Tools, Dies, and Industrial Molds: Competitive Conditions in the United States and Selected Foreign Markets

ITC Investigation No. 332-435
Abstracted from ITC Study

Executive Summary

Introduction

This study was requested by the Committee on Ways and Means of the U.S. House of Representatives (Committee) in a letter dated December 20, 2001.[1] The Committee requested that the U.S. International Trade Commission institute a fact finding investigation of the current competitive conditions facing producers in the U.S. tool, die and industrial mold [2](TDM), or tooling[3] industries. The Commission's report provides U.S. market trends and a profile of the U.S. TDM industry as well as an overview of global trends and an assessment of significant foreign markets and industries, including those in China, Taiwan, Japan, Canada, Mexico, and EU member countries (Germany and Portugal); examines the principal challenges and potential implications of these industries over the near term; and compares the strengths and weaknesses of U.S. and foreign producers, for the period 1997-2001.

The U.S. TDM industry is faced with several major dilemmas: (1) the recent downturn in the U.S. economy and its slow recovery; (2) a shrinking domestic market due to the migration of manufacturing customers to foreign locations; (3) excess capacity due to reduced domestic market demand and new technologies; (4) customer demands for lower prices and more services; (5) increasing foreign competition; and (6) rising costs, particularly labor-related costs.

Domestic Industry Overview

- The U.S. industry has about 7,000 firms, with more than 90 percent employing fewer than 50 persons. TDM operations are concentrated in areas that have historically supported extensive manufacturing activity: Michigan, Illinois, Ohio,

[1] The request from the Committee is reproduced in full in appendix A. A copy of the Commission's Federal Register notice is included in appendix B.
[2] See appendix C for a complete list of covered terms.
[3] End-use industries, such as the metal stamping , die-casting, and plastic molding industries typically refer to the dies, punch tool for dies, industrial molds, and jigs and fixtures as tooling—the tools used in their machines that give the final shape or form to the items being produced.

California, Pennsylvania, Indiana, and Wisconsin. Many domestic producers have invested in up-to-date production equipment and sophisticated computer software resulting in decreasing lead times and increasing productivity and capacity.

- Adverse conditions in recent years have resulted in downsizing at many firms, according to recent industry information, and the exit of many firms from the industry (at least 200 firms in the past three years). Shipments and average hourly earnings rose during 1997-2000. During 2001-2002, however, publicly available data indicate sharp declines in employment and average weekly hours.

- Commission questionnaire data show steep declines in the same factors as well as a 20 percent drop in shipments.

Financial performance of the U.S. industry

- Financial performance of TDM producers responding to the Commission's questionnaire deteriorated sharply between 2000 and 2001, after rising slightly between 1999 and 2000. Indicators include a fall in the industry's ratio of operating income to net sales to below 1 percent, decreased cash flow, and a near doubling in the number of companies reporting losses on an operating and net-income-before-tax basis.

- These companies reported relatively low research and development expenses compared to sales. An irregular decline in capital expenditures between 1999 and 2001, which exceeded charges for depreciation, led to increases in the value of plant and equipment. Company cash flow represented in the dominant source of funds, followed by secured debt.

Market Characteristics and Trends

- Since demand for tooling is heavily dependent upon new product introduction in the automotive industry (which absorbs nearly 50 percent of tooling), the tooling industry has weakened during the last 24 months as automotive manufacturers have delayed new product introduction in order to build up their balance sheets. At the same time, many of the industries supplied by U.S. toolmakers, such as appliances, have become very cost-competitive, forcing many tooling customers who produce in the US to reduce product costs by sourcing their tooling from less-expensive foreign locations.

- The compression of product cycles in many key industries (such as automotive, appliances, electronics and telecommunications) due to competitive pressures has required toolmakers to adapt to these product cycles by shortening their lead times to supply tooling to OEMs. In many cases, these shortened lead times have favored foreign toolmakers, particularly in Asia, who frequently operate their plants 24 hours a day to supply customer orders.

- For many items that are easy to ship, such as small appliances and electronics or telecommunications items, it has become cost-effective for manufacturers to produce in low-cost foreign locations, such as Asia, for shipment to the U.S. market. This is especially the case for products like air conditioners, radios, vacuum cleaners, power hand tools, televisions, and telephones, which are increasingly produced abroad. This has adversely affected U.S. toolmakers who no longer supply the tooling for many of these items because the TDM sourcing has shifted to foreign locations along with the manufacturing.

