

Manufacturing in Maryland

The Cornerstone of Shared Prosperity

MAM

Manufacturers'
Alliance
of Maryland

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Developed by Sage Policy Group, Inc. for
Manufacturers’ Alliance of Maryland (MAM)

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Manufacturing in Maryland: The Cornerstone of Shared Prosperity

Executive Summary: **KEY FINDINGS**

In Maryland, there is a perception that manufacturing represents an important part of the state's economic past, but not necessarily its future. This notion is reinforced by figures that show by 2006 only 5.3 percent of Maryland's nonfarm jobs were in manufacturing, ranking the state 43rd in the nation and behind all states of the Mid-Atlantic region. Employment declines have been particularly pronounced in textile, apparel, and metal manufacturing.

Yet, there is a staggering disparity between these facts and the importance of manufacturing to prosperity in Maryland. Between 1996 and 2006, average manufacturing wages in Maryland rose 48.3 percent, more than the corresponding statistic for the overall state economy. The implication is that even as the number of Maryland workers employed in manufacturing has declined, the demand for higher-skilled workers has been on the rise. As a result, the number of workers employed in the sector remains significant as are the total sales, export values and the tax revenues generated by manufacturing.

The data reviewed in this report support a conclusion that manufacturing remains a vital component of Maryland's economy whose importance must not be discounted. At a time of declining state revenues, a heightened appreciation of its criticality to the state's prosperity dictates that any meaningful 21st century economic development strategy for Maryland must include manufacturing as a focal point.

The hi-tech manufacturing of today is increasingly based on the knowledge economy of tomorrow and not manufacturing's low tech product fabrication of the past. It is time for Maryland's policymakers to commit to an economic policy that is fully supportive of this transformation given the industry's disproportionate importance in terms of creating job opportunities, promoting innovation, generating revenues, and sustaining the Port of Baltimore.

The facts around manufacturing in Maryland clearly prove its economic value to workers and its fiscal impact on the state:

- The average wage per direct manufacturing job approaches \$60,000/annum;
- In 2007, the industry supported a total of 334,000 jobs in Maryland once one accounts for multiplier effects;
- These jobs were associated with \$16 billion in annual wage and salary income statewide, or nearly \$50,000 per job per annum;
- Maryland manufacturing was responsible for \$86.5 billion in total statewide business sales in 2007 or roughly 20 percent of state output.

While the pressures of global competition have steadily squeezed out labor intensive, low-tech manufacturing activities from Maryland, this report also makes clear the strength of Maryland's export manufacturing sector:

- In 2005, Maryland's top export sectors were transportation equipment (e.g., aerospace), computers/electronics, chemicals and machinery. Together, these four industries generated roughly \$4 billion in exports, which represented approximately two-thirds of Maryland's \$6 billion in manufacturing exports that year and well over half of Maryland's **total** exports.

- In 2007, Maryland's merchandise export shipments totaled \$8.9 billion, up 81 percent from the 2003 total of \$4.9 billion and is set to march higher in the years ahead, particularly if the state begins to pay attention to the industry's needs.

And at a time when the state is anticipating record tax revenue shortfalls, manufacturing activity is associated with augmented income, sales and other tax collections.

It is estimated that manufacturing in Maryland, and the workers and businesses that depend on the manufacturing sector, generated more than \$2.5 billion in tax revenue in FY 2007 for state and local government in Maryland.

To put this figure into perspective, \$2.5 billion represents approximately 18 percent of Maryland's FY-2007 General Fund Budget.

In 2007 *Forbes* Magazine ranked all 50 states in terms of best states for business. Maryland ranked 12th best overall, but within that ranking Maryland was 41st in terms of business costs.

Policy Recommendations

By focusing policy on several areas of interest to manufacturers, policymakers will promote a climate that encourages manufacturers to retain and increase their Maryland presence, Maryland employment, and Maryland purchasing. Necessary actions must:

■ Provide a competitive and stable business and regulatory environment

As a foundational principle, Maryland must have a stable and competitive business climate, especially in relation to neighboring states. Investment decisions take into account both current business climate issues such as a competitive tax and regulatory climate and the stability of that climate. Therefore, it is important for Maryland to maintain both an attractive and stable business climate to continue to attract capital investment, thereby fueling high-wage and medium-wage job creation.

In 2007 *Forbes* Magazine ranked all 50 states in terms of best states for business. Maryland ranked 12th best overall, but within that ranking Maryland was 41st in terms of business costs. To the extent that state government can assist manufacturers by providing them with access to competitive tax rates, reliable and competitively priced energy, assistance with health care costs and with a regulatory environment that does not overly burden producers vis-à-vis their competitors in neighboring states, it should do so.

■ Adopt a manufacturer-friendly energy policy

Of central importance is the cost and availability of electricity. Experts predict possible electricity shortages (brownouts and blackouts) by 2011. Even if additional transmission lines are installed in time to alleviate the projected shortages, issues of long-term energy cost competitiveness remain. Local manufacturers are concerned by a host of legislative initiatives, including the Renewable Portfolio Standard (RPS) the Healthy Air Act and the Regional Greenhouse Gas Initiative (RGGI) compact, all of which may result in higher electricity costs.

EXHIBIT E1: Total fiscal impacts of Maryland manufacturing

| Source of tax revenue | Value (millions) |
|--|------------------|
| Taxes paid by workers and individuals | \$1,900 |
| Taxes paid by manufacturers and businesses | \$640 |
| Total | \$2,540 |

Source: IMPLAN, Sage

Voluntary improvement in energy efficiency and energy conservation in all consuming segments is essential and should be constantly encouraged. Concurrently, policies that facilitate and enhance the production and use of traditional resources, as well as those that support development of market-based alternative energy sources and technologies should be continued.

MAM opposes any state government actions regarding climate change that could adversely affect the international competitiveness of Maryland's manufacturers.

■ Increase funding for Maryland Research & Development Tax Credit

Although resources are limited, the Governor and the General Assembly should consider increasing the funding for the state's Research and Development Tax Credit Program, which remains underfunded at its initial funding level in 2000 of \$6 million per year.

■ Market Maryland's interest in manufacturing to the world

Policymakers need to make it clear that Maryland remains committed to establishing itself on the cutting edge of a variety of 21st century industries, including aerospace, defense electronics, pharmaceuticals/life sciences, information technology and machinery. The goal should be to promote both foreign direct investment in Maryland and to position Maryland's manufacturers to gain domestic and export market share.

Conclusion

The following report shows Maryland is well-positioned to compete globally for high-tech manufacturing jobs as a result of its current activity, its educated and well-trained workforce, and the state's strategic location. To maximize manufacturing's potential as a sector that helps Maryland emerge from the current economic slowdown and builds sustained growth elected officials must address these issues and orient the policy environment towards supporting significant long term manufacturing investments.



Manufacturing in Maryland: The Cornerstone of Shared Prosperity

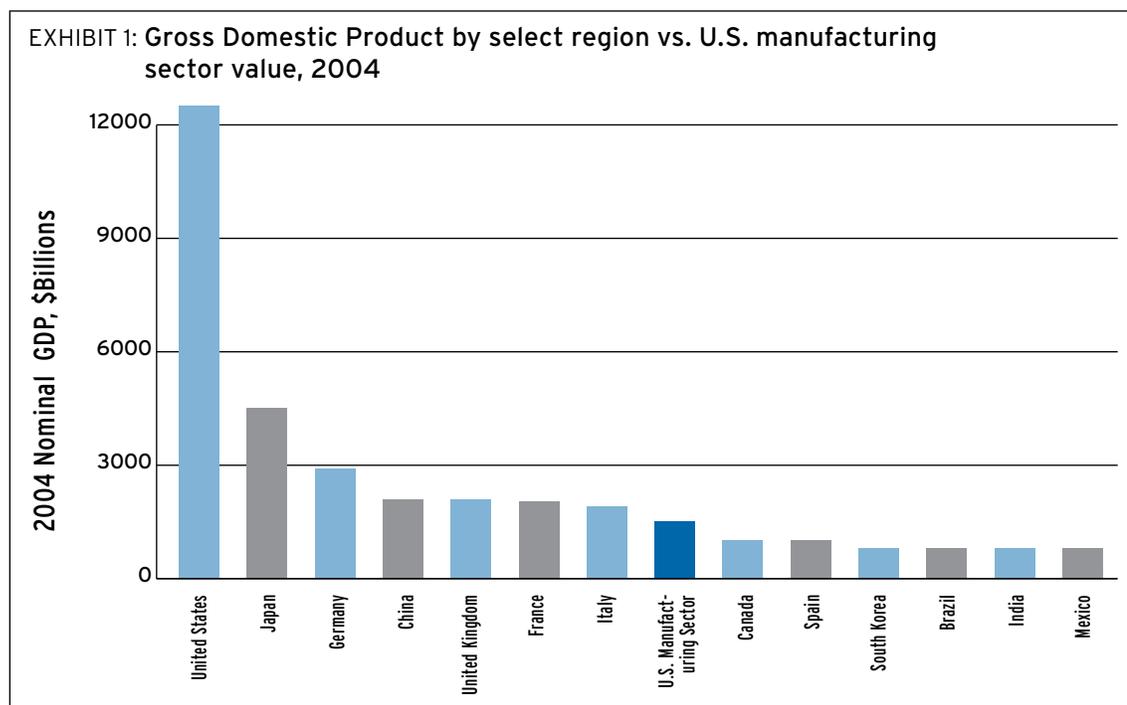
Introduction

The State of U.S. Manufacturing

It is regarded by some observers as axiomatic that America is evolving towards a post-Industrial society and that it is simply a matter of time before the domestic economic landscape is virtually devoid of industrial pursuits. This has much to do with the perception of China as an indefatigable industrial rival that benefits from its access to dramatically cheaper labor and a less restrictive regulatory environment. Other nations also share these characteristics, with the implication being that America will become increasingly service oriented over time, leaving production activities to others.

