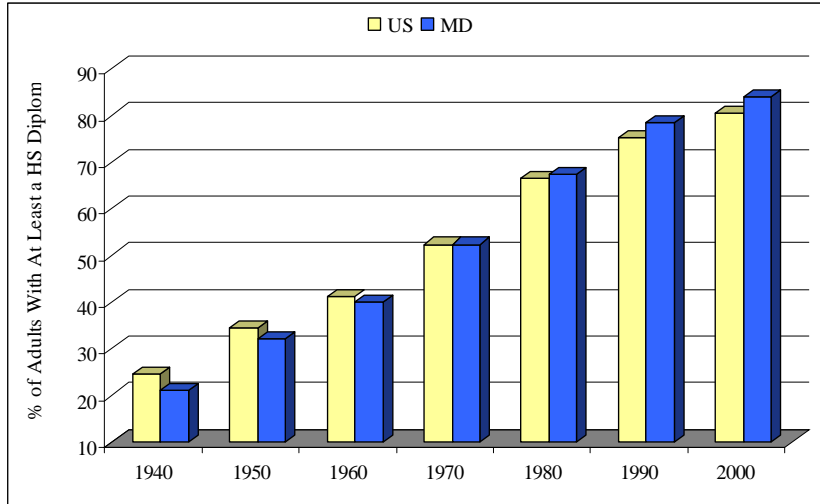


Historical Backdrop

Figure B: Educational Attainment for U.S. and Maryland¹⁴



These significant changes coincided with increasing labor force educational attainment levels, as shown in Figure B. In 1940, the first year in which educational attainment data was collected, 21.1 percent of Maryland's population age 25 and over had obtained a high school education or higher. By 2000, this percentage approached 84.0 percent. Corresponding national figures were 24.5 and

80.4 percent, respectively. Over the same period, the percentage of the state's population age 25 and over with a Bachelor's degree or higher skyrocketed from under 5.0 percent in 1940 to 31.5 percent in 2000.¹⁵ This chart reveals what employers and workforce development professionals have known for some time – an educated workforce has become increasingly critical to maintaining and nurturing economic success.

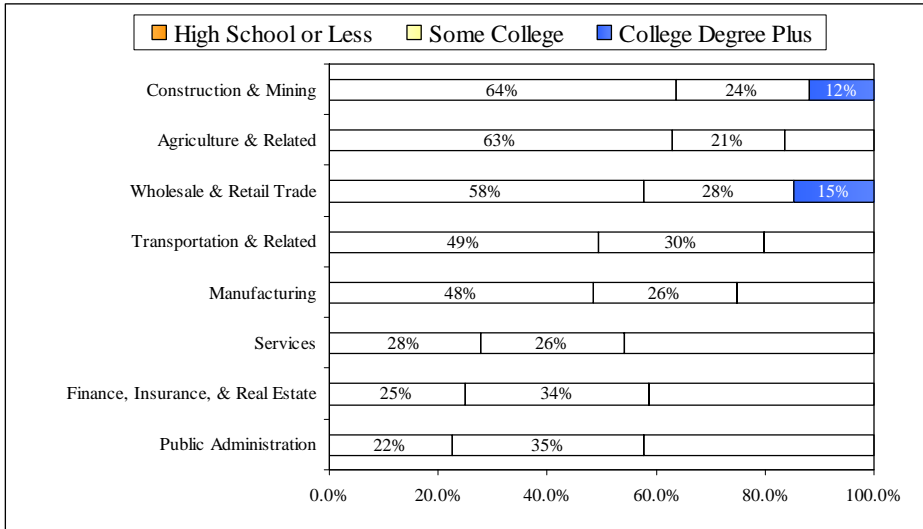
¹⁴ Percent of Population aged 25+ with a High School Education or Higher. U.S. Census Bureau, "A Half-Century of Learning: Historical Census Statistics on Educational Attainment in the United States, 1940 to 2000."

¹⁵ The corresponding national rate in 2000 was just 24.4 percent.

Historical Backdrop

The increased demand for educated workers in Maryland has been broad-based and is reflected in industry-level educational attainment data. Even in industries traditionally considered “blue collar,” such as Manufacturing and Construction, the educational attainment of workers has risen. Data show that the proportion of workers in each Maryland industry with some college education has increased from just three percent of the state’s manufacturing workers in 1940 to 26 percent in 2000. The proportion of Agriculture workers with some college skyrocketed from one percent in 1940 to over 20 percent in 2000.

Figure C: Maryland Educational Attainment by Industry, 2000¹⁶



By 2000, more than 40% of workers employed within Services, Finance, Insurance & Real Estate, and Public Administration had obtained a college degree or higher. More than half of the workers in Maryland’s manufacturing sector had at least some college or higher. Other industries employed a

higher proportion of workers with a high school education or less, such as Construction & Mining (64 percent), Agriculture & Related (63 percent) and Wholesale & Retail Trade (58 percent).

¹⁶ RESI, U.S. Census Bureau, Public Use Micro Data. The graph refers to the distribution of maximum educational attainment levels by industry.

Historical Backdrop

Today, Maryland enjoys a healthy, diverse economy driven by growth in services sectors such as education, health care and other technical and professional services. Among Maryland's top 50 largest private employers are health and educational services firms (including The Johns Hopkins University and Hospital, Adventist HealthCare, and Helix Health System, among others), defense and intelligence contractors (such as Northrop Grumman Corporation and Lockheed Martin Corporation), and other technical and professional services firms (such as Computer Sciences Corporation, IBM Corporation, Science Applications International Corporation, and Westat Research Incorporated).¹⁷

Though life sciences firms are not generally considered to be large employment generators, there is no doubt that the state's economy also has been shaped by the presence of industry high fliers such as MedImmune (recently acquired by AstraZeneca) and Human Genome Sciences, Inc. Any discussion of Maryland employers would not be complete without consideration of the state's proximity to and presence of federal research centers and labs.

The importance of the federal government to the state's economy cannot be underestimated. The many federal laboratories and facilities located within and near Maryland, such as the Goddard Space Flight Center and the Naval Air Systems Command at Patuxent River, have contributed greatly to Maryland's science and security base. The presence of the Food and Drug Administration (FDA) and the National Institutes of Health (NIH) have spurred growth among bioscience firms. The National Security Agency (NSA) and Maryland's many military installations (including Fort Detrick, Fort Meade and Aberdeen Proving Ground) have been critical to building the state's base of science and security.

¹⁷ Maryland Department of Business & Economic Development, 2006.

Maryland's Labor Supply

4.0 Maryland's Labor Supply

4.1 *Population Trends and Characteristics*

The shifting composition and growth of Maryland's population directly impacts the state's economy and labor force. Population characteristics, such as age, educational attainment and diversity, have a profound impact on the needs and types of services that will best ensure continued economic growth and prosperity throughout the state. The extent to which policy makers, educators and business leaders recognize and meet these needs can further strengthen Maryland's ability to attract and retain quality jobs and workers.