International Trade

- Canada is the largest U.S. trade partner accounting for 41 percent of U.S. TDM import value and 34 percent of export value in 2001. Other important trade partners include Japan (accounting for 33 percent of import values) and the EU (almost 16 percent of import value). Although the value of U.S. TDM imports from many countries peaked in either 1999 or 2000, imports from China and Korea, among other countries, continued to rise to higher levels in 2001. During 1997-2001, U.S. TDM imports from China and Korea rose by 191 percent and 248 percent, respectively, albeit from relatively low bases.

- The major U.S. export market, other than Canada, is Mexico which accounts for 27 percent of total TDM export value in 2001. Canada and Mexico overshadow all other markets with the third largest export destination, Germany, accounting for only about 4 percent of total TDM export value.

- The value of imports as a share of U.S. consumption stayed fairly stable from 1997 – 2000. However, Commission questionnaire data suggested that import penetration rose in 2001. Aggregate export value remained relatively stable during 1997-2001, but major shifts occurred in the value of exports to Canada (down by about 35 percent) and Mexico (up by 27 percent).

Government Assistance Programs

- Several U.S TDM producers responding to the Commission's questionnaire indicated overall positive perceptions from participating in government assistance programs. Many TDM firms have access to loan guarantees and diverse financing/working capital assistance through a variety of widely available Federal and State programs, which are intended to help with short-term needs by acquiring loans that may not be feasible under normal financing conditions.

- Programs also provide assistance for improving a firm's competitive ability. Such assistance has been used for a variety of activities, including the acquisition of International Standards Organization (ISO) or other quality assurance standard certifications, materials engineering research, computer design and manufacturing software implementation, apprenticeship programs and workforce training, productivity improvement and business planning, market analysis, energy audits,

application of information technology and electronic commerce, and tax abatement.

- Other respondents to the Commission's producers' questionnaire noted that certain mechanisms to provide assistance were not always responsive to their needs, and some programs imposed more stringent guidelines than others. In some instances, modest fees and paperwork requirements were considered a burden, and ceiling limits within some programs were considered insufficient for machinery or labor-related costs typically expended by TDM producers.

- Some government programs attempt to lessen these burdens by facilitating services to individual firms through extensive networks of various local assistance centers[4]. These include assistance offered through Trade Adjustment Centers (TAACs), the Manufacturing Extension Partnership (MEP) nationwide network, SBA's Small Business Development Centers (SBDCs), as well as State and regional offices of other Federal and State programs that work with local leaders.

Selected Foreign Industry Profiles

North America

Canada

- Most of Canada's TDM production is exported to the U.S. automotive sector. The United States is Canada's leading trading partner for TDMs, with total trade (imports plus exports) far exceeding trade with all other countries combined.

- Overseas-based motor vehicle producers are increasing their investment in North America and these transplant producers tend to import TDM's from their home countries. As the transplants' share of North American automobile production increases, Canadian TDM firms may be facing a declining demand for tooling in this market, unless they are successful in winning business from the non-traditional North American automotive producers.

- The Canadian dollar depreciated against the U.S. dollar during 1997-2001, giving Canadian TDM producers a potential competitive advantage on sales to the US. Some US industry sources contend that with the exchange rate, prices of Canadian produced TDMs can be as much as 40 percent lower than comparable US tooling, while Canadian industry sources consider the prices of Canadian-produced TDMs to be roughly equal to U.S.-produced TDMs.

[4] See "Contact Information" in chapter 3, tables 3-19 and 3-20

- According to Canadian industry sources, costs for the manufacture of molds are very similar to those in the U.S. in terms of raw materials and capital costs. These sources state that Canadian moldmakers purchase materials and equipment on a U.S. dollar basis and have no advantage over U.S. moldmakers as far as material costs are concerned. Labor costs, however, are affected by fluctuations in the Canada/U.S. exchange rate. The current impact of the lower Canadian dollar is estimated by Canadian sources to provide an advantage of less than 10 percent to Canadian moldmakers in terms of overall costs.

Mexico

- Mexico's indigenous TDM shops are few and of small-scale. Due to limited production capabilities and capacity, Mexico is highly dependent on imports to meet domestic consumption needs, despite the presence of U.S. and other foreign TDM makers following their customers to develop Mexican TDM suppliers. Trade in TDMs is enhanced by preferential import duties and tax-treatment programs for TDM-using customers.

- Due to shortages of skilled TDM builders and limited machining technology, Mexican TDM firms generally build, maintain, and upgrade less-complex products. Sector performance and growth are also constrained by relatively high labor rates and electricity costs, and by the high cost and limited availability of domestic investment capital. Moreover, some customers in Mexico are moving their production abroad, particularly to China and Southeast Asia.