But the economic data present a far more complex view of the recent past and future. Industrial output produced in America has been rising, and China has sustained the most significant declines in manufacturing employment in the world as new production

techniques replace outmoded, inefficient processes. In fact, manufacturing's share of the U.S. economy, as measured by real GDP, has been stable since the 1940s. During this time, the ratio of manufacturing output to GDP has ranged from 16 percent to 19 percent.



Source: IMF; BEA; National Association of Manufacturers

As an example of just how massive America's industrial sector remains, according to data sourced from the International Monetary Fund and the Bureau of Economic Analysis, in 2005, the U.S. manufacturing sector by itself would have ranked as the world's eighth largest economy (see Exhibit 1 on page 6), seventh if the overall U.S. economy were not included in the comparison. In that year, the U.S. manufacturing sector created roughly \$1.5 trillion in output.

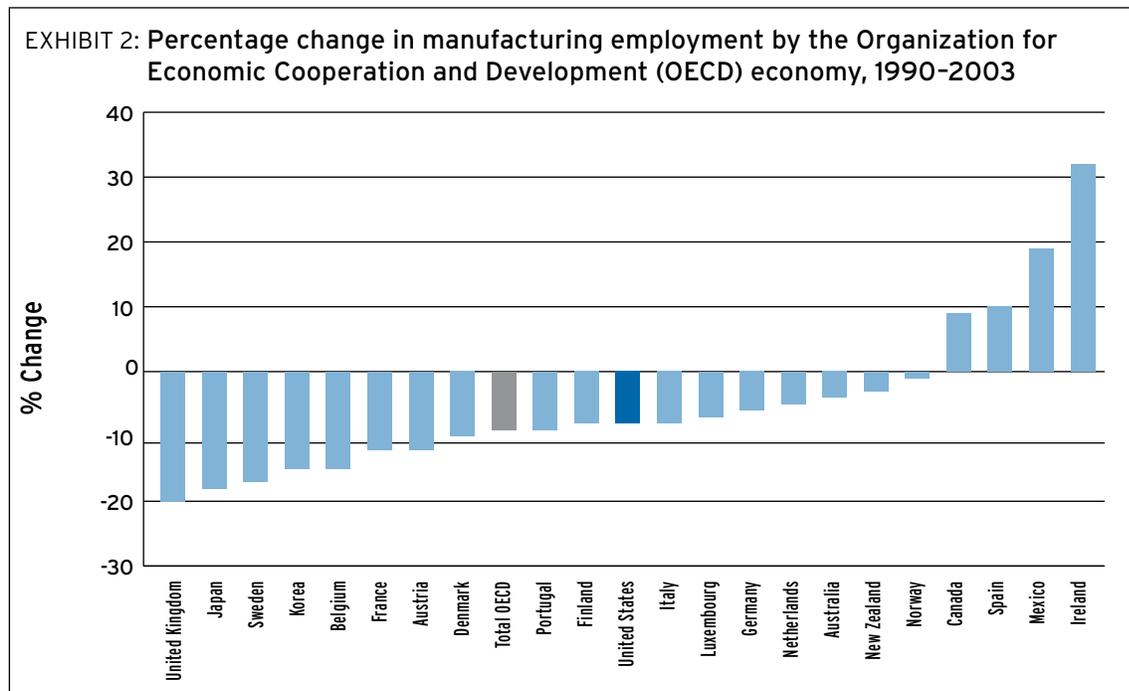
America has been able to retain a larger share of its manufacturing employment than have a number of other industrialized nations.

Moreover, America has been able to retain a larger share of its manufacturing employment than have a number of other industrialized nations. As Exhibit 2 below indicates, the U.K., Japan and South Korea have each shed jobs at a more rapid clip than has the U.S. This is due to a host of competitive advantages that America continues to leverage, including world-class research laboratories, R&D

spending, protection of intellectual property rights, a unique relationship between institutions of higher education and manufacturers, the scale of the domestic economy and functional capital markets (normally). To the extent that U.S. has experienced losses in manufacturing, much of this is due to gains in productivity as opposed to losses in aggregate output.

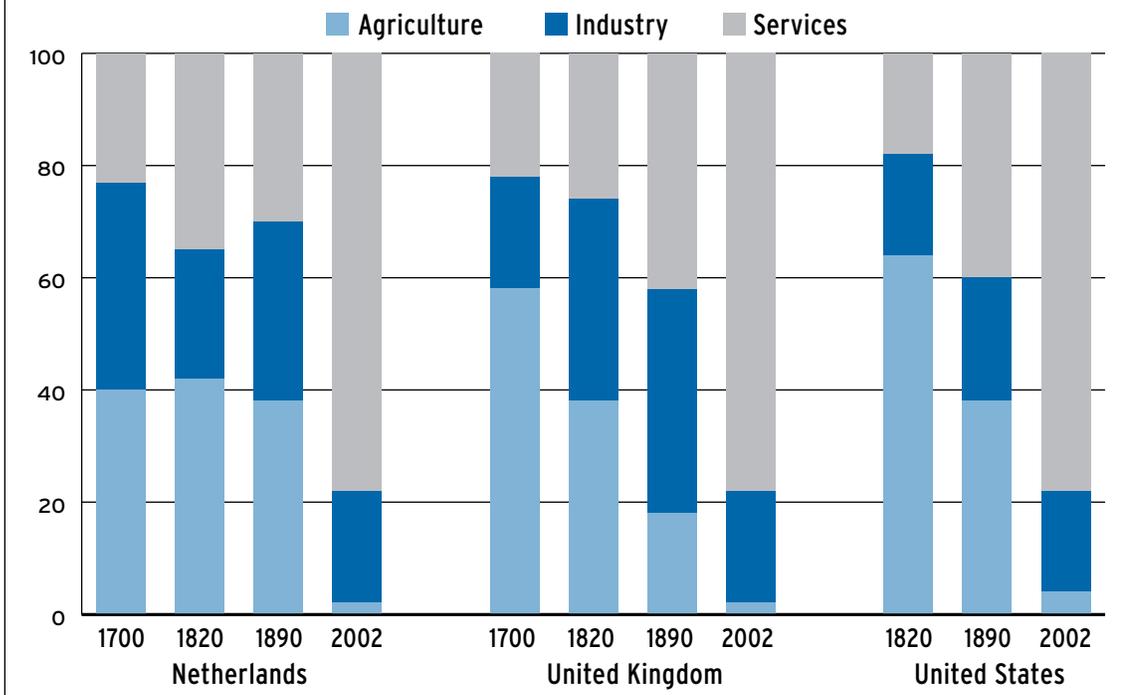
Unfortunately, the loss of manufacturing employment has led many policymakers to deemphasize its import in the makeup of the modern economy. This is puzzling in light of the ongoing view that agriculture remains a critical component of the nation's economy, despite the fact that agriculture's share of total U.S. employment has fallen far more dramatically than has manufacturing's over time, not just in the U.S. but also in representative OECD nations. This is reflected in Exhibit 3 on page 8.

Rather than choose to ignore agriculture, policymakers have implemented a variety of policies to promote farming and related activities, including direct subsidization, technical assistance, ethanol policy, and a host of other initiatives. Manufacturing has not enjoyed similar considerations.



Source: Pilat, D. et.al (2006/9). *The Changing Nature of Manufacturing in OECD Economies*, STI Working paper.

EXHIBIT 3: Share of employment in main economic activities, select OECD economies, 1700-2002



Source: Pilat, D. et.al (2006/9). *The Changing Nature of Manufacturing in OECD Economies*, STI Working paper.

Manufacturing in Maryland Today

In Maryland, there is arguably an even greater perception that manufacturing represents an important part of the state's economic past, but not necessarily its future. After all, eight decades ago, Maryland ranked 16th in the nation in terms of the value of industrial production, ranking ahead of states such as Virginia, Georgia and South Carolina.

Well after World War II, Maryland's manufacturing activities continued to be rapidly expanding. A March 1962 report by the Research Division of the Maryland Department of Economic Development (DED) pointed out that, "Among the five mid-eastern states, Maryland's rate of growth of manufacturing employment from 1947 to 1958 of 13.3% (from 228,655 to 259,085) was topped only by Delaware."¹ But in that same report, DED foreshadowed economic transitions to come. "Maryland's work force followed the national trend by moving into non-manufacturing employment faster than into manufacturing employment . . .

¹ Maryland DED (March 1962), *The Maryland Economy: Composition, Changes, Trends*.

Consequently, the percentage of manufacturing employment to non-manufacturing employment fell from 39.8% in 1950 to 34.9% in 1960."²

By 2006, only 5.3 percent of Maryland's nonfarm jobs were in manufacturing, ranking the state 43rd in the nation and behind all states of the Mid-Atlantic region. Employment declines have been particularly pronounced in textile, apparel, metal, and computer and electronic product manufacturing with these sectors experiencing a greater than 20 percent decline of average annual employment since 2002. Indiana and Wisconsin reported the highest proportions of manufacturing jobs in the nation at 19 and 18 percent, respectively. Hawaii ranked last at 2.5 percent.

These statistics can be used to suggest that Maryland should de-emphasize manufacturing in its economic development efforts and focus instead on a combination of high, medium, and low wage service sector industries such as information technology, medical research/biotech, financial services and tourism. But this type of juxtaposition is completely inappropriate. Though it is true

² Id.

that Maryland is unlikely to be globally competitive in low-tech areas such as apparel and textiles, Marylanders can help the U.S. compete in the area of high-technology manufacturing, and should do so not only for nationalistic reasons, but also to promote more broadly shared prosperity.

This report provides an update regarding the economic and fiscal impacts of Maryland's manufacturing industry on the state's economy. It also provides significant background information to help policymakers understand just how important the sector remains to Maryland's long-term economic prospects, particularly in the areas of innovation, exports, and middle class household formation.

Marylanders can help the U.S. compete in the area of high-technology manufacturing, and should do so not only for nationalistic reasons, but also to promote more broadly shared prosperity.