4.1.1 *Population Growth, Migration and Diversity*

Maryland's population exceeded 5.6 million in 2006, ranking the state 19th in the nation in population size. The state's rate of population growth between July of 2005 and 2006 was just 0.5 percent. Not only did the state lag the 1.0 percent national rate of population expansion, but Maryland ranks among the bottom third of states (36th fastest growth), according to this measure.

This sluggish rate of population growth is not characteristic of Maryland's past performance. Between 1990 and 1999, the state's population expanded at an average annual rate of 1.0 percent. Between 2000 and 2003, Maryland recorded annual population growth ranging from 1.1 to 1.3 percent.

The state's slower rate of population expansion in recent years can be explained by negative net migration trends. In each of the three most recent years for which data are available (2004 through 2006), the state recorded negative net migration. In other words, more people are moving out of the state than are moving in. Maryland recorded a net migration loss of 5,000 in 2006 and 6,800 in 2005; the largest such decline the state has seen since 1981.¹⁸ While it is true that net international migration continues to bolster the state's population growth, net domestic outflows (migration between states) outweigh international migration gains. Between 2005 and 2006, for instance, Maryland's net domestic migration outflows exceeded 25,000 persons, offsetting the 21,000-person gain due to international migration.¹⁹

It should be noted that Maryland's net domestic migration decline represents a departure from recent trends. Between 2000 and 2004, for instance, the state recorded net domestic migration gains of more than 5,400 per year.²⁰ While in the past, domestic outflows have been associated with deteriorating or weakening economic conditions within the state, recent trends appear to be driven by cost of living issues, especially housing costs. Out migration to border counties in Pennsylvania and West Virginia has increased significantly in recent years. A possible explanation for this movement is the availability of affordable housing in these areas. Median home values in Pennsylvania jurisdictions, such as York and Franklin counties, are roughly \$75,000 below those of Baltimore County. This gap increases significantly when home values in

¹⁸ Maryland Department of Planning.

¹⁹ U.S. Census Bureau.

²⁰ U.S. Census Bureau, 2006.

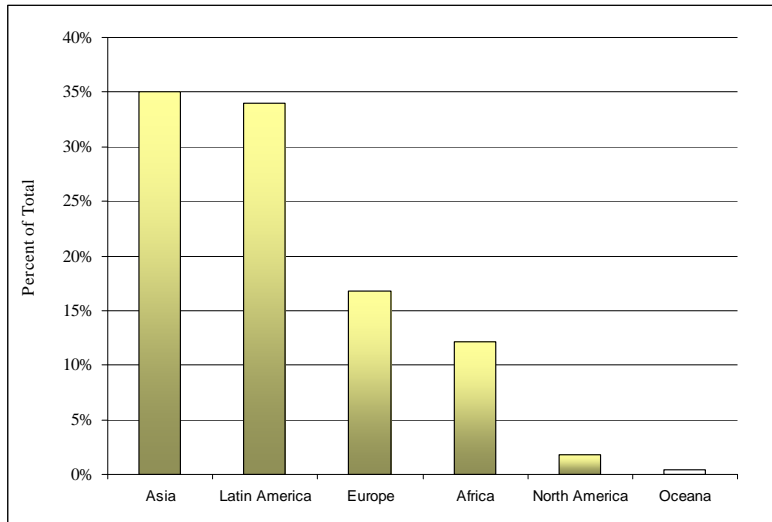
Maryland's Labor Supply

Carroll and Frederick counties are considered. Many former Maryland households have taken advantage of lower housing costs in these locales, while still being part of Maryland's job market.

The good news is that this trend will likely be stemmed by the current and future Department of Defense (DoD) Base Realignment and Closure (BRAC) movements to Maryland. The job movements, which call for more than 15,000 civilian jobs to transfer to Maryland by 2011, are expected to result in substantial household movements to Maryland as well.

As previously noted, international migration continues to bolster population growth, both locally and throughout the nation. Foreign immigration represents 44.3 percent of the state's population gain between 1990 and 2000. Maryland's level of foreign-born population has grown from roughly 94,000 in 1960 to more than 313,000 in 1990. By 2000, nearly one out of every 10 Maryland residents (more than 518,000 persons) was foreign born.²¹

Figure E: Maryland's Share of Foreign-Born Population, 2000²²



More than two-thirds of the state's foreign-born population reports their region of origin to be either Asia or Latin America. The most commonly reported Asian countries of origin include: China (which comprises 6.5 percent of the state's 2000 foreign-born population), India (6.2 percent), Korea (6.0 percent) and the Philippines (4.0 percent). El Salvador leads Latin American countries and accounts for another 8.1 percent. In fact, El Salvador comprises the single largest share of Maryland's foreign-born population. Jamaica and Mexico

each comprise an additional 3.7 percent. Nigeria, Vietnam, Germany and the United Kingdom each comprise close to 3.0 percent of the state's foreign-born residents.

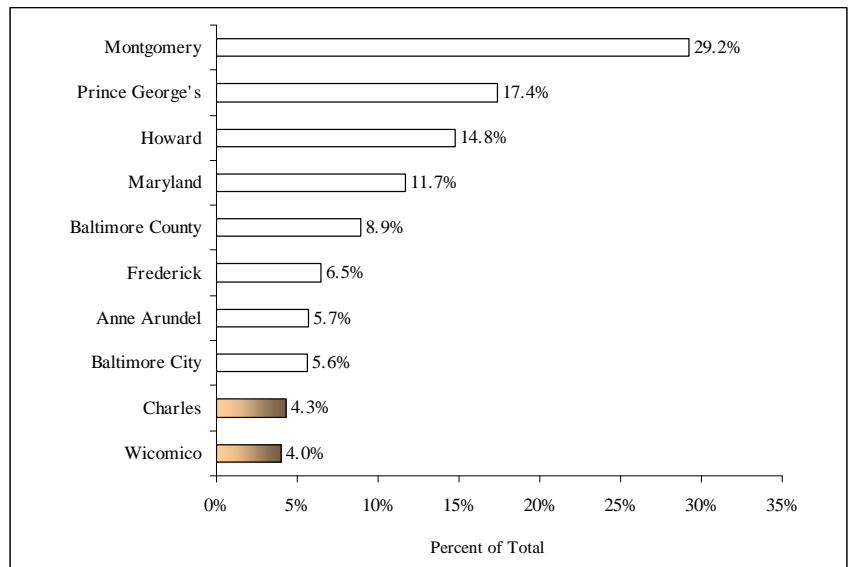
²¹ Goldstein, 2006.

²² U.S. Census Bureau.

Maryland's Labor Supply

International migration is forecast to increase Maryland's population by 593,000 persons between 1995 and 2025, ranking the state ninth in the nation, according to this measure.²⁴ Montgomery and Prince George's counties will continue to absorb the lion's share of the state's international migration. Foreign immigration accounted for 89.1 percent of Montgomery County's population gains and 71.9 percent of Prince George's County's gains between 1990 and 2000. In 2005, foreign-born people accounted for 29.2

Figure F: Foreign-Born Population as Percent of Total, 2005²³



percent of Montgomery County's population and 17.4 percent of Prince George's County residents. Howard County follows with 14.9 percent.