Asia

Japan

- Japanese TDM producers are experiencing many of the same difficulties as U.S. firms, including a shrinking domestic market, excess capacity, increased competition from lower cost Asian suppliers, and severe cost and time pressures. Moreover, the transfer of technology, via overseas training initiatives and the transferal of TDM designs, data, and production techniques to foreign producers, has contributed to the erosion of the industry and has helped overseas suppliers increase their capabilities and competitiveness vis-à-vis domestic firms. Further, the industry is dominated by small producers, who often lack the financial resources and marketing skills necessary to compete in the global market.

- A tenuous but lingering strength of the Japanese industry is the endurance of keiretsu-style relationships among TDM firms within the domestic subcontracting hierarchy and between domestic TDM producers and Japanese OEMs and transplants. Further, Japanese producers have applied niche market and specialization strategies effectively to secure work and increase their competitiveness.

China

- This large and growing industry is estimated to be the third largest die and mold manufacturer after Japan and Germany, by value, and second in terms of quantity after Japan. About 70 percent of the TDM industry production is integrated, allowing such companies to provide both tooling and parts production. Unlike other major TDM producers, China has a substantial number of large, foreign-invested TDM producers. Foreign investment has largely resulted from integrated foreign tooling suppliers following their customers to China.

- China has the advantages of a low cost, well educated labor force and a large, growing domestic and international customer base. Chinese wages for toolmakers are among the lowest in the world. Its disadvantages include a lack of sophistication and creativity in tooling design, high costs for imported inputs, and low quality domestic TDM inputs. Currently, China appears to have difficulty producing low-cost TDMs of low and medium precision and complexity.

Hong Kong

- The Hong Kong industry has contracted significantly from a peak of 2,000 firms in the mid-1990s to its present level of approximately 50 firms. Much of the industry moved manufacturing operations to low cost facilities in China. Therefore, the Hong Kong tooling industry is highly integrated with, and largely dependent upon, tooling and other manufacturing enterprises in China. Proximity to China combined with Western business infrastructure allow Hong Kong TDM producers to integrate Chinese production with a modern business infrastructure gateway to the global market.

- Hong Kong tooling producers are able to produce many types of medium and high precision TDMs and can produce TDMs within short lead times.

Taiwan

- The current production and design capabilities of TDM producers in Taiwan are primarily based on technologies transferred by Japanese companies that invested in Taiwan in the 1960s and 1970s and trained Taiwan toolmakers. Such training allowed the Taiwan TDM industry to advance rapidly from the production of simple products to the manufacture of medium precision and more complex TDMs. Taiwan producers are known for their short lead times and competitive prices. In the future, the industry intends to focus on the production of high precision TDMs and cultivate the region's expertise as a design and management center for tooling production.

- A number of Taiwan firms operate manufacturing facilities in China. The combination of manufacturing in China with design and business functions in

Taiwan allows TDM firms to take advantage of low wage rates while controlling key processes. Taiwan firms are also reportedly strong in terms of computerization and international sales and marketing. At the same time, the relocation of numerous manufacturing industries from Taiwan to low-cost productions locations such as China has reportedly hurt those firms that continue to manufacture TDMs domestically.

European Union (EU)

- As a region, the EU likely ranks as the largest producer and consumer of TDMs in the world with a relatively small number of tooling producers in each EU member country. Two TDM industries in the EU stand out, those of Germany and Portugal.

- The principal issues affecting the TDM industries in traditional producing nations include rising labor costs and a migration of EU customers to low cost foreign production locations and emerging markets. EU customers have shifted production to Spain, Eastern Europe, and Asia. High cost EU tooling producers are turning to foreign direct investment to take advantage of lower labor costs in Spain, Portugal, and Eastern European countries such as the Czech Republic, Poland and Hungary.

Germany

- The German TDM industry ranks as the largest exporter and importer in the EU, and is a world leader in the production of high precision and high complexity TDMs. Germany is also one of the largest producers of tooling in the world.

- Since high labor costs and labor regulations hamper German TDM producers, German TDM producers have focused on high-precision and complex TDMs. In this regard, the German tooling industry benefits from a strong tradition of craftsmanship, as well as strong apprenticeship training programs and extensive TDM research and development efforts.

Portugal

- Despite Portugal's small size, it has emerged as one of the world's leading exporters of industrial molds. In 2001, despite limited production of dies, Portugal was the eighth largest producer of dies and molds in the world and it exports to more than 70 countries.

- The Portuguese TDM industry's success in exporting and adoption of the latest computer technologies has occurred despite the fact that Portugal has a small industrial base on which the TDM industry can depend.