Maryland Manufacturing: A Brief History

■ Manufacturing is integral to Maryland's economic heritage

While the tidewater tobacco trade was the centerpiece of Maryland's economy in the 1770s, a number of manufacturing segments emerged during this period and would eventually become more important to the populace.³ The most important of these was the timber industry and allied trades, including carpentry and shipbuilding. Iron manufacturing and numerous commercial, craft and service sectors also emerged during this period.

Wherever good ship timber stood proximate to navigable water, shipbuilding proved a natural pursuit for the local labor force. Shipyards were established on the Eastern Shore in the seventeenth century, primarily in the small ports of Talbot and Kent counties. As early as the mid-eighteenth century, the maritime industry also could be

³ Arnold and Basu (2003), *Maryland: Old Line to New Prosperity*, American Historical Press, p. 41.

found in Annapolis, Baltimore and other ports of the Western Shore. These enterprises, in turn, spawned ropewalks, sail manufacturers, iron forgers and other nautical trades.⁴ While there are no accurate statistics regarding the number of vessels constructed in Maryland's shipyards, figures from the 1756-1775 Annapolis port books record the presence of 386 Maryland-built boats.

Iron furnaces emerged as some of the largest structures in the colony, often twenty-five feet on one side and thirty or forty feet tall. Forges used to refine crude pig iron were almost as large. While the British Iron Act of 1750 prohibited Americans from manufacturing finished metal products, the regulation was ignored. Maryland's furnaces manufactured a wide variety of items, including nails, pots, pans, black-smithing tools, axes, agricultural implements, ship fittings, barrel hoops, Dutch ovens and dozens of additional items for the home, farm and shop.

The scale of Maryland's manufacturing activities expanded into the early nineteenth century, and then was catalyzed by the Baltimore and Ohio Railroad Company, which was chartered by the Maryland Assembly on February 28, 1827. Because of a combination of legal, financial and engineering issues, the railroad did not reach Cumberland until 1842. After constructing eleven tunnels and more than one hundred bridges, the railroad completed its final link over the mountains to Wheeling on the Ohio River in 1852.

By the early twentieth century, Baltimore stood as the fourth largest clothing manufacturer in the United States.

Maryland's transportation system came to focus heavily upon the port of Baltimore, which assured its pre-eminent position as the state's manufacturing and commercial center. With its intermodal transportation infrastructure in place, Baltimore in the 1850s was by far the largest industrial center south of the Mason-Dixon Line. In excess of 17,000 people were employed in its factories and shops in 1860. Two trades dominated the industrial sector by this time: clothing producers

⁴ Id.

employed over 6,000 men and women and the iron industry boasted roughly 4,000 workers.⁵

By the early twentieth century, Baltimore stood as the fourth largest clothing manufacturer in the United States. By 1910, 349 firms, employing 20,670 people, produced men's clothing and shirts, while another 2,953 people made women's apparel. The city's foundries, car works, copper smelters and steel mills provided well over 20,000 jobs by 1910 and made Baltimore the "Pittsburgh of Maryland." This base of activities positioned Baltimore and Maryland to support the nation's activities as World War I approached.

Since World War II, Maryland has transitioned to a new type of manufacturing, led by global enterprises such as Black & Decker, WL Gore and Associates, and MedImmune.

During the five years between 1914 and 1919, Baltimore's labor pool rose by a third. Investment in plants and machinery doubled and the city annexed most of its major industrial suburbs with the exception of Sparrows Point. National defense needs had provided Maryland with the opportunity to show its value as a center of waterborne traffic and as an industrial complex that could expand rapidly under pressure. Shipbuilding became even more prominent during these years. The Cunard Line ordered a number of large freighters, the U.S. Navy purchased fifty vessels, and employment in this sector rose from 2,000 to 20,000 in just a few short years.

One after another, national and international manufacturing firms began to locate in Baltimore during the early 20th century, including Lever Brothers, Proctor and Gamble, Crosse and Blackwell, Revere Copper, and Rustless Iron and Steel (Armco Steel). In 1928 alone, forty-four businesses came to the area bringing 4,000 jobs with them. Among these arrivals were the Glenn L. Martin Airplane Company and Western Electric, the equipment manufacturer for American Telephone & Telegraph. Martin had been producing planes for the navy in Cleveland, but chose to move its entire operation to Baltimore because it was so proximate

⁵ Id., p. 66.

to Washington and the government facilities at Norfolk. Western Electric Company's decision to locate its primary Eastern cable production facility in Baltimore was described by the Association of Commerce as "the major event of the city's industry life since the conclusion of the World War (I)." Many of the industries attracted to Maryland were attracted here because of the state's excellent port facilities and major improvements in their efficiency made through private investment and state bond issues.

During the Great Depression, this industrial capacity was financially strained, and during the worst period from 1931-1934, several hundred Baltimore businesses of all types failed. But this was reversed after 1935 by the arrival of additional manufacturers, the largest of which was the General Motors Company, which located a Chevrolet assembly plant here in 1935. By 1939, the Baltimore's industrial employment exceeded its 1929 level, and while joblessness remained at 9.9 percent, the figure was approximately 4 percentage points lower than the national average.⁶

The Second World War helped to spread prosperity to much of the balance of Maryland. In Western Maryland, the Celanese plant began producing a synthetic yarn, Foristan, used in making parachutes and a variety of other items for soldiers in the tropics. Celanese's production expanded 35 percent and employment peaked at 13,000. Almost half of these workers were women. During the war, the Kelly-Springfield Tire Company turned to the manufacturer of .50 caliber armor-piercing cartridges and mortar shells, and when synthetic rubber became available in 1943, the company also began making tires again. Two years later the firm returned to civilian production and became Allegany County's economic mainstay for the next 35 years.

Historians generally agree that the greatest single enterprise in Baltimore's war effort was Bethlehem Steel's herculean shipbuilding program. Its Sparrows Point shipyards built ninety-eight vessels, including a number of oil tankers weighing over 200,000 dead-weight tons. At the time, these were among the largest ships afloat.⁷ Perhaps even more spectacular in the annals of shipbuilding was the construction of 508 vessels, mostly Liberty ships for the merchant marine, located across the harbor at Fairfield. In

⁶ Id., p. 119.

⁷ Id. p. 135.

the fall of 1943, the Fairfield yards were completing four ships per week, constructing them in thirty days from keel laying to launching. At peak employment, Bethlehem boasted over 60,000 workers on its Baltimore payrolls, 46,700 at Fairfield alone.

Glenn L. Martin Aircraft expanded rapidly as well. In 1939, it had received orders from England and France and began production on its B-26 Marauder for the United States. By 1945, it had manufactured over 10,000 aircraft and countless components. Between 1938 and 1940 employment grew from 3,500 to 13,000 and at its peak in 1943, the number reached 53,000.

Since World War II, Maryland has transitioned to a new type of manufacturing, led by global enterprises such as Black & Decker, WL Gore and Associates, and MedImmune. Assembly line processes have steadily disappeared, replaced by purely technological processes that are less labor intensive and associated with the manufacture of defense electronics, fiber optics, biological products (MedImmune maintains a large manufacturing facility in Frederick and is building another one there) and software.

And in the post 9-11 world, the ability of Maryland's manufacturing sector to answer the nation's call has been reaffirmed. Serving as headquarters to Lockheed Martin, BAE Systems, and home to Northrop Grumman's Electronic Systems, ATK's Advanced Propulsion and Space Systems Group in Cecil County and to a host of other defense and related contractors, Maryland continues to represent a disproportionate share of the nation's defense manufacturing capacity. Indeed, Northrop Grumman remains Maryland's largest for profit private sector employer.

Manufacturing Today: A Global, High-Tech, High-Wage, High Educational Attainment Sector

■ Exports and Globalization

The pressures of global competition have steadily squeezed out labor intensive, low-tech manufacturing activities from the U.S. and Maryland economic markets. In 2004, according to the National Association of Manufacturers,

traditional Maryland strongholds such as apparel and paper manufacturing were no longer among the top ten Maryland manufacturing sectors. Among the top five were chemicals, computers & electronics, and machinery, an indication of the growing sophistication of today's Free State manufacturing segment. Meanwhile, more traditional manufacturing firms such as PPG, Celanese, Western Electric and Kelly Springfield disappeared from Maryland.

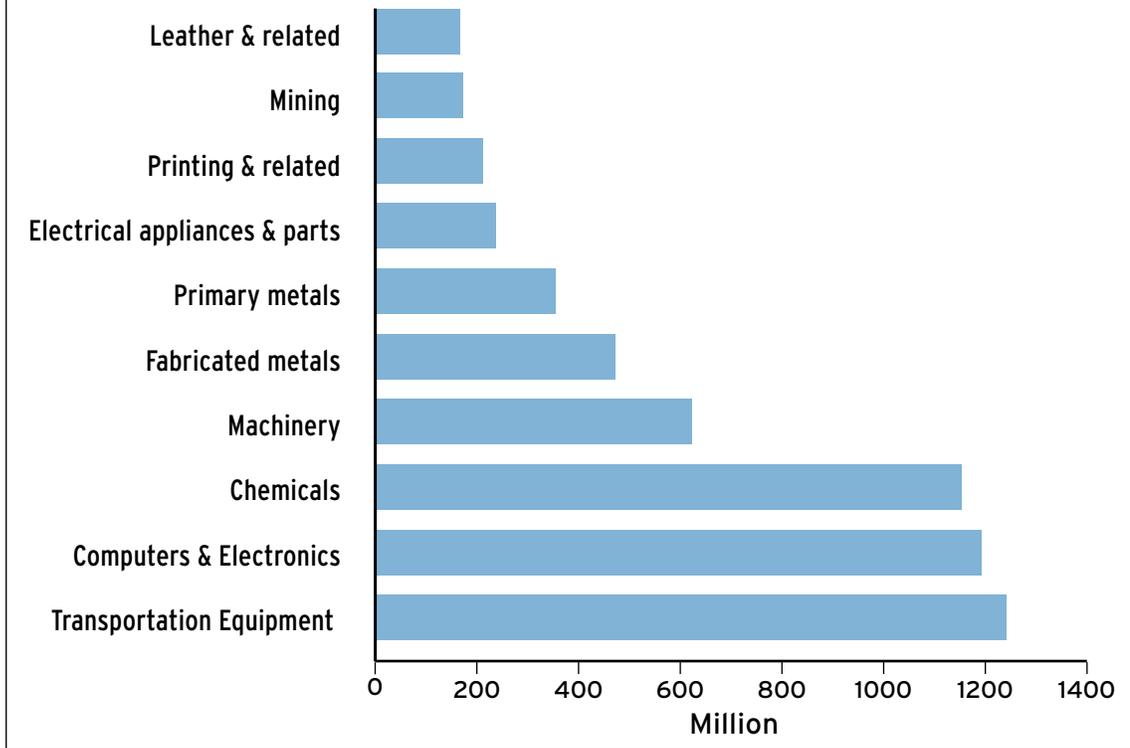
Export data provide a similar picture. In 2005, Maryland's top export sectors, which have become increasingly important given America's need to close its massive trade gap and the opportunities created by a weak dollar, were transportation equipment (e.g., aerospace), computers/electronics, chemicals and machinery (Exhibit 4 on page 12). Together, these four industries generated roughly \$4 billion in exports, which represented approximately two-thirds of total Maryland manufacturing exports that year and well over half of Maryland's total exports. By contrast, fabric mill products ranked 14th among Maryland's export industries, paper ranked 15th and wood products ranked 16th. These three sectors generated not quite \$250 million in exports in 2005. Overall, manufacturing represents roughly 90 percent of total Maryland exports.