Migration continues to increase diversity in Maryland, which has recorded substantial increases in its minority population in recent years. Between 2000 and 2006, the state's minority population expanded by roughly 327,000 persons. In contrast, the state's non-Hispanic white population declined by 23,000 persons over the same period. Census projections indicate that by 2025, Maryland's non-Hispanic white population will comprise just 54.3 percent of the state's total population, down from 66.6 percent in 1995. Over the same period, persons of Hispanic origin are expected to increase and comprise 7.0 percent of Maryland's total population, up from 3.6 percent in 1995.²⁵

²³ Goldstein, 2006.

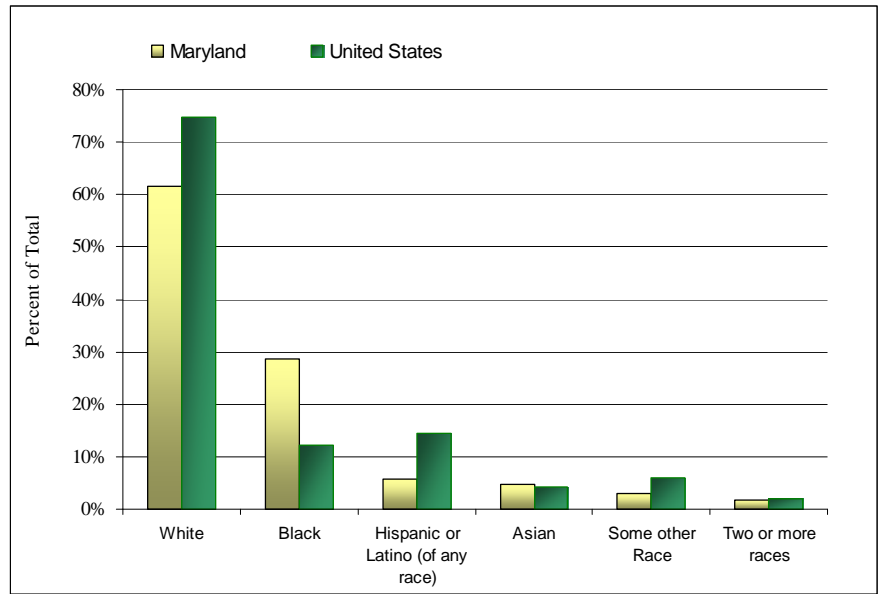
²⁴ U.S. Census Bureau, Population Division.

²⁵ U.S. Census Bureau, Population Division.

Maryland's Labor Supply

Census estimates for 2005 reveal Maryland's population to be quite diverse relative to the nation. African-Americans constitute 28.7 percent of the state's population, more than twice the national share. The state also is home to a slightly larger (percent share) Asian population than is seen nationally. While Maryland's population of Hispanic or Latino origin has increased significantly in recent years, (from roughly 230,000 in 2000 to 318,000 in 2005), this group comprised 5.8 percent of the state's population in 2005 and 6.0 percent in 2006. The corresponding national share for people of Hispanic or Latino origin in 2005 was 14.5 percent.

Figure G: Share of Population by Selected Race/Origin, 2005²⁶



4.1.2 Affluence

Recent data releases once again confirm Maryland's reputation as one of the most affluent states in the nation. With a 2006 median household income of \$65,144, Maryland ranks first in the nation, according to this measure, and far surpasses the comparable national income level of \$48,451.

Poverty data reveal similar patterns. Overall, the statewide family poverty rate was 5.3 percent, far below the national rate of 9.8 percent. In 2006, only 7.8 percent of Maryland's population lived below the poverty level, the lowest rate in the nation and 5.5 percentage points below the national average.

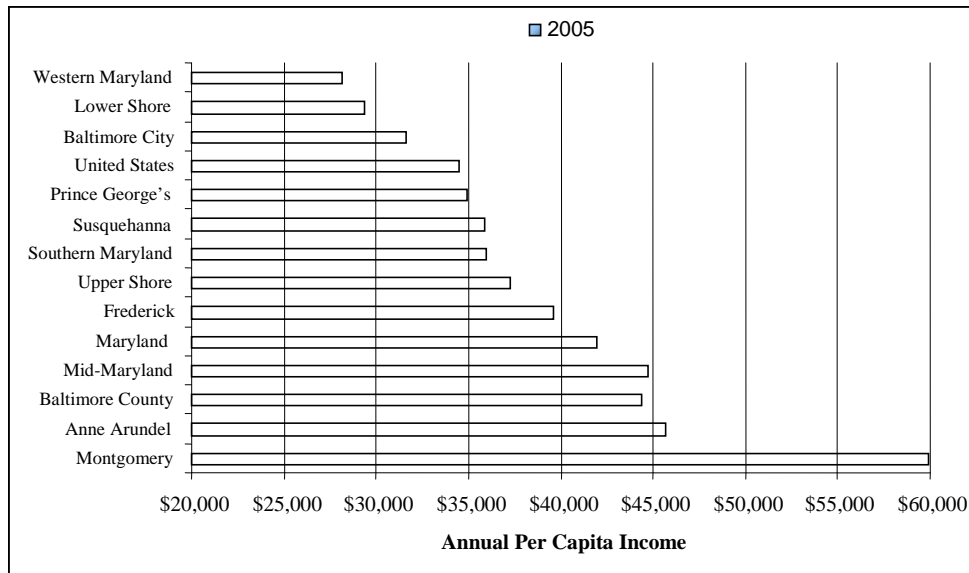
The fact that the state's households are well compensated is a reflection of Maryland's highly educated and skilled workforce. More than a third (35.1 percent) of the state's population age 25 and older has a Bachelor's degree or higher. The comparable national percentage is 27.0 percent. The fact that Maryland has a relatively high proportion of households with two or more workers also helps to explain the state's high income levels. In 2006, four out of 10 households fell within this category, compared to 3.5 for the nation.²⁷

²⁶ U.S. Census Bureau, American Community Survey, 2006.

²⁷ U.S. Census Bureau, American Community Survey, 2006.

Maryland's Labor Supply

Figure H: Per Capita Income Levels, by Maryland Workforce Investment Area (WIA)²⁸



Maryland's affluence is significant for another reason. Wealth offers a measure of protection from cyclical economic fluctuations. Maryland may be better prepared to weather economic downturns than the balance of the nation. However, it should be noted

that all regions in Maryland are not equally protected. Certain areas have participated less fully in recent economic recoveries than others, as indicated by their per capita income levels. With an annual per capita income level below \$29,000, Western Maryland (comprised of Allegany, Garrett and Washington counties) trails all other Maryland Workforce Investment Areas (WIAs).²⁹ The Lower Shore (which includes Somerset, Wicomico and Worcester counties) also lags other areas with an annual per capita income level of just under \$30,000.