- Since joining the EU in 1986, Portugal has focused on serving customers in the common market. The share of total Portuguese exports of industrial molds going to the U.S. has declined from 65 percent in 1997 to less 11 percent in 2001.

Competitive Position of U.S. and Foreign Producers

- U.S. TDM producers ranked competition from low-cost imports as their number one concern in their responses to Commission questionnaires. The second biggest concern was the shift of production by U.S. customers to foreign production locations. They also listed, in descending order, high U.S. labor costs, healthcare costs, and insurance costs.

- Price was by far the leading factor of competition cited by U.S. TDM producers in their responses to the Commission's U.S. producer questionnaires. U.S. purchasers responding to Commission questionnaires stated that foreign producers usually have a significant advantage in price. Delivery time and product quality were cited as the next most important competitive factors by U.S. producers. However, U.S. purchasers indicated that neither U.S. nor foreign TDM producers had any significant advantage with regard to competitive factors other than price.

- During the past 5 years, competitive market conditions have driven domestic manufacturers of consumer goods to rationalize all aspects of production, including the procurement of TDMs, with resultant downward pricing pressure on tooling producers. This pressure has been especially significant for molds used in sectors such as automotive, household appliances, power hand tools, housewares, and electronics.

- The difference in prices between U.S. produced and imported TDMs can be significant. Many U.S. TDM producers cite prices from China and Taiwan as being extremely low, ranging from 30-75 percent below prices quoted by U.S. TDM producers. In their responses to the Commission's questionnaire, U.S. purchasers reported that prices quoted by producers in China and Taiwan are significantly lower, but not as low as U.S. producers reported. Other countries with significantly lower prices include Korea, and certain other countries in Asia and Eastern Europe.

- Technological advances within the tooling industry have significantly improved productivity and competitiveness, while increasing capacity and ameliorating the need for highly skilled labor, traditionally a strength of the U.S. industry. Because advanced TDM production technology is universally available, increased productivity is occurring simultaneously in both formerly industrialized and newly industrializing regions.

- Since prices are largely a function of production costs, U.S. and foreign TDM producers constantly strive to minimize their production costs. Despite the significant capital equipment used in this industry, labor costs are the largest

single component of production costs for U.S. TDM producers and a significant component of production costs for all global producers.

- With regard to labor costs, the U.S. TDM industry is at a significant disadvantage compared with China, Portugal, Hong Kong, Taiwan, and Korea. Chinese hourly compensation costs for toolmakers and tool designers are one-twelfth of those in the U.S., and those in Taiwan are one-third.

- Factory overhead costs for many U.S. TDM producers are high compared with certain foreign competitors. This is in part the result of firms operating at less than full capacity because of the weak business conditions and intense foreign competition. Many Chinese firms operate 24 hours a day, 7 days a week, thus more fully utilizing their machinery. With regard to material costs, U.S. and many foreign TDM producers often purchase certain materials, such as some specialized tool and mold steel and other components, from a limited number of suppliers worldwide and prices are believed to be approximately the same. However, steels that are more widely available may vary significantly in price in different national markets, and the scale of purchases may introduce pricing differentials for all materials among TDM producers.

- Although the majority of tool steel used by U.S. TDM producers was excluded from the imposition of additional tariffs announced in March 2002 by the U.S. Government, certain steel products used by toolmakers were subject to tariffs, including stainless steel bar and rod which are used in molds and dies. Although some TDM industry sources report that prices for steel subject to tariffs did not rise in price because of existing inventories in the U.S., some moldmakers have reported difficulties due to increased steel costs.

- The extent of government involvement in foreign TDM industries is for the most part limited. The Chinese Government has provided tax incentives to attract foreign TDM investment and also offers import tariff exemptions on machinery, including TDM production machinery. These incentives are part of a larger set of policies aimed at encouraging foreign manufacturing investment in China.

- With regard to tariffs, trade in TDMs is free of duty within NAFTA. Otherwise, many U.S. tariffs on TDMs are free, with tariffs on dies ranging from 2.9% ad valorem to 5.7% ad velorem and on molds from free to 3.8% ad valorem. Like the U.S., EU tariffs are relatively low (ranging from free to 5% ad valorem), however, tariffs in China (ranging from free to 19% ad valorem) and Taiwan (ranging from free to 11.5% ad valorem) are relatively high.[5]

- The strong value of the U.S. dollar relative to foreign currencies has adversely affected the competitive position of U.S. TDM producers in the global tooling market. U.S. TDM producers responding to the Commission's questionnaire note

[5] For a comparison of tariffs for countries addressed in this report, see Appendix E, table E-1.

that the strong value of the U.S. dollar has significantly limited their ability to obtain business in foreign markets.