In 2005, Maryland's top export sectors were transportation equipment (e.g., aerospace), computers/electronics, chemicals and machinery.

Despite the fact that Maryland's export base is dominated by a handful of high-tech manufacturing sectors, the number of companies exporting from Maryland numbers in the thousands. Specifically, according to the International Trade Administration of the U.S. Department of Commerce, a total of 3,575 companies exported goods from Maryland locations in 2005. Of these, 3,066 (86 percent) were small and medium-sized enterprises employing fewer than 500 people.

The potential of Maryland's export base for growth is explosive. Maryland's merchandise export shipments in 2007 totaled \$8.9 billion,

EXHIBIT 4: Top 10 Maryland export sectors, 2005



Source: U.S. Commerce Department

up 81 percent from the 2003 total of \$4.9 billion (Exhibit 5 on page 13). Among the 50 U.S. states, this percentage increase ranked Maryland 16th.⁸

In 2007, Maryland's manufacturers exported to 205 foreign destinations. Canada was Maryland's leading export market. That year, Maryland delivered \$1.4 billion of output to Canadian customers, or 16 percent of the state's total. Egypt (\$713 million) was Maryland's second leading market, followed by the U.K. (\$470 million), Mexico (\$466 million) and China (\$446 million).⁹

Exhibit 6 on page 14 is a list of the largest manufacturing employers statewide and their respective product/service areas. Many of these firms are involved in cutting edge industries, such as defense electronics, aeronautics, systems engineering, medical diagnostics, specialty chemicals, software and aircraft engines.

⁸ Source: Origin of Movement State Export Series, Bureau of the Census, Foreign Trade Division

⁹ Revised Origin of Movement State Export Series, Bureau of the Census, Foreign Trade Division

■ A Smaller, More Skilled Manufacturing Workforce

During the three decades that followed the mid-1970s, the U.S. lost almost 5 million manufacturing jobs. During that period, the industry's share of the nation's workforce dipped from 20 percent in 1979 to roughly 10 percent today. By 2003, the U.S. manufacturing sector employed roughly the same number of workers, 16 million, as it did in 1961.

Productivity growth and mounting competition in labor-intensive goods production from lower-cost foreign manufacturers have in significant measure driven this decline. Low-skilled workers have disproportionately felt the impact of these forces. Nevertheless, while elevated productivity and globalization have produced job losses for less skilled U.S. workers, they have also helped create high-skill jobs. In fact, high-skill manufacturing employment, an area in which the U.S. and Maryland enjoy a competitive edge, has been expanding.¹⁰

¹⁰ Deitz and Orr (2006), A Leaner, More Skilled U.S. Manufacturing Workforce, Federal Reserve Bank of New York.

Together, the job-producing and job-displacing effects of trade and technology have led to a transformation in the types of jobs performed in America's manufacturing sector. Between 1983 and 2002, employment in high-skill manufacturing occupations, which is largely comprised of professional specialty occupations, increased 37 percent, an increase of roughly 1.2 million jobs.¹¹ High-skill jobs were the only source of job growth in America's manufacturing sector during this period, and these workers now represent one-quarter of the sector's workforce.

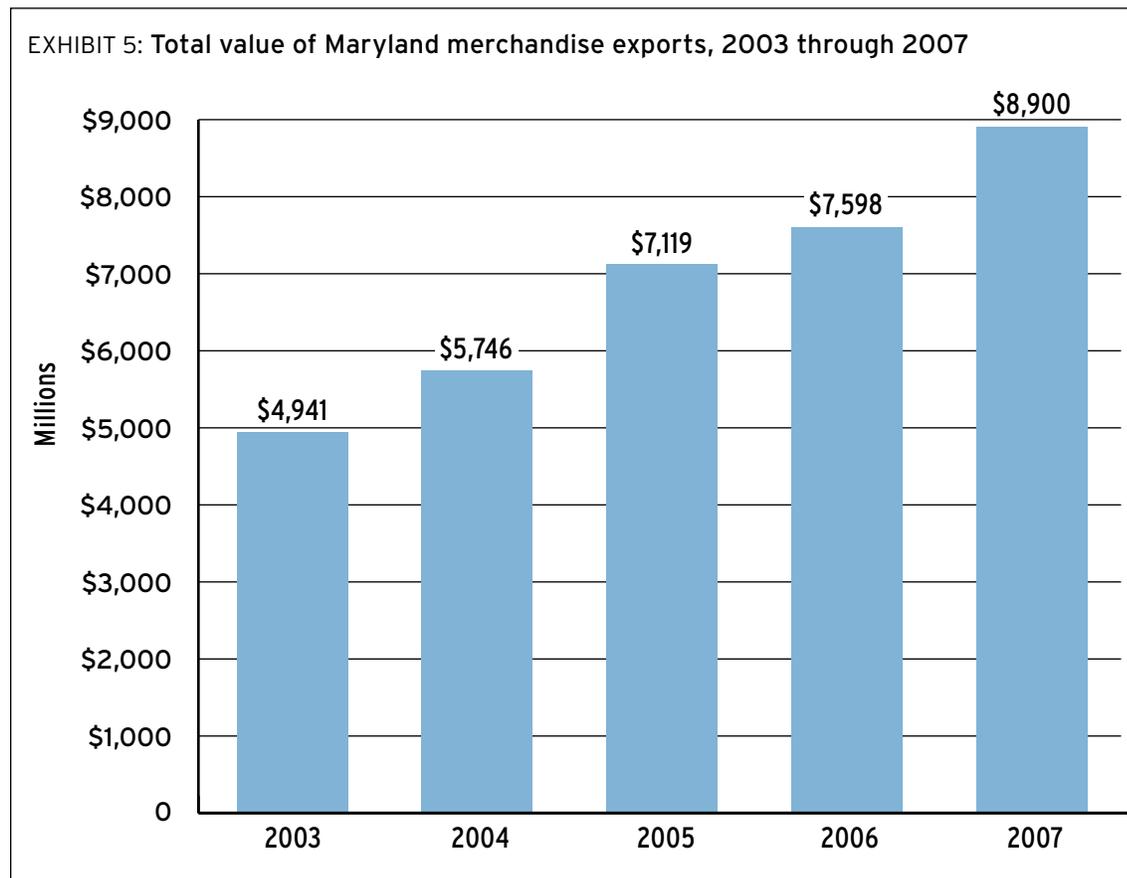
By contrast, low-skill jobs declined 25 percent from 1983-2002, a loss of roughly 2 million workers, and mid-skill positions, which include occupational categories such as sales, administrative, craft and repair, declined by almost 18 percent, or roughly 1.3 million jobs.

■ High-Tech, High-Wage

Given the sophistication and cost structure of Maryland's economy, it is not surprising that the Free State has been particularly accommodating to the presence of high-wage, high-tech manufacturing activities. On average, production workers in Maryland added \$85.90 in manufacturing value for each hour worked in 2000, a manufacturing productivity level that was 3 percent higher than the national level of \$83.42. Production workers accounted for 64 percent of Maryland manufacturing workforce that year compared to 72 percent nationwide. The implication is that Maryland's manufacturing sector possesses a higher-than-average share of non-production (e.g., design-oriented, service-oriented, strategically-oriented) workers, a category that encompasses engineering, technical activities, management, legal and financial duties and other office functions.¹²

¹¹ Id.

¹² Maryland Department of Business and Economic Development.



Source: U.S. Commerce Department; Maryland Department of Business and Economic Development

The growing sophistication of the typical Maryland manufacturing worker can also be viewed in a number of other ways. Exhibit 7 on page 15 details the progression of average manufacturing wages (wage/worker) in Maryland over time. Between 1996 and 2006, average manufacturing wages in Maryland rose 48.3 percent, more

Given the sophistication and cost structure of Maryland's economy, it is not surprising that the Free State has been particularly accommodating to the presence of high-wage, high-tech manufacturing activities.