While affluence can be considered a strength, especially in the face of economic downturns, it poses a challenge for other reasons. Increased living costs, and housing costs in particular, can encourage out migration to lower cost areas, a trend analysts believe has been occurring with increased frequency in Maryland for each of the last three years.

²⁸ Bureau of Economic Analysis, RESI of Towson University. WIA refers to Workforce Investment Area. Maryland is home to 12 local WIAs, each with a common labor pool and 200,000 or more residents. Each WIA is served by a separate Local Workforce Investment Board (LWIB).

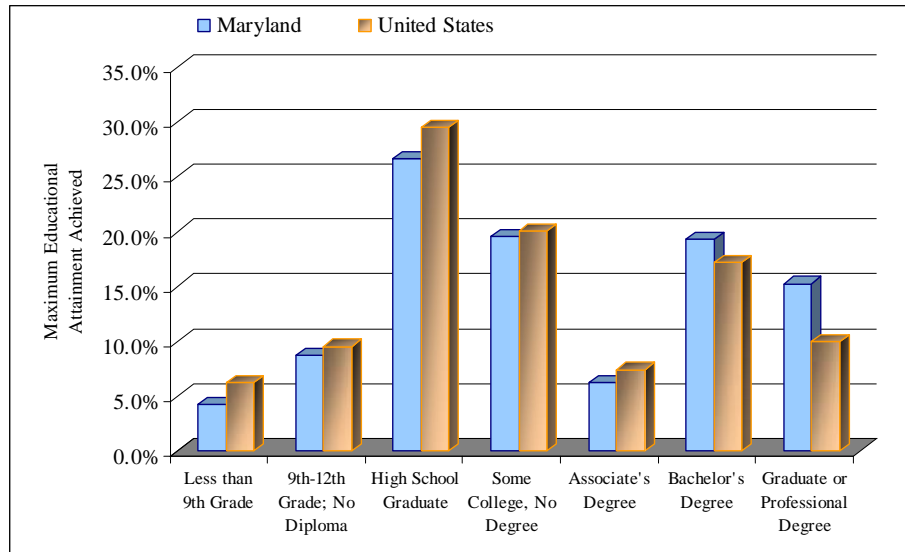
²⁹ In percentage terms, however, the Western Maryland region boasts the fastest rate of appreciation between 2004 and 2005, with growth in annual per capita income of 6.3 percent.

Maryland's Labor Supply

4.1.3 Educational Attainment

Figure I: 2005 Education Attainment Levels, Population 25 and Older³⁰

Maryland is home to a highly educated population. The state consistently ranks ahead of the nation on a variety of education-related measures. For instance, the National Science Foundation ranks Maryland second in the nation in terms of doctoral scientists and engineers per 100,000 population. In addition, in 2005, the state's concentration of professional and technical workers (24.9 percent) ranked second in the nation.

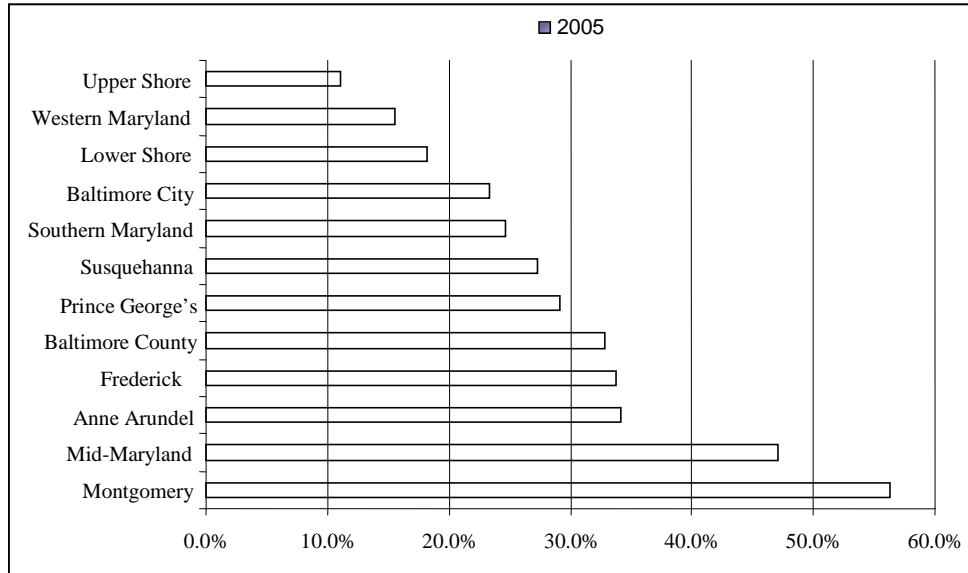


Census educational attainment data tell a similar story. In 2005, nearly one in four (19.4 percent) Marylanders age 25 and older earned a Bachelor's degree as their highest level of educational attainment. Approximately 15.7 percent of state residents have a graduate or professional degree. Taken together, 35.1 percent of Maryland's population has a Bachelor's degree or higher, ranking Maryland third in the nation, compared to 27.0 percent nationally. The gap between Maryland and the nation has widened in recent years as Maryland has increased its proportion of highly educated residents. In 1990, only 26.5 percent of the state's population had earned a Bachelor's degree or higher, just six percentage points ahead of national levels.

³⁰ U.S. Census Bureau, American Community Survey, 2006.

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Figure J: Percent of Population with a Bachelor's Degree or Higher, by WIA³¹



In 2005, Montgomery County and the Mid-Maryland region lead the state in terms of the percent of population age 25 and older with a Bachelor's degree or higher, with 56.3 and 47.1 percent, respectively. The Upper Shore and Western Maryland

lag the balance of the state with 11.1 and 15.5 percent of regional population, respectively, with a Bachelor's degree or higher.

Figure K: Maryland Educational Attainment by Race, 2005³²

Educational attainment distributions vary by race and ethnicity/origin as well. While six out of every 10 Asians in Maryland has a Bachelor's degree or higher, less than 25 percent of African-Americans and less than 20 percent of Hispanics fall into this category. Nearly 39.0 percent of the state's Hispanic population does not have a high school diploma, and 24.2 percent of Hispanics have less than a ninth grade education, roughly six times the state average.

	Total	White Alone	Black Alone	Asian Alone	Hispanic (Any Race)
Less than 9th Grade	4.3%	3.4%	3.7%	4.9%	24.2%
9th-12th Grade; No Diploma	8.7%	7.5%	11.7%	4.5%	14.6%
High School Graduate	26.7%	26.1%	30.9%	14.1%	22.5%
Some College, No Degree	19.6%	18.9%	23.1%	11.3%	13.5%
Associate's Degree	6.3%	6.3%	6.3%	6.0%	5.4%
Bachelor's Degree	19.3%	20.9%	14.7%	28.4%	11.6%
Graduate or Professional Degree	15.2%	16.8%	9.6%	30.8%	8.2%
Bachelor's Degree or Higher	34.5%	37.7%	24.3%	59.3%	19.8%

³¹ U.S. Census Bureau, American Community Survey, 2005.