Challenges and Potential Implications Facing the Indusy Over the Near Term

- Major challenges facing the U.S. TDM industry include (1) the recent downturn in the U.S. economy and its slow recovery, which caused significant delays in manufacturing activity that would have otherwise created demand for tooling; (2) a contracting domestic market resulting from the U.S. TDM customers shifting production to foreign locations; (3) excess capacity in the TDM industry caused by reduced domestic market demand and new technologies; (4) customer demand for lower prices and more value-added service; (5) increasing foreign competition; and (6) rising costs, particularly labor-related costs. A number of these issues will continue into the foreseeable future.

- When asked what challenges the U.S. TDM producers are likely to face over the next three years, many respondents to the Commission's questionnaire stated that "survival" was an overriding concern. U.S. toolmakers have frequently mentioned that the current TDM business environment has resulted in significantly reduced profit margins, resulting in increased cash flow problems. Therefore, it becomes more difficult to obtain funding for purchasing state-of-the-art equipment and/or training deemed necessary to remain competitive.

- In the short term, there likely will be a significant number of firms exiting the industry. U.S. industry representatives estimate current excess production capacity at 25-30%. One industry representative forecasts a 50% decline in the number of firms in the U.S. TDM industry, despite forecasts that North American automakers expect to launch numerous new products during 2003-2005.

- The character of the U.S. TDM industry is likely to change, as small, often family owned businesses exit the sector and the number of larger firms (measured by sales and numbers of employees) increases. In the automotive TDM market, increased consolidation is forecast, resulting in fewer, larger firms that are able to supply a full range of TDM services.

- Suggestions for improving the competitive ability of U.S. TDM producers have been offered by TDM industry groups, and by U.S. producers and purchasers in response to Commission questionnaires:

    - U.S. TDM industry groups suggested the formation of industry-wide consortia in areas such as marketing and technical cooperation, and building a model of a world class TDM firm to benchmark the best global business and technical practices.

- U.S. TDM purchasers focused on operational improvements, such as investing in modern machinery, reducing lead times, and providing more value-added service.

- Some U.S. TDM producers suggested changes to existing U.S. laws and regulations, such as an investment tax credit to enhance their capability to purchase new machinery, and changes in the tax treatment for depreciating machinery to reflect the short life span and high cost of machinery and computer software used in TDM production.[6]

- With regard to healthcare, a major concern for many TDM producers, industry representatives suggested that laws be amended to allow trade associations to purchase group healthcare plans that would cover all interested member companies.

- Potential solutions to some of the U.S. TDM industry's challenges may lie in TDM business practices of other countries and in recommendations from groups that have studied the industry.

    - Where production and cost constraints allow, or in geographic areas in which TDM producers are concentrated, increased use of subcontracting certain precision machining operations to firms not focused on tooling production may be viable. However, some TDM producers note that in the current economic environment, there is unused capacity that would mitigate against the use of subcontractors unless firms were to reduce capacity. In Japan and Taiwan, subcontracting has been used not only to reduce lead times but also as a buffer in weak economic times against having excess capacity and employee layoffs.

    - In response to the abilities of larger foreign competitors, the formation of buyer groups for the purchase of materials, supplies such as cutting tools and fluids, and machinery also may be investigates. Such buyer groups might include firms in related industries, such as the precision machining industry.

    - Some foreign TDM producers are leveraging the amount of time firms have available to design by having design offices in several countries or continents. Emulating this expansion of operations to include other time zones may result in quicker lead times.

    - In the automotive market, some industry sources contend that in the past, U.S. TDM producers and original equipment parts suppliers have not aggressively pursued business with foreign transplant automotive producers in the U.S. Foreign transplants are expected by one source to

[6] U.S. TDM industry sources state that some foreign TDM competitor countries' tax treatment of machinery and software allows faster depreciation (by up to 4 years) than in the United States.

garner up to 40 percent of North American production by the end of the decade. Initiatives by U.S. toolmakers to gain access to this new business are considered essential to forestall the likelihood of this business otherwise being absorbed by foreign competitors.

- Foreign TDM industries and/or their governments also have recognized problems or opportunities facing TDM industries, and in many instances are implementing plans to move their industries forward.[7] The extent to which the U.S. TDM industry pursues industry-wide and firm level initiatives to improve its competitiveness, concurrent with numerous efforts by foreign TDM industries and governments to do so, will affect the outlook and future competitive ability of the U.S. TDM industry.

[7] A summary of these efforts appears in chapter 6, table 6-10