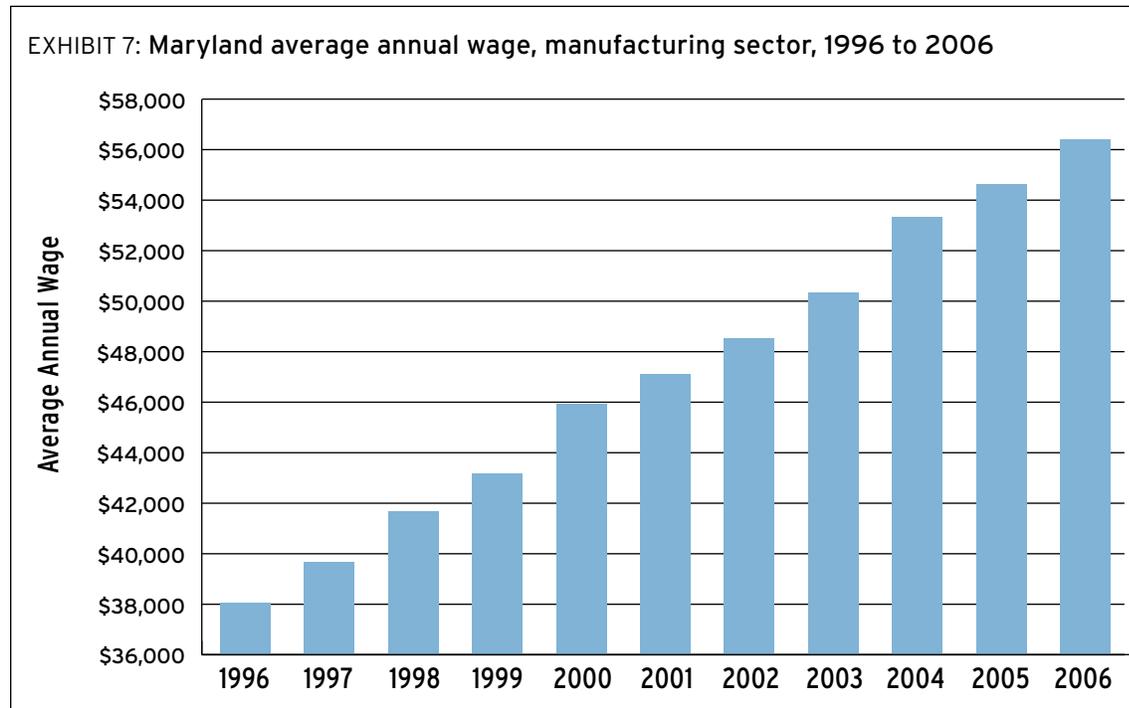
Exhibit 6: **Leading Manufacturers in Maryland**

| Name | Principal Area of products and services |
|---------------------------------|--|
| AAI Corp. | Unmanned aircraft systems, training/simulation systems, test equipment |
| Air Products and Chemicals Inc. | Atmospheric gases, process and specialty gases, performance materials |
| ARINC Inc. | Transportation communications, systems engineering |
| BAE Systems | Land, air, and sea defense systems |
| BD Diagnostic Systems | Medical diagnostics products |
| Black & Decker Corp. | Power tools/accessories, hardware, home improvement products |
| Coca-Cola Enterprises | Beverages |
| Ciena Corp. | Systems, software, access, data, transport/switching, packet interworking |
| Diageo North America | Spirits, wine, beer |
| Frito-Lay Inc. | Snack foods |
| GM Allison Transmission | Automatic transmissions |
| Lockheed Martin Corp. | Aeronautics, electronic systems, space systems, communications |
| McCormick & Co. Inc. | Spices, herbs, seasonings |
| MedImmune | Pharmaceuticals |
| New Page | Paper |
| Northrop Grumman Corp. | Defense electronics and systems, radar, electronic countermeasures |
| The Pepsi Bottling Group, Inc. | Beverages |
| Perdue Farms | Poultry |
| Phillips Foods | Seafood |
| Procter & Gamble Cosmetics | Cosmetics, toiletries, household and personal products |
| Severstal Sparrows Point, LLC | Steel mill products, steel sheets, railroad rails |
| Smithfield Foods | Pork, turkey |
| Solo Cup Co. | Food service and food packaging products |
| Unilever | Liquid laundry detergents and fabric conditioners |
| Volvo Mack Truck | Trucks |
| W.L. Gore & Assoc. | Cable, cable assemblies, electronic and electrochemical materials, fabrics, fibers, filtration, geochemical, medical, pharmaceutical, sealants, venting products |
| W.R. Grace & Co. | Specialty chemicals and materials |

than the corresponding statistic for the overall state economy. The implication is that even as the number of Maryland workers in manufacturing has declined, the demand for higher-skilled workers has been on the rise allowing wages to increase off an already elevated base.

Another way to view this is by analyzing trends in educational attainment. According to 2001 U.S.

Census data, Maryland ranked in the top half of U.S. states in terms of the educational level of its workforce. Maryland's ranking would have been higher but for the significant presence of food processing, an industry of great importance and potential in a world increasingly characterized by food shortages, but which does not necessarily create outsized demands for technically sophisticated personnel.



Source: Maryland Department of Labor, Licensing and Regulation

Profile of Maryland Manufacturing and Total Impact on Maryland's Economy

Maryland's Manufacturing Industry in Statistical Brief

For the manufacturing sector, the most generally reliable source of employment data are those collected by the state and federal government as a part of the unemployment insurance program. These data are published quarterly, the most recent published data being for the third quarter of the year 2007. Exhibit 8 on page 17 provides employment and establishment data for a recently completed quarter.

As shown in the exhibit, the most recent estimate of total manufacturing employment in Maryland is almost 132,000 workers. This represents roughly a 3 percent decrease from the average annual employment in 2006. The number of manufacturing establishments also declined about 3 percent from the 2006 annual average of 4,188 to 4,066 in the third quarter of 2007.

Manufacturing's Economic Impact

One of the strengths of Maryland's manufacturing sector is its capacity to provide substantial wages to its workers. For example, in 2006, the average manufacturing worker in Maryland earned \$56,426 or 27 percent more than the average for all private-sector workers in the state (\$44,519).

As shown in Exhibit 9 on page 18, average annual wages per worker varied significantly among the state's manufacturing sectors, and ranged from over \$27,000 in the apparel sector to over \$90,000 in the computer and electronic products sector. During the most recent full year for which data are available, the manufacturing industry as a whole generated \$7.7 billion in wages for

Maryland workers in 2006. Four of the sectors below pay in excess of \$60,000/job on average.

It should be noted that wages do not include the value of benefits paid to manufacturing workers. The manufacturing sector has a strong tradition of providing substantial benefits to its workers. In Maryland, the value of benefits to workers, including highly attractive medical benefits, is estimated at 21 percent of wages or roughly \$1.6 billion in 2006.¹³

In fact, high health costs have become a particularly serious drag on employment in economic sectors such as manufacturing that have historically provided good jobs with benefits. Because of manufacturing's historic commitment to the well being of its employees, it has fully felt the sting of the nation's health care crisis.

¹³ While the Maryland Department of Labor, Licensing, and Regulation estimates that the average manufacturing worker received \$56,426 in wages in 2006, the estimate of total compensation provided to the average Maryland manufacturing worker in that year is \$71,457. The estimate of total compensation is derived from data provided by IMPLAN, a standard source of economic data on employment, value added, and business sales and revenue. The difference between total compensation and wages is the value of benefits provided to workers.

The \$7.7 billion in wages for manufacturing workers reflected in Exhibit 9 also do not include all types of income or value added that are generated by the manufacturing industry in the state. In addition to employee wages and benefits, manufacturers generate an estimated \$0.8 billion in proprietor (business owner) income and an additional \$5.1 billion in other indirect income, including income from manufacturing-related intellectual property, dividends, royalties and licensing fees.

The value of the goods created by Maryland manufacturers in 2006, the most recent year for which data are available, is estimated at \$52.7 billion. As shown in Exhibit 10 on page 19, almost half of this value was created by three manufacturing sectors: chemicals, computer/electronic products, and food.

Another substantial strength of manufacturing is its capacity to support other economic activity. Maryland's manufacturers purchase a wide range of

Exhibit 8: Maryland manufacturing establishments and employment

| Manufacturing sector | 2007 Third Quarter | |
|---|--------------------------|--------------------|
| | Number of Establishments | Average Employment |
| Food | 367 | 15,550 |
| Beverage and tobacco product | 63 | 3,925 |
| Textile mills | 44 | 1,354 |
| Textile product mills | 123 | 980 |
| Apparel | 56 | 1,423 |
| Leather and allied product | 13 | 153 |
| Wood product | 146 | 3,091 |
| Paper | 47 | 4,646 |
| Printing and related support activities | 663 | 12,650 |
| Petroleum and coal products | 37 | 843 |
| Chemical | 238 | 12,677 |
| Plastics and rubber products | 97 | 6,829 |
| Nonmetallic mineral product | 174 | 4,873 |
| Primary metal | 59 | 3,594 |
| Fabricated metal product | 471 | 9,981 |
| Machinery | 227 | 7,647 |
| Computer and electronic product | 310 | 22,071 |
| Electrical equipment and appliance mfg. | 83 | 2,183 |
| Transportation equipment | 140 | 8,074 |
| Furniture and related product | 263 | 3,930 |
| Miscellaneous | 445 | 5,280 |
| Total Manufacturing | 4,066 | 131,754 |

goods and services as inputs into the manufacturing process. These suppliers, in turn, are able to purchase other goods and services because of the business revenues they receive from manufacturers. This cascading series of business-to-business transactions is considered the indirect effect of Maryland's manufacturing industry. In addition, manufacturing

sector workers and workers within the broader supply chain spend their wages on a vast array of consumer purchases, which creates the induced (household spending) effect of the manufacturing industry.