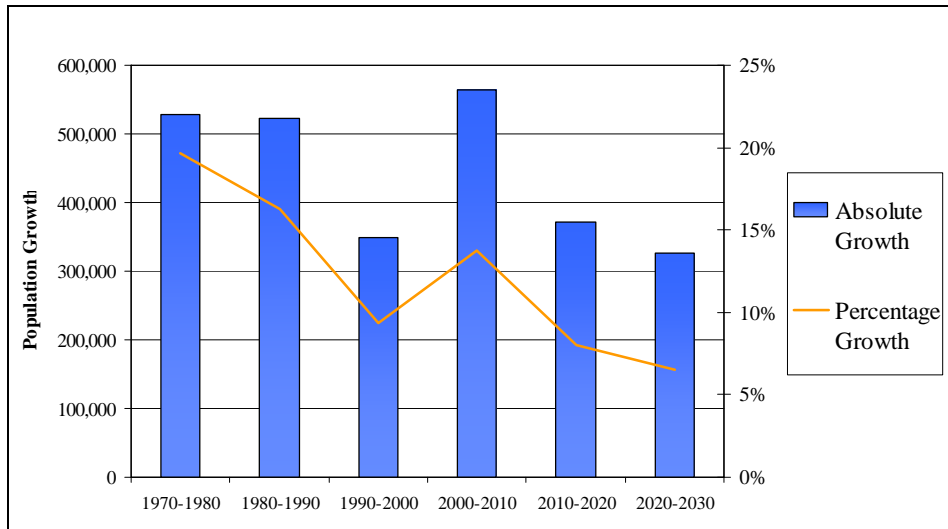
³² U.S. Census Bureau, American Community Survey, 2005.

Maryland's Labor Supply

4.1.4 Aging Population

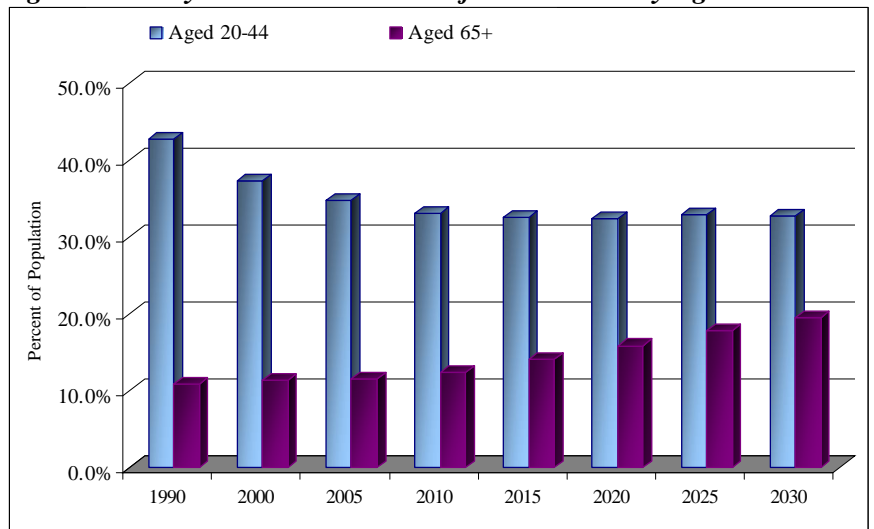
Many of the issues Maryland will face in terms of future workforce and economic development will be rooted in demographics. Between 1970 and 1980, Maryland' population grew by nearly 20 percent. Between 2020 and 2030, growth is expected to be just over five percent. As the state's population growth continues to wane, finding skilled workers to fill jobs will become increasingly challenging.

Figure L: Historic and Projected Growth among Maryland's Population Age 16+³³



The Maryland Department of Planning projects that, between 2000 and 2030, the state's share of population age 20 to 44 will drop from 37.4 percent to 32.3 percent. Over the same time frame, the share of population age 65 and older will increase from 11.3 to 19.5 percent. Maryland is not alone experiencing this trend, though median age data indicate that the state's population is slightly older than that of the nation. Maryland's median age in 2005 was 37.1 years, compared to a median age of 36.5 years for the nation as a whole.

Figure M: Maryland Historic and Projected Growth by Age³⁴



³³ Maryland Department of Planning.

³⁴ Maryland Department of Planning.

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Census data from 2000 provide an indication of the relative median age of Maryland's regions. Eastern Shore jurisdictions, such as Dorchester, Kent and Worcester counties, all have median ages over 40 years of age. Talbot County's population is the oldest in the state, with a median age of 43.3 years of age. Increased immigration of retirees to Eastern Shore locales helps to explain this trend. All three Western Maryland jurisdictions also are home to older populations. The trend in Western Maryland, and Allegany County in particular, is attributed to ongoing population decline and out migration among younger people.

By 2005, more than 60 percent of the state's population was of working age (i.e., age 18 to 64). Of this population, the vast majority (83.3 percent) fell into the 18 to 54 age range. More than one fifth (20.7 percent) of the state's 2005 population of working age was comprised by the leading edge (those born between 1946 and 1955) of the baby boomers, those born between 1946 and 1964. This segment of the population is set to face retirement between 2011 and 2020. By 2020, the number of baby boomers between ages 18 and 54 will increase by more than 123,000 and will account for 22.3 percent of the state's working age population. The data make clear that the retirement of roughly one-fifth of the state's working age population is fast approaching and will have a disproportionate effect on those regions that are already home to a large concentration of older residents and workers (such as Western Maryland and the Eastern Shore).

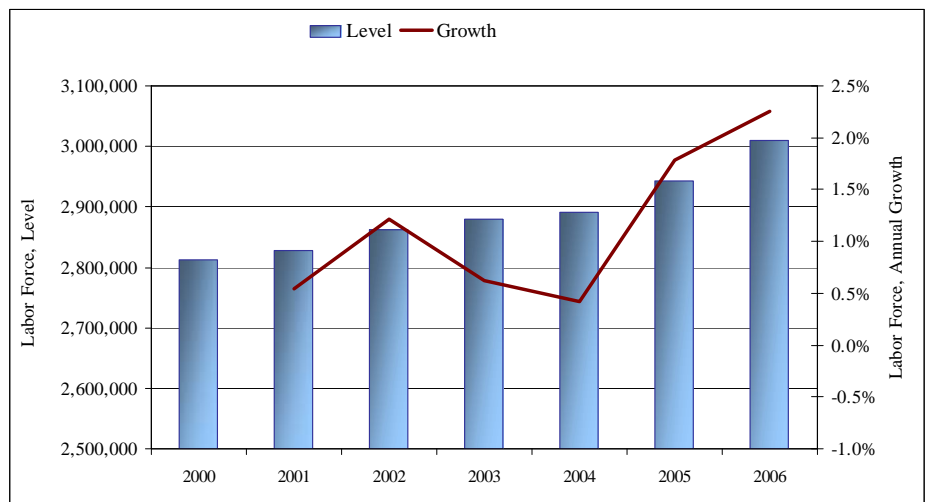
4.2 Workforce Trends

4.2.1 Labor Force Growth

Figure N: Maryland's Labor Force, 2000 – 2006³⁵

Maryland's labor force topped the 3 million mark for the first time in the second quarter of 2006. The state recorded a 2.3 percent expansion in its labor force between 2005 and 2006, surpassing the 1.4 percent growth rate recorded nationwide. This expansion was driven by a 2.0 percent increase in the number of employed people and a 3.6 percent contraction in the number of unemployed persons.

