50
January 1973-----	105.75	81.50	90.00	91.50
February 1973-----	105.75	83.50	90.00	91.50
March 1973-----	116.25	92.00	90.00	91.50
April 1973-----	116.25	92.00	99.00	91.50

<sup>1/</sup> Applicable rate basis is whichever yields the greater revenue.

<sup>2/</sup> No rate provided.

<sup>3/</sup> Effective in February 1971, a \$3.00 allowance for containerization.

<sup>4/</sup> Effective in October 1972, a 5-percent discount for palletized cargo.

Source: Federal Maritime Commission, Bureau of Compliance.

Table 24.--Ocean freight rates set by the Trans-Pacific Freight Conference and major independent carriers on shipments of ball bearings and parts thereof from Japan to U.S. Pacific coast ports, 1967-73

(Per short ton or 40 cubic feet 1/)

Month rate became effective	Rate established by--		
	Trans-Pacific Freight Conference	Thai Mercantile Marine, Ltd.	States Marine International, Inc.
September 1967-----	\$51.50	<u>2/</u>	<u>2/</u>
August 1968-----	51.50	<u>2/</u>	\$51.50
November 1968-----	55.00	<u>2/</u>	51.50
October 1970-----	60.50	<u>2/</u>	51.50
February 1971 <u>3/</u> -----	60.50	\$78.25	51.50
May 1971-----	60.50	49.50	49.50
October 1971-----	74.50	49.50	49.50
December 1971-----	74.50	49.50	61.25
January 1972-----	74.50	60.50	61.25
March 1972-----	74.50	66.50	61.25
April 1972-----	80.00	66.50	61.25
May 1972-----	80.00	69.50	64.50
October 1972 <u>4/</u> -----	80.00	69.50	64.50
January 1973-----	85.50	69.50	64.50
February 1973-----	85.50	69.50	66.50
March 1973-----	94.00	69.50	73.00

1/ Applicable rate basis is whichever yields the greater revenue.

2/ No rate provided.

3/ Effective in February 1971, a \$3.00 allowance for containerization.

4/ Effective in October 1972, a 5-percent discount for palletized cargo.

Source: Federal Maritime Commission, Bureau of Compliance.



Table 25.--Ocean freight rates set by Continental North Atlantic Westbound Freight Conference and major independent carriers on shipments of ball bearings and parts thereof from Bremen-Hamburg to U.S. North Atlantic ports, 1968-73

		(Per long ton)			
		Rate established by--			
Month rate became effective	Continental North Atlantic Westbound Freight Conference <sup>1/</sup>	Meyer Line	American Export Isbrandtson Lines, Inc.		
January 1968-----	<u>2/</u>	\$85.00			\$94.00
March 1968-----	<u>2/</u>	85.00			106.50
March 1969-----	<u>2/</u>	99.00			66.50
June 1969-----	<u>2/</u>	55.00			66.50
July 1969-----	<u>2/</u>	55.00			60.50
August 1969-----	<u>2/</u>	58.00			60.50
December 1969---	<u>2/</u>	58.00			58.00
January 1971-----	<u>2/</u>	58.00			61.00
June 1971-----	\$52.20	58.00			61.00
August 1971-----	52.20	57.25			66.80
March 1972-----	57.42	57.25		<u>3/</u>	
April 1972-----	57.42	69.25		<u>3/</u>	
May 1972-----	60.00	60.00		<u>3/</u>	
July 1972-----	69.25	57.00		<u>3/</u>	
September 1972--	57.00	57.00		<u>3/</u>	
March 1973-----	62.50	62.50		<u>3/</u>	

<sup>1/</sup> Rates shown for the conference are rates for container shipments, the lowest rates offered by the conference.

<sup>2/</sup> Rates were declared "open," meaning that member carriers were free to set their own rates.

<sup>3/</sup> American Export Isbrandtson became a member of the conference in March 1972.

Source: Federal Maritime Commission, Bureau of Compliance.

Table 26.--Profit-and-loss experience of 15 U.S. producers on the overall operations of their establishments in which ground ball bearings (including such bearings with integral shafts, and parts thereof) are produced, 1968-72 <sup>1/</sup>

Item	1968	1969	1970	1971	1972
Percent of U.S. producers' total sales of ground ball bearings accounted for by the reporting producers-----	69.0	69.0	70.0	73.0	69.0
Net sales, including captive sales 1,000 dollars-----	451,026	468,357	456,631	424,704	481,480
Cost of goods sold-----	333,800	357,677	350,813	338,682	389,219
Gross profit-----	117,226	110,680	105,818	86,022	92,261
Administrative, general, engineering, and selling expenses-----	60,956	64,413	65,939	62,169	64,074
Net operating profit-----	56,270	46,267	39,879	23,853	28,187
Other income or (expense), net-----	(2,248)	(2,591)	(1,777)	(1,815)	(1,746)
Net profit before income taxes-----	54,022	43,676	38,102	22,038	26,441
Ratio of net operating profit to net sales percent-----	12.5	9.9	8.7	5.6	5.9
Ratio of net profit before income taxes to net sales-----percent-----	12.0	9.3	8.3	5.2	5.5
Percent of net sales accounted for by ground ball bearing sales, including captive sales-----	71.0	71.0	71.0	69.0	69.0
Percent of net sales accounted for by captive sales-----	2.0	3.0	3.0	3.0	4.0

<sup>1/</sup> The accounting year of 9 producers ended on Dec. 31, and that of 2 producers ended on June 30. The accounting year for the other 4 producers ended on Jan. 31, Mar. 31, July 31, and Oct. 31.