These indirect (business-to-business) and induced (household) effects are often called the multiplier effect, which can be measured in terms of jobs,

Exhibit 9: Maryland manufacturing annual wages

| Manufacturing sector | Annual Wages per Worker, 2006 | Total Annual Wages (millions) | Share of Total Annual Wages |
|---|-------------------------------|-------------------------------|-----------------------------|
| Food | \$39,255 | \$626 | 8.1% |
| Beverage and tobacco product | \$46,375 | \$197 | 2.6% |
| Textile mills | \$32,796 | \$49 | 0.6% |
| Textile product mills | \$35,679 | \$34 | 0.4% |
| Apparel | \$27,360 | \$48 | 0.6% |
| Leather and allied product | \$43,427 | \$8 | 0.1% |
| Wood product | \$36,810 | \$131 | 1.7% |
| Paper | \$42,392 | \$222 | 2.9% |
| Printing and related support activities | \$47,736 | \$633 | 8.2% |
| Petroleum and coal products | \$57,329 | \$58 | 0.7% |
| Chemical | \$70,485 | \$848 | 11.0% |
| Plastics and rubber products | \$48,936 | \$375 | 4.9% |
| Nonmetallic mineral product | \$45,680 | \$232 | 3.0% |
| Primary metal | \$65,786 | \$239 | 3.1% |
| Fabricated metal product | \$45,563 | \$449 | 5.8% |
| Machinery | \$65,638 | \$580 | 7.5% |
| Computer and electronic product | \$90,813 | \$1,977 | 25.7% |
| Electrical equipment and appliance mfg. | \$51,702 | \$112 | 1.5% |
| Transportation equipment | \$59,544 | \$496 | 6.5% |
| Furniture and related product | \$36,518 | \$153 | 2.0% |
| Miscellaneous | \$43,969 | \$224 | 2.9% |
| Total | \$56,426 | \$7,693 | 100.0% |

Source: Maryland Department of Labor, Licensing, and Regulation
Note: Values may not add up due to rounding

wages or income, and sales by businesses. Exhibit 11 on page 20 presents data on the multiplier effect of Maryland manufacturing jobs on the creation of other jobs in Maryland. Based on the most recent employment data for the third quarter of 2007, it is estimated that the 131,754 manufacturing jobs in Maryland support an additional 202,013 indirect and induced jobs. In total,

Maryland manufacturing supported 333,767 jobs statewide in the third quarter of 2007.

Exhibit 12 on page 21 presents sector by sector information regarding the multiplier effect of Maryland manufacturing wages. Average weekly wages in the third quarter of 2007 were 1.4 percent higher than the average wage for all of 2006.

Exhibit 10: Value of Maryland manufacturing sales, shipments, and revenue

| Manufacturing sector | Annual Sales, Shipments, Revenue (millions) | Share of Total Annual Sales, Shipments, Revenue |
|---|---|---|
| Food | \$6,083 | 11.6% |
| Beverage and tobacco product | \$2,852 | 5.4% |
| Textile mills | \$367 | 0.7% |
| Textile product mills | \$188 | 0.4% |
| Apparel | \$340 | 0.6% |
| Leather and allied product | \$44 | 0.1% |
| Wood product | \$839 | 1.6% |
| Paper | \$1,810 | 3.4% |
| Printing and related support activities | \$2,045 | 3.9% |
| Petroleum and coal products | \$767 | 1.5% |
| Chemical | \$9,811 | 18.6% |
| Plastics and rubber products | \$2,082 | 4.0% |
| Nonmetallic mineral product | \$1,472 | 2.8% |
| Primary metal | \$2,335 | 4.4% |
| Fabricated metal product | \$2,693 | 5.1% |
| Machinery | \$3,653 | 6.9% |
| Computer and electronic product | \$9,666 | 18.4% |
| Electrical equipment and appliance mfg. | \$697 | 1.3% |
| Transportation equipment | \$2,638 | 5.0% |
| Furniture and related product | \$1,578 | 3.0% |
| Miscellaneous | \$697 | 1.3% |
| Total | \$52,657 | 100.0% |
| Source: IMPLAN, Sage | | |

In total, Maryland manufacturing supported 333,767 jobs statewide in the third quarter of 2007.

Exhibit 12, therefore, reflects estimates that total annual wages for 2007 were \$7.7 billion. These \$7.7 billion of manufacturing wages are estimated to support an additional \$8.3 billion in wages received by indirect and induced workers, whose

livelihood depends upon the presence of manufacturing in Maryland. Manufacturing's total wage effect in 2007 is estimated at \$16 billion.

It is estimated that the total value of sales, shipments, and revenue from manufacturers in 2007 was at least \$53.7 billion, perhaps slightly more. As shown in Exhibit 13 on page 22, this value of manufacturing activity supported an additional \$32.8 billion worth of sales, shipments, and revenue for other Maryland businesses

Exhibit 11: Multiplier effect of Maryland manufacturing jobs

| Manufacturing sector | Direct jobs | Indirect and induced jobs | Total Jobs | Multiplier (1) |
|---|----------------|---------------------------|----------------|----------------|
| Food | 15,550 | 31,296 | 46,846 | 2.0126 |
| Beverage and tobacco product | 3,925 | 8,500 | 12,425 | 2.1655 |
| Textile mills | 1,354 | 1,004 | 2,358 | 0.7417 |
| Textile product mills | 980 | 813 | 1,793 | 0.8295 |
| Apparel | 1,423 | 940 | 2,363 | 0.6603 |
| Leather and allied product | 153 | 146 | 299 | 0.9543 |
| Wood product | 3,091 | 2,644 | 5,735 | 0.8553 |
| Paper | 4,646 | 6,589 | 11,235 | 1.4182 |
| Printing and related support activities | 12,650 | 7,553 | 20,203 | 0.5971 |
| Petroleum and coal products | 843 | 1,745 | 2,588 | 2.0701 |
| Chemical | 12,677 | 32,462 | 45,139 | 2.5607 |
| Plastics and rubber products | 6,829 | 6,462 | 13,291 | 0.9462 |
| Nonmetallic mineral product | 4,873 | 5,735 | 10,608 | 1.1769 |
| Primary metal | 3,594 | 11,640 | 15,234 | 3.2388 |
| Fabricated metal product | 9,981 | 8,886 | 18,867 | 0.8903 |
| Machinery | 7,647 | 8,409 | 16,056 | 1.0997 |
| Computer and electronic product | 22,071 | 44,201 | 66,272 | 2.0027 |
| Electrical equipment and appliance mfg. | 2,183 | 2,889 | 5,072 | 1.3233 |
| Transportation equipment | 8,074 | 10,627 | 18,701 | 1.3161 |
| Furniture and related product | 3,930 | 3,322 | 7,252 | 0.8453 |
| Miscellaneous | 5,280 | 6,150 | 11,430 | 1.1647 |
| Total | 131,754 | 202,013 | 333,767 | 1.5332 |

Note: 1. Multiplier is the ratio of indirect and induced impacts relative to direct impacts. These values are derived from IMPLAN.
Source: Sage

(through multiplier effects). Therefore, the total value of the manufacturing sector to Maryland's economy is \$86.5 billion, a figure that represents the industry's annual impact on Maryland's economy. To put this figure into perspective, manufacturing-related business sales equal approximately 20 percent of total state output, which includes both intermediate and final goods (as opposed to gross domestic product, which only measures the value of final goods).

Manufacturing's Fiscal Impact

Maryland manufacturers generate substantial tax revenues for state and local governments. These tax revenues are generated from three sources. First, manufacturing establishments in Maryland pay corporate income taxes, sales taxes, and real and personal property taxes. Second, the employees of manufacturers pay a range of taxes of which the most significant are income, sales, and property taxes.

Exhibit 12: Multiplier effect of Maryland manufacturing wages (millions of 2007 dollars)

| Manufacturing sector | Direct wages | Indirect and induced wages | Total wages | Multiplier (1) |
|--|----------------|----------------------------|-----------------|----------------|
| Food | \$620 | \$1,081 | \$1,701 | 1.7428 |
| Beverage and tobacco product | \$193 | \$302 | \$495 | 1.5634 |
| Textile mills | \$50 | \$44 | \$94 | 0.8841 |
| Textile product mills | \$34 | \$26 | \$61 | 0.7696 |
| Apparel | \$52 | \$37 | \$88 | 0.7038 |
| Leather and allied product | \$7 | \$4 | \$12 | 0.5850 |
| Wood product | \$136 | \$118 | \$254 | 0.8669 |
| Paper | \$231 | \$223 | \$454 | 0.9649 |
| Printing and related support activities | \$670 | \$323 | \$993 | 0.4818 |
| Petroleum and coal products | \$62 | \$58 | \$120 | 0.9421 |
| Chemical | \$895 | \$1,417 | \$2,311 | 1.5836 |
| Plastics and rubber products | \$411 | \$297 | \$708 | 0.7221 |
| Nonmetallic mineral product | \$234 | \$229 | \$463 | 0.9801 |
| Primary metal | \$224 | \$349 | \$572 | 1.5572 |
| Fabricated metal product | \$461 | \$364 | \$825 | 0.7902 |
| Machinery | \$493 | \$416 | \$910 | 0.8439 |
| Computer and electronic product | \$1,948 | \$2,159 | \$4,106 | 1.1082 |
| Electrical equipment and appliance | \$113 | \$95 | \$208 | 0.8457 |
| Transportation equipment | \$497 | \$527 | \$1,024 | 1.0599 |
| Furniture and related product | \$154 | \$93 | \$246 | 0.6034 |
| Miscellaneous | \$242 | \$125 | \$367 | 0.5147 |
| Total | \$7,727 | \$8,287 | \$16,012 | 1.0724 |
| Note: 1: Multiplier represents the ratio of indirect and induced impacts relative to direct impacts. These values are derived from IMPLAN. Source: Sage | | | | |

To put this figure into perspective, manufacturing-related business sales equal approximately 20 percent of total state output.

Finally, as with the economic impacts of jobs, income, and sales, there is a multiplier effect on tax revenues generated by manufacturers and their employees. The businesses and workers whose livelihood is dependent

upon the economic activity of Maryland manufacturing establishments also pay the same types of taxes—income, sales, property, and so on.