The state's recent performance reverses a trend of diminishing growth registered between 2002 and 2004, when Maryland trailed the national rate of expansion.

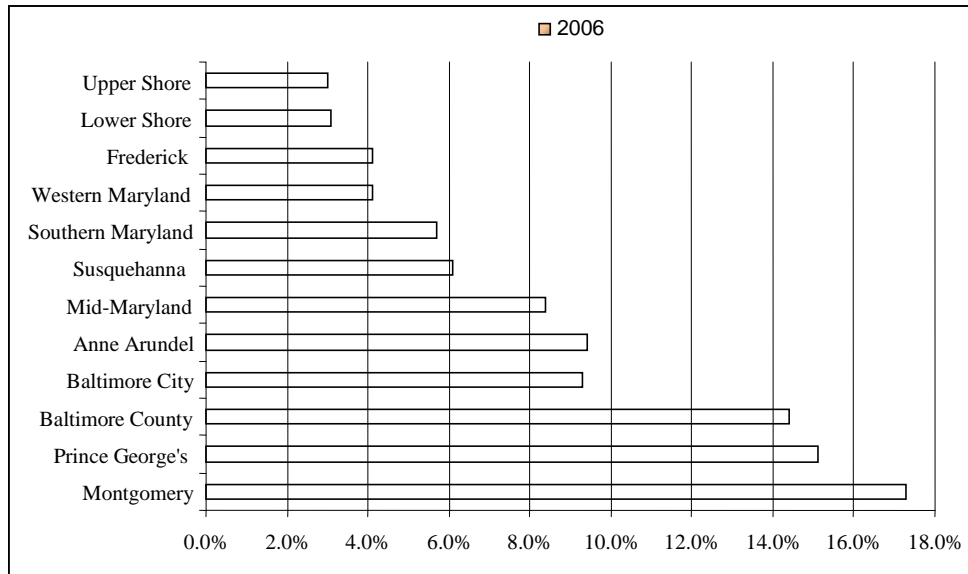


³⁵ Maryland Department of Planning.

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Despite this recent up tick, the pace of expansion for both the state and national labor force has been slowing since 1970. Between 1970 and 1980, Maryland's workforce expanded by nearly 453,000 workers, or 27 percent. During the 1990s, Maryland's labor force grew by just five percent, about 130,000 workers. According to projections from the Maryland Department of Planning, the growth in Maryland's labor force will slow even further in the future. Between 2020 and 2030, the state's workforce is expected to expand by just three percent (or roughly 101,000 workers). This trend is being driven by the aging of Maryland's population.

Figure O: Labor Force Shares by WIA³⁶



The vast majority of the state's labor force³⁷ resides in the suburban jurisdictions outside Baltimore City and Washington D.C. In fact, Montgomery and Prince George's counties are home to just under one-third of the state's labor force. Collectively,

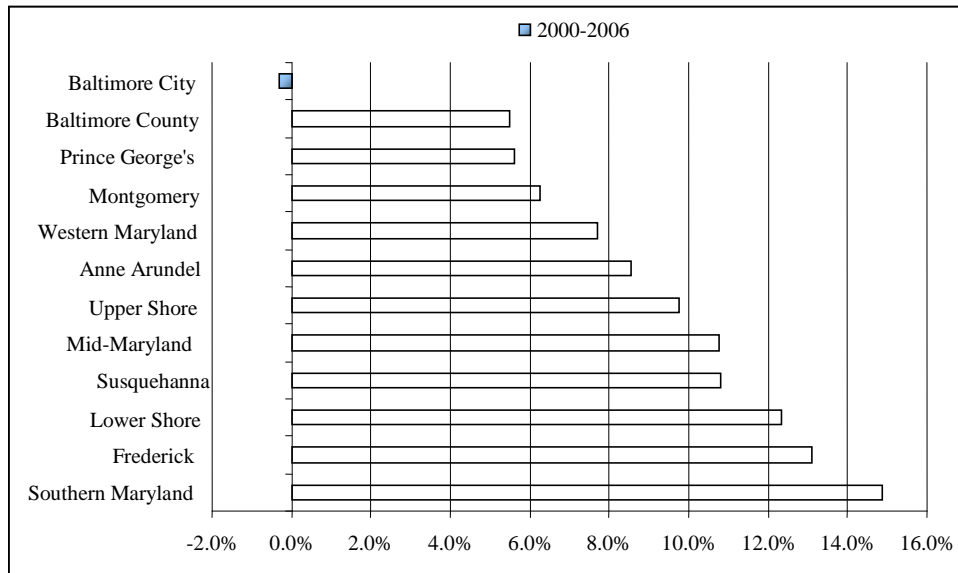
Western Maryland and the Upper and Lower Shore regions comprise another 10 percent of Maryland's labor force.

³⁶ Maryland Department of Planning.

³⁷ Refers to resident labor force or the population currently working or actively looking for a job.

Maryland's Labor Supply

Figure P: Labor Force Growth, 2000 to 2006³⁸



All Maryland Workforce Investment Act (WIA) areas, except Baltimore City, recorded resident labor force growth between 2000 and 2006. In fact, with the exception of Baltimore and Prince George's counties, all WIAs outpaced the national rate of

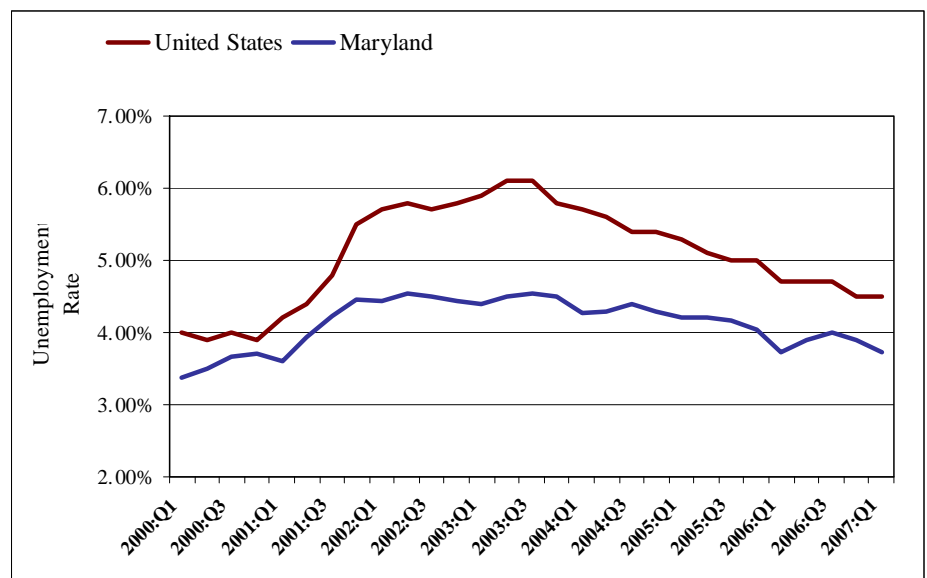
expansion (6.2 percent) during this period.