Source: Compiled from data submitted to the U.S. Tariff Commission by U.S. producers.

Table 27.--Profit-and-loss experience of 15 U.S. producers on their operations producing ground ball bearings (including such bearings with integral shafts, and parts thereof), 1968-72 <sup>1/</sup>

Item	1968	1969	1970	1971	1972
Percent of U.S. producers' total sales of ground ball bearings accounted for by the reporting producers-----	69.0	69.0	70.0	73.0	69.0
Net sales, including captive sales					
1,000 dollars--	341,467	357,706	346,140	313,567	355,508
Cost of goods sold-----	252,630	273,961	266,770	251,831	287,236
Gross profit-----	88,837	83,745	79,370	61,736	68,272
Administrative, engineering, and selling expenses-----	44,184	47,068	46,706	43,085	44,841
Net operating profit-----	44,653	36,677	32,664	18,651	23,431
Other income or (expense), net-----	(1,393)	(1,924)	(1,097)	(1,113)	(1,080)
Net profit before income taxes-----	43,260	34,753	31,567	17,538	22,351
Ratio of net operating profit to net sales percent--	13.1	10.3	9.4	5.9	6.6
Ratio of net profit to net sales-----do--	12.7	9.7	9.1	5.6	6.3
Percent of net sales accounted for by captive sales-----	5.0	6.0	6.0	7.0	7.0
Percent of net sales accounted for by ground ball bearing sales, including captive sales--	93.0	93.0	93.0	93.0	94.0
Percent of net sales accounted for by unground ball bearing sales-----	2.0	2.0	2.0	2.0	2.0
Percent of net sales accounted for by anti-friction ball sales-----	1.0	1.0	1.0	1.0	1.0
Percent of net sales accounted for by sales of products other than ball bearings and parts--	4.0	4.0	4.0	4.0	3.0

<sup>1/</sup> The accounting year of 9 producers ended on Dec. 31, and that of 2 producers ended on June 30. The accounting year for the other 4 producers ended on Jan. 31, Mar. 31, July 31, and Oct. 31.

Source: Compiled from data submitted to the U.S. Tariff Commission by U.S. producers.

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Table 30.--Profit-and-loss experience of 4 U.S. producers on the overall operations of their establishments in which antifriction balls are produced, 1968-72 <sup>1/</sup>

Item	1968	1969	1970	1971	1972
Net sales, including captive sales					
1,000 dollars--	17,702	19,995	18,107	14,804	19,189
Cost of goods sold--	13,778	15,723	14,057	12,862	15,852
Gross profit--	3,924	4,272	4,050	1,942	3,337
Administrative, general, engineering, and selling expense--	2,046	2,078	2,087	1,942	2,505
Net operating profit--	1,878	2,194	1,963	-	832
Other income or (expense), net--	(14)	(4)	(6)	(70)	23
Net profit or (loss) before income taxes					
1,000 dollars--	1,864	2,190	1,957	(70)	855
Ratio of net operating profit to net sales	10.6	11.0	10.8	0	4.3
Ratio of net profit or (loss) before income taxes to net sales	10.5	11.0	10.8	(.5)	4.5
Percent of net sales accounted for by captive sales	2.0	3.0	4.0	4.0	4.0
Percent of net sales accounted for by antifriction ball sales, including captive sales	95.0	96.0	96.0	96.0	97.0

<sup>1/</sup> The accounting year of 2 producers ended Dec. 31; that of the other 2 producers ended Mar. 31 and July 31. The 4 producers accounted for about 57 percent of the total open-market sales of the U.S. industry during the period 1968-72.

Source: Compiled from data submitted to the U.S. Tariff Commission by U.S. producers.



Table 31.--Profit-and-loss experience of 4 U.S. producers on their antifriction ball operations, 1968-72 <sup>1/</sup>

Item	1968	1969	1970	1971	1972
Net sales, including captive sales					
1,000 dollars	16,782	19,166	17,353	14,215	18,521
Cost of goods sold	13,214	15,241	13,570	12,500	15,419
Gross profit	3,568	3,925	3,783	1,715	3,102
Administrative, general, engineering, and selling expense	1,870	1,907	1,924	1,796	2,374
Net operating profit or (loss)	1,698	2,018	1,859	(81)	728
Other income or (expense) net	(16)	(1)	(2)	(68)	23
Net profit or (loss) before income taxes	1,682	2,017	1,857	(149)	751
1,000 dollars					
Ratio of net operating profit or (loss) to net sales	10.1	10.5	10.7	(0.6)	3.9
Ratio of net profit or (loss) before income taxes to net sales	10.0	10.5	10.7	(1.0)	4.1
Percent of net sales accounted for by captive sales	2.0	3.0	4.0	4.0	5.0

<sup>1/</sup> The accounting year of 2 producers ended Dec. 31; that of the other 2 producers ended Mar. 31 and July 31. The 4 producers accounted for about 57 percent of the total open-market sales of the U.S. industry during the period 1968-72.

Source: Compiled from data submitted to the U.S. Tariff Commission by U.S. producers.

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