One important source of tax revenue for the state and local governments in Maryland is from the wages paid by manufacturers and the income generated by the multiplier effect. Local (county “piggyback”) income taxes are estimated to total \$342 million, while state income tax totals an estimated \$510 million, and the state sales tax

Exhibit 13: Multiplier effect of Maryland manufacturing sales, shipments, revenue (millions of 2007 dollars)

| Manufacturing sector | Direct Sales, Shipments, Revenue | Indirect and induced Sales, Shipments, Revenue | Total Sales, Shipments, Revenue | Multiplier (1) |
|---|---|---|--|-----------------------|
| Food | \$6,205 | \$4,507 | \$10,712 | 0.7264 |
| Beverage and tobacco product | \$2,909 | \$1,569 | \$4,478 | 0.5395 |
| Textile mills | \$375 | \$190 | \$565 | 0.5066 |
| Textile product mills | \$192 | \$98 | \$290 | 0.5128 |
| Apparel | \$347 | \$194 | \$541 | 0.5605 |
| Leather and allied product | \$45 | \$32 | \$77 | 0.7056 |
| Wood product | \$856 | \$588 | \$1,444 | 0.6872 |
| Paper | \$1,846 | \$1,112 | \$2,958 | 0.6027 |
| Printing and related support activities | \$2,086 | \$1,128 | \$3,214 | 0.5405 |
| Petroleum and coal products | \$782 | \$256 | \$1,038 | 0.3280 |
| Chemical | \$10,008 | \$5,757 | \$15,765 | 0.5752 |
| Plastics and rubber products | \$2,123 | \$980 | \$3,103 | 0.4614 |
| Nonmetallic mineral product | \$1,501 | \$849 | \$2,350 | 0.5657 |
| Primary metal | \$2,382 | \$1,288 | \$3,670 | 0.5408 |
| Fabricated metal product | \$2,747 | \$1,392 | \$4,139 | 0.5069 |
| Machinery | \$3,726 | \$2,219 | \$5,945 | 0.5957 |
| Computer and electronic product | \$9,860 | \$7,176 | \$17,036 | 0.7278 |
| Electrical equipment and appliance mfg. | \$711 | \$384 | \$1,095 | 0.5404 |
| Transportation equipment | \$2,691 | \$1,620 | \$4,311 | 0.6019 |
| Furniture and related product | \$1,609 | \$972 | \$2,581 | 0.6039 |
| Miscellaneous | \$711 | \$464 | \$1,175 | 0.6525 |
| Total | \$53,712 | \$32,775 | \$86,487 | 0.6102 |

Note: 1. Multiplier is the ratio of indirect and induced impacts relative to direct impacts. These values are derived from IMPLAN.
Source: Sage

totals an estimated \$331 million. Property taxes paid by all these workers are estimated at \$717 million.¹⁴ In total, based on income generated in 2007, manufacturing activities in Maryland supported an estimated \$1.9 billion in state and local tax revenues paid by households for income tax, sales, and real property tax. See Exhibit 14 for summary detail.

In addition to taxes paid by individuals and households from their wages, manufacturers and other businesses whose livelihood are dependent on manufacturers also pay taxes to state and local government in Maryland. These taxes include real property taxes on land and improvements and personal property taxes on inventories, furnishings, and equipment such as computers and furnishings (equipment directly involved in the manufacturing process is tax-exempt).

Moreover, manufacturers and all other businesses pay, usually to the state, sales and use taxes, fees, and licenses of various types. All these taxes are often classified as taxes on production. In addition, Maryland manufacturers pay corporate income tax on the profits they generate.

¹⁴ Property tax payments are based on the value of housing that could be supported by the average manufacturing worker or the average indirect and induced worker supported by manufacturing. It is assumed that the average worker pays 25 percent of income to a 30-year mortgage at 7.5 percent for a residence where a 20 percent down payment was made. Property taxes are based on average county tax rates weighted on the basis of where manufacturing assets are located.

Exhibit 15 on page 24 summarizes these taxes paid by Maryland manufacturers and other businesses that depend on the state's manufacturers. Manufacturers are estimated to pay \$260 million in property taxes.¹⁵ Property taxes paid by businesses that are dependent on manufacturing activity are estimated to contribute \$120 million in property taxes.¹⁶ These property taxes are paid overwhelmingly to counties and municipal governments; a small fraction (roughly 10%) goes to state government.

¹⁵ Property taxes are based on Sage's estimate of manufacturing assets in Maryland, including land, improvements, and inventory and weighted average county property tax and state property tax rates. The estimate of property tax paid by Maryland manufacturers is based primarily on an estimate of the value of real property and inventory. Maryland manufacturers account for approximately 0.8 percent of the nation's manufacturing output. The state's prorated share of the national net property, plant, and equipment (after depreciation, depletion, and amortization) is estimated at \$9.9 billion or 39 percent of the state's assessed value of all industrial real property (i.e., the assessed value of real property for manufacturing, warehousing, distribution, and transportation terminal facilities). Inventory, subject to county personal property tax, is estimated at \$4.9 billion. Personal property tax rates are 2.5 times real property tax rates. Average tax rates for Maryland counties are \$1.125 and \$2.813 per \$100 for real and personal property respectively, weighted by the location of industrial real assets.

¹⁶ The business sales (output) of the business establishments that depend on manufacturing represent an estimated 10.9 percent of the total private sector output for the state excluding manufacturing. Real property tax estimates are based on this share of real property tax paid by non-manufacturing businesses in Maryland. Personal property tax is based on the estimated value of inventories held by wholesalers and retailers, based on IMPLAN estimates of wholesale and retail sales values and national averages for inventory to sales ratios. These inventory taxes are attributable to the 10.9 percent of wholesale and retail trade that is estimated to be linked to manufacturing in Maryland.

Exhibit 14: Fiscal impacts of Maryland wages attributable to local manufacturing

| Type of tax revenue | Value from Direct Wages (millions) | Value from Indirect and Induced Wages (millions) | Total Value (millions) |
|------------------------------|------------------------------------|--|------------------------|
| Local income tax | \$165 | \$177 | \$342 |
| State income tax | \$246 | \$264 | \$510 |
| Sales tax | \$160 | \$171 | \$331 |
| Real property tax | \$342 | \$375 | \$717 |
| Total for individuals | \$913 | \$987 | \$1,900 |
| Source: Sage | | | |

In total, based on income generated in 2007, manufacturing activities in Maryland supported an estimated \$1.9 billion in state and local tax revenues paid by households for income tax, sales, and real property tax.

Corporations also pay income tax to the State of Maryland.¹⁷ In 2007 corporate income taxes paid by manufacturers and other businesses are estimated to total \$160 million, roughly three-quarters of which was paid by manufacturers with the remaining paid by businesses in the manufacturing supply chain.

¹⁷ In 2007, the Maryland Comptroller reported \$782 million in corporate income tax received by the State of Maryland. This was a slight decline from the \$820 million paid in 2006. Corporate taxes were projected to decline further 2008 before rising to \$914 million in 2009. Fluctuations in corporate income taxes were attributed to changes in corporate profits and tax refunds as well as the increase in the corporate tax rate.

Sales and use taxes also constitute a significant contribution by the manufacturing industry to state government revenue.¹⁸ In 2007, manufacturers paid an estimated \$73 million in corporate income taxes while those businesses dependent on manufacturing added another \$27 million.

In total, manufacturers generated tax revenue estimated at \$449 million and businesses dependent on manufacturers paid an additional \$191 million for a total of \$640 million in business-related taxes accrued as a result of manufacturing activities in Maryland. Exhibit 15 provides summary detail.

In total, it is estimated that the manufacturing sector in Maryland, and the workers and businesses whose livelihood is dependent upon manufacturers generated over \$2.5 billion in

¹⁸ Estimated sales and use taxes paid by manufacturers derived from "Sales and Use Tax, Summary by Subdivision and Business Activity, Fiscal 2007" available from Comptrollers' web site. Estimated sales and use taxes for the supply chain is based on output of the supply chain and ratio of sales and use tax to output for manufacturers.

Exhibit 15: Fiscal impacts of Maryland manufacturers

| Type of tax revenue | Value from Direct Sales (millions) | Value from Indirect Sales (millions) | Total Value (millions) |
|----------------------|------------------------------------|--------------------------------------|------------------------|
| Property tax | \$260 | \$120 | \$380 |
| Corporate income tax | \$116 | \$44 | \$160 |
| Sales and use taxes | \$73 | \$27 | \$100 |
| Total | \$449 | \$191 | \$640 |
| Source: Sage | | | |

Exhibit 16: Total fiscal impacts of Maryland manufacturing

| Source of tax revenue | Value (millions) |
|--|------------------|
| Taxes paid by workers and individuals | \$1,900 |
| Taxes paid by manufacturers and businesses | \$640 |
| Total | \$2,540 |
| Source: IMPLAN, Sage | |

In 2007, manufacturers paid an estimated \$73 million in corporate income taxes while those businesses dependent on manufacturing added another \$27 million.

tax revenue for state and local government in Maryland. As shown in Exhibit 16, almost three-quarters of these taxes were paid by manufacturing workers and the workers and individuals whose livelihood depends on manufacturing with the remaining taxes paid by manufacturers, their suppliers, and other businesses that depend upon manufacturing for their livelihood. To put this

figure into perspective, \$2.5 billion represents approximately 18 percent of Maryland's FY2007 General Fund Budget.

It should be noted that manufacturers and all other businesses collect and/or pay sales and excise taxes, fees, and licenses of various types. All these taxes and other costs are often classified as taxes on production and can be substantial. Detailed data on these taxes paid to state and local government in Maryland, however, are not readily available. As a result, the \$2.5 billion in total fiscal impacts should be considered a conservative estimate of the total support that manufacturing provides to state and local government in Maryland through the generation of tax and other government revenue.

Policy Implications

It is time for the State of Maryland to refocus its attention on manufacturing and take a more pragmatic and long-term perspective. As the analysis above has quantified and qualified, manufacturing remains an important economic and fiscal driver in Maryland. Moreover, the industry is of disproportionate import in terms of creating middle-income job opportunities, promoting innovation, generating exports, sustaining the Port of Baltimore, defending the homeland, and helping to solve issues related to environmental sustainability and energy conservation.