4.2.2 Unemployment Rate Analysis

Figure Q: Unemployment Rates, 2000 to 2007³⁹

Maryland's average annual unemployment rate, which held steady at 3.8 percent in 2007, remains quite healthy compared to historical and national levels. The comparable U.S. jobless rate is 4.6 percent.

The unemployment rate measures the level of unemployed persons (persons who are not working and who are available and actively looking for work) as a percentage of the total labor force. This indicator is significant because it provides a relative measure of the state's economic health.



Maryland's low unemployment rate is significant to workforce development professionals because it demonstrates that local labor market conditions are increasingly tight. Most

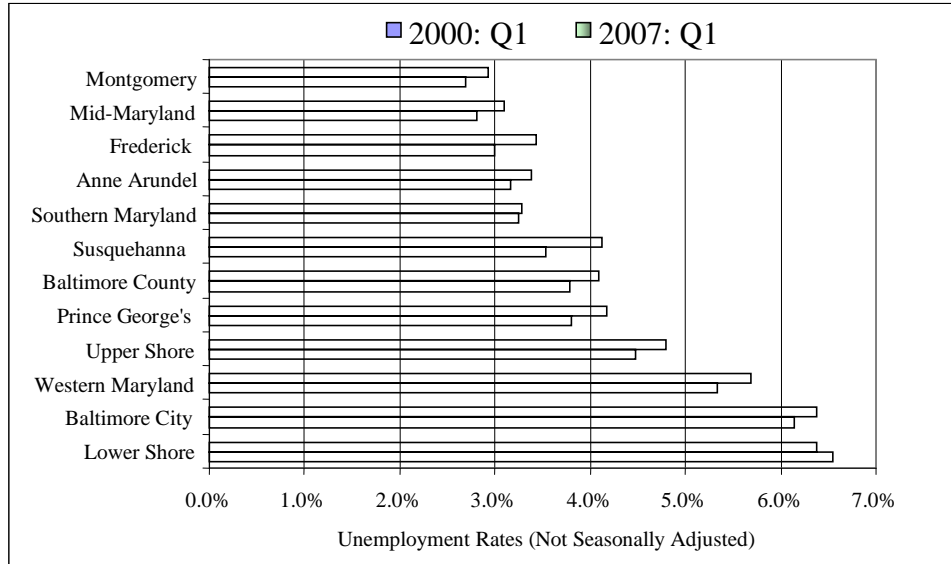
³⁸ Bureau of Labor Statistics.

³⁹ Bureau of Labor Statistics.

Maryland's Labor Supply

economists agree that an unemployment rate in the range of 3.5 to 4.5 percent is indicative of an economy operating at full employment. Maryland's jobless rate continues to fall within that range. In fact, the state has not recorded an unemployment rate above 4.5 percent since July 2003.

Figure R: Unemployment Rates for WIAs⁴⁰



While Maryland's low unemployment rate testifies to the strength of the state's economy, persistent, tight labor market conditions also have the potential to aggravate labor shortages and to apply upward pressure on wages.

Not all Maryland regions boast tight labor market conditions. Western Maryland, Baltimore City and the Lower Shore, for instance, have consistently posted unemployment rates upwards of 5.0 and 6.0 percent. Western Maryland's high unemployment rate stems from the loss of high-wage manufacturing jobs over the past two decades due to closures of former mainstay employers. While the region has since experienced job growth, much of the new job creation has been in low-skill, low-wage positions. The fact that the region has a high share of population with less than a high school diploma makes it more difficult for these workers to find quality jobs.

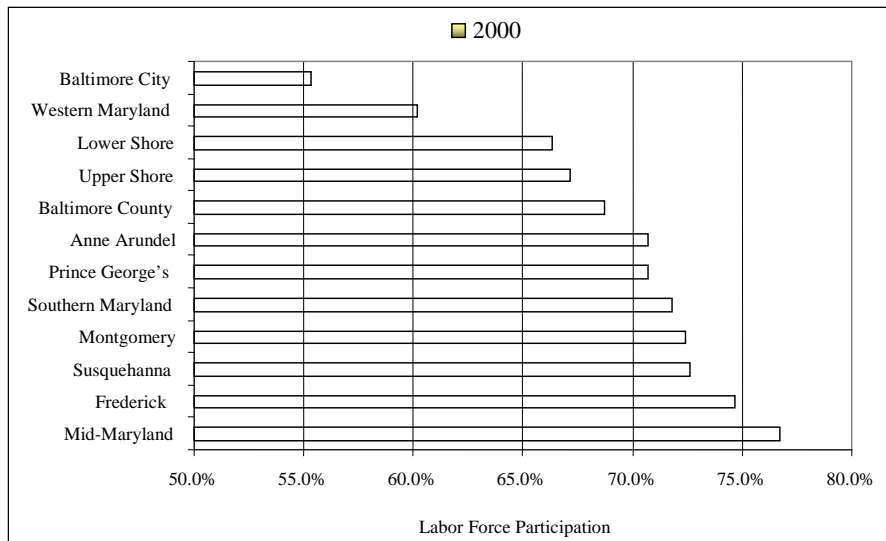
⁴⁰ Bureau of Labor Statistics.

Maryland's Labor Supply

With an unemployment rate of 6.1 percent in 2007, Baltimore City also is characterized by looser labor market conditions.⁴¹ Baltimore is faced with serious long-term challenges, including a significant number of underemployed workers, as well as large segments of population who do not participate in the workforce. The city is home to the largest number of residents with less than a ninth grade education (26,679 persons in 2006, or 6.6 percent of Baltimore's population age 25 and older). The city's high school dropout rate, at 10.5 percent in the 2005-2006 school year, exceeds the 3.5 percent rate posted statewide. These dropouts pose a serious workforce development challenge for the city. Helping these nontraditional segments of the population (dislocated workers, veterans, disabled population, ex-offenders, etc.) participate more fully in the labor market may help alleviate the demand for workers in the face of growing skill set and worker shortages.

4.2.3 Labor Force Participation Rates

Figure S: Labor Force Participation Rates for WIA⁴²



Maryland's labor force participation rate among 16- to 64-year-olds (including military) was 78.2 percent in 2006, ranking the state 11th in the nation, according to this measure. The comparable national rate is 74.5 percent.⁴³

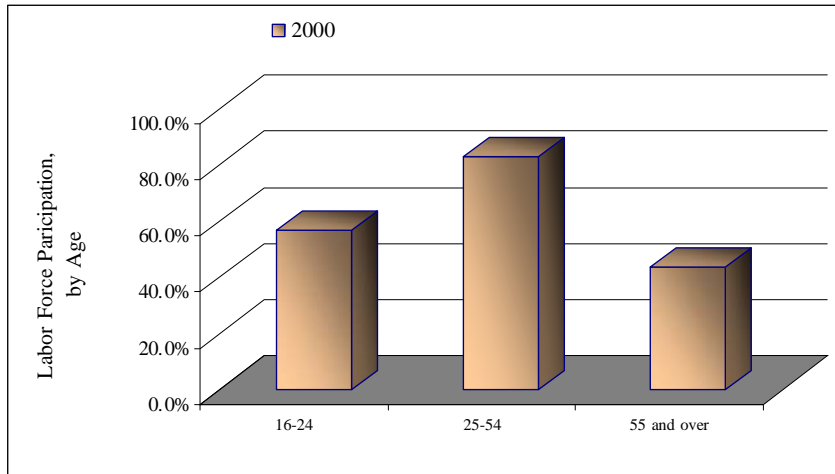
⁴¹ It should be noted, however, that labor market conditions have improved significantly from 2004, when the city consistently recorded unemployment rates in excess of 7.0 percent.

⁴² Bureau of Labor Statistics.

⁴³ U.S. Census Bureau, American Community Survey, 2006.

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Figure T: Labor Force Participation Rates by Age⁴⁴

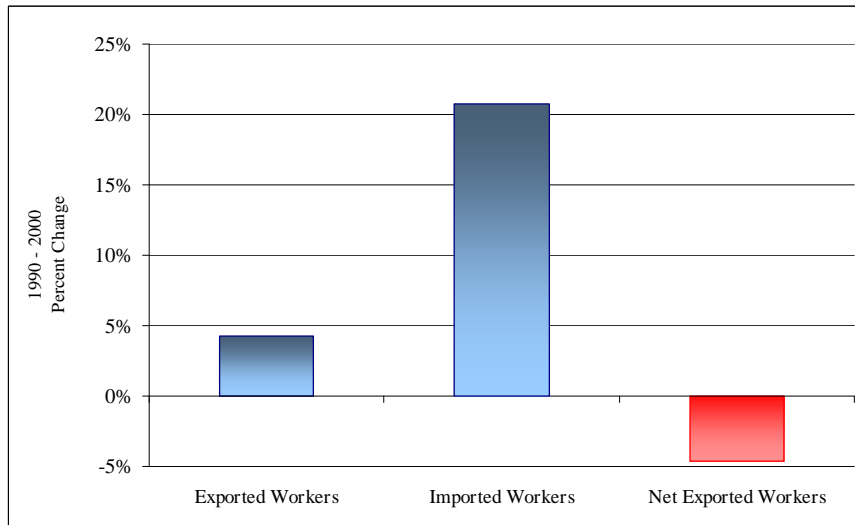


Shifting demographics will have an effect on the state's labor force going forward. According to Maryland Department of Planning data, labor force participation rates in 2000 approached 60 percent among those age 16 to 24 years. Nearly 83.0 percent of those aged 25 to 54 years participated in the labor force. However, only 43.9 percent of those age 55 and over were in the labor force.

Analysts increasingly anticipate that older workers will remain in the workforce longer, compared to previous generations. Still, it is clear that, as Maryland's population ages, labor force participation will be affected.

4.2.4 Commuting Patterns

Figure U: Percent Change in Maryland's Imported/Exported Workers⁴⁵



Journey-to-work data from the 2000 Census reveal that for every Maryland worker living outside the state, there are 2.5 Maryland residents who leave the state for work. In other words, Maryland is a net exporter of workers. In 2000, the state recorded net exported workers in excess of 268,000. This trend is not surprising, since 1990 commuting patterns show the same pattern. However, an examination of 1990 and 2000 data indicates

that the situation is improving. In 1990, Maryland exported 2.9 resident workers for every imported worker. This improvement is explained by the fact that growth among imported workers (up 20.8 percent between 1990 and 2000) far surpasses the growth of exported workers (up 4.3 percent).

⁴⁴ Bureau of Labor Statistics.

⁴⁵ U.S. Census Bureau.

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Between 1990 and 2000, the number of out-of-state residents commuting to Maryland jumped from 151,330 to 182,787. In 2000, the vast majority of these workers (87.2 percent) resided in Washington D.C., Delaware, Virginia and West Virginia. Growth was driven especially by outflows from the latter three states. While the number of workers commuting from Washington D.C. to Maryland increased over the period, they were a smaller share of Maryland's imported workers, dropping from 23.6 percent in 1990 to 19.9 percent in 2000.

More than 450,000 Maryland residents commuted outside the state for work in 2000. The lion's share of these residents worked in Washington D.C. (62.0 percent), while another 24.2 percent worked in Virginia. Delaware and Pennsylvania comprise another 5.2 and 2.8 percent, respectively. The number of out commuters to Washington D.C. dropped by more than 11,000 persons, or by 3.9 percent between 1990 and 2000.

Maryland's commuting patterns data is relevant, not only from a workforce perspective, but also from a quality of life perspective. According to the Transportation Research Board, by 2000, Maryland had joined the ranks of New York, New Jersey and Illinois with more than 10 percent of workers traveling over 60 minutes to get to work.⁴⁶ The 2006 American Community Survey figures indicate that Maryland's average commute time of 30.6 minutes is the second longest commute time in the nation, closely trailing New York's average commute time of 30.9 minutes.⁴⁷

⁴⁶ Pisarski, 2006.

⁴⁷ U.S. Census Bureau, American Community Survey, 2006.

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4.3 *Maryland's Educational Supply Pipeline*

It is abundantly clear that an educated workforce is essential to Maryland's economy. While Maryland's educational institutions produce a majority of the state's workers, there is a substantial amount of ebb and flow of educated workers between Maryland and other areas. Enrollment in Maryland's educational institutions has risen greatly and is expected to continue to grow in the foreseeable future.

As of the 2005-2006 academic year, Maryland educational institutions yielded the following labor supply:

- 56,302 high school graduates;
- 13,715 Associate's degrees (or certificates);
- 25,484 Bachelor's degrees;
- 13,265 Master's degrees;
- Another 1,122 first professional degrees (i.e., lawyers); and
- 1,363 Doctoral degrees.

Not all of these graduates choose to remain and work in Maryland. Conversely, not all of Maryland's labor supply comes from the state's higher educational institutions. Survey estimates reveal that the vast majority (84 percent) of Maryland's community college graduates were full-time Maryland workers at least one year after graduation. The corresponding figures are 64 percent for those with Bachelor's degrees and 57 percent for graduates of Maryland's private career schools.⁴⁸ Maryland