Several strategies/principles have been identified to promote accelerated capital investment. These are detailed below:

Provide a competitive and stable business and regulatory environment

■ Maryland's business climate

As a foundational principle, Maryland must have a stable and competitive business climate, especially in relation to neighboring states. Manufacturers are capital intensive and correspondingly engage in long-term investments in facilities and equipment. Therefore, capital investment decisions take into account both current business climate issues such as a competitive tax and regulatory climate and the stability of that climate. Given the rapid changes in technology and the continual redefinition of cutting edge, it is important for Maryland to maintain both an attractive and stable business climate to continue to attract capital investment, thereby fueling high-wage and medium-wage job creation.

A current example of the perceived threat to the stability of the present business climate from the perspective of the state's manufacturers is the

formation of the Maryland Business Tax Reform Commission. The Commission was created by an act of the legislature during the 2007 Special Session and will perform its work over a three-year period. It is charged with examining the state's business tax structure and recommending changes. Specifically, the law directs the Commission to look at the issue of enacting unitary combined reporting, the possible repeal of the single sales factor apportionment formula for manufacturers, and other corporate tax changes. Each one of these changes has the potential to negatively impact Maryland manufacturers. The question is whether the uncertainties created by such a Commission delay investment or shift it away from Maryland altogether.

Further, the General Assembly, in order to create the Commission, imposed new reporting requirements for certain multistate corporations and manufacturers as set forth in Section 10 of the Tax Reform Act (Chapter 3, Acts of 2007, Special Session) and amended by the Corporate Income Tax - Reporting & Study (Chapters 177 & 178, Acts of 2008). These reporting requirements were created to provide the new Maryland Business Tax Reform Commission with information necessary for the review and evaluation of the state's current

business tax structure. The extent to which these heightened reporting requirements will dissuade investment in Maryland remains unclear.

■ Help manufacturers reduce costs to the extent possible

Manufacturers compete on both the quality and cost of their products. To the extent that costs can be minimized, additional resources are available for enhancements in product quality and innovation. Moreover, lower costs also permit firms to gain market share and reap economies of scale.

Maryland policymakers need to recognize that there is a tipping point where business costs override other positive elements of the business climate such as labor, economic climate, and growth prospects.

In 2007 *Forbes* Magazine ranked all 50 states in terms of best states for business. Maryland ranked 12th best overall, but within that ranking Maryland was 41st in terms of business costs. The 9 states with a lower ranking were Rhode Island (42); Maine (43); Connecticut (44); Vermont (45); New Jersey (46); Hawaii (47); New York (48); Massachusetts (49) and California (50). Moreover, this ranking did not reflect the actions taken during the November 2007 Special Session of the legislature where business taxes were increased by at least \$600 million per year.¹⁹

Maryland policymakers need to recognize that there is a tipping point where business costs override other positive elements of the business climate such as labor (3rd), economic climate (8th), and growth prospects (15th). This report stands for the proposition that to the extent that state government can assist manufacturers by providing them with access to competitive tax rates, reliable and competitively priced energy, assistance with healthcare costs and with a regulatory environment that does not overly

¹⁹ A revised chart for 2008 was recently published reflecting similar results because the impact of the tax increases enacted at the 2007 special session were still yet to be taken into account.

burden producers vis-à-vis their competitors in neighboring states, it should do so. The multiplier impacts of such policies are positive and large and the economics of manufacturing are precisely aligned with the needs of Maryland's middle class.

Of course, these issues are not unique to Maryland. A recent California study prepared by the Milken Institute indicated that a sales tax reduction of 5 percent on manufacturing and telecommunications equipment would result in more than 25,000 new jobs per year over the next ten years. Of these, over 7,000 would be in the manufacturing sector. It is instructive that the Milken report was precipitated in part by a loss of almost 200,000 manufacturing jobs this decade due to California's above-national average corporate tax rates. The Milken study concluded that state tax revenues from added personal and corporate income tax receipts would offset the sales tax credits in all of the ten years of this program.

Adopt a manufacturer-friendly energy policy

Also of central importance is the cost and availability of electricity. Experts predict possible electricity shortages (brownouts and blackouts) by 2011. This could permanently dislocate certain key operations in Maryland, including at the state's largest manufacturer, the Electronic Systems Sector of Northrop Grumman located near BWI Thurgood Marshall Airport. That single facility currently employs 10,000 high technology workers. Without a reliable supply of electricity, the BWI facility could close; inconveniencing national security while also potentially resulting in a shift of jobs to other Northrop Grumman plants. The same circumstances could be faced by other key Maryland manufacturing operations, including W L Gore and Associates in Cecil County, McCormick and Company in Baltimore County, MedImmune in Montgomery and Frederick Counties and Perdue Farms on the Eastern Shore.

Even if additional transmission lines are installed in time to alleviate the projected shortages, there remains the issue of long-term energy cost competitiveness. Local manufacturers are concerned by a host of legislative initiatives, including the Renewable Portfolio Standard (RPS) the Healthy Air Act and the Regional Greenhouse Gas Initiative (RGGI) compact, all of which may result in higher electricity costs.

Voluntary improvement in energy efficiency and energy conservation in all consuming segments is essential and should be constantly encouraged.

Moreover, there is still the specter of Global Warming Solutions legislation (SB309; 2008). Introduced in 2008, the Act would have taken one of the nation's most aggressive stances on climate change, requiring Maryland to cut 2006 levels of carbon emissions by 25 percent by 2020. This legislation was narrowly defeated in the House of Delegates on the last day of the regular 2008 session of the Maryland General Assembly after having passed the Senate. Should this bill become law in the near future, many believe it will result in even greater shortages of electricity and increases in electricity prices. These types of "green" energy policies support environmental improvements, but disproportionately burden industries that maintain significant capital stock designed to transform one set of materials into another. A favorable outcome can be achieved with a more holistic perspective on striking a balance between environmental and economic considerations. The two are not incompatible.

Voluntary improvement in energy efficiency and energy conservation in all consuming segments is essential and should be constantly encouraged. Concurrently, policies that facilitate and enhance the production and use of traditional resources, as well as those that support development of market-based alternative energy sources and technologies should be continued.

Increase funding for Maryland Research & Development Tax Credit

On occasion, Marylanders have exhibited significant foresight along these dimensions. On June 16, 2008, Governor O'Malley announced a bold new initiative called BIO 2020 wherein the state will invest \$1.1 billion in Maryland's bioscience industry over the next 10 years. The initiative calls for increased state funding of important programs such as the Biotech Investment Tax Credit Program where the current \$6 million annual allotment would be doubled in 2010 and doubled again by 2013.

The Governor and the General Assembly should also consider increasing the funding for the state's Research and Development Tax Credit Program, which remains under-funded at its initial funding level in 2000 of \$6 million per year. Because of the annual \$6 million cap, the tax credit must be prorated when it is oversubscribed. The most recent data from DBED indicate that applicants for the R&D credits are receiving approximately 10 percent of desired amounts.

By increasing the R&D Tax Credit funding, the state will be encouraging R&D in the biotech sector as well as other technology sectors in Maryland. There is also a compelling case to be made for increasing the R&D credit funding from the perspective of regional competitiveness. When the Maryland program was adopted in 2000 at a \$6 million annual funding level, the program was modeled after the Pennsylvania R&D tax credit, which was then funded at \$15 million. Since 2000, the Commonwealth's funding level has been increased to \$40 million.

There is also a compelling case to be made for increasing the R&D credit funding from the perspective of regional competitiveness.

Market Maryland's interest in manufacturing to the world

There is a perception among certain Maryland manufacturers that policymakers do not view the sector as one of great importance. Policymakers need to make it clear both to Marylanders and to the balance of the world that Maryland remains committed to preserving its manufacturing heritage by establishing itself on the cutting edge of a variety of 21st century industries, including in aerospace, defense electronics, pharmaceuticals/life sciences, information technology and machinery. The goal should be to promote both foreign direct investment in Maryland and to position Maryland's manufacturers and their products to gain domestic and export marketshare. For example, foreign-controlled companies accounted for 12.6 percent, over one-eighth, of total manufacturing employment in Maryland in 2005.²⁰

²⁰ U.S. Department of Commerce, Bureau of Economic Analysis

Conclusion

A conventional wisdom has emerged in Maryland that suggests that manufacturing is an economic phenomenon of the past, and technology is the driver of the future. The manufacturing/technology dichotomy is a false one. As this analysis indicates, manufacturing remains highly relevant to middle class aspirations in Maryland, to the state's potential for innovation and to its fiscal health.

The sector remains highly relevant. In 2007, the industry supported a total of 334,000 jobs in Maryland once one accounts for multiplier effects. These jobs were associated with \$16 billion in annual wage and salary income statewide, or nearly \$50,000 per job per annum. The average wage per direct manufacturing job approaches \$60,000/annum. The local industry was also responsible for \$86.5 billion in total business sales in Maryland in 2007.

This economic activity is associated with augmented income, sales and other tax collections. In 2007, it is estimated that the manufacturing sector in Maryland, and the workers and businesses whose livelihoods are dependent upon manufacturers generated over \$2.5 billion in tax revenue for state and local government in Maryland. To put this figure into perspective, \$2.54 billion represents approximately 18 percent of Maryland's FY2007 General Fund Budget.

Given the manufacturing sector's disproportionate import in terms of creating middle-income job opportunities, promoting innovation, gener-

ating exports, sustaining the Port of Baltimore, defending the homeland, and helping to solve issues related to environmental sustainability and energy conservation, it is time for Maryland's policymakers to commit to an environment that is fully supportive of the competitiveness of Maryland manufacturers. Desirable policy initiatives include the provision of a more stable and competitive tax and regulatory environment, a coherent energy policy, increased funding for the state's Research and Development Tax Credit program, and enhanced marketing of the industry both domestically and globally.

Indeed, Maryland would be more prosperous today had it adopted many of the principles and strategies discussed in this report. Given the growing strains on America's and Maryland's middle classes, it is time for the State of Maryland to supply an environment in which manufacturers could reasonably be expected to flourish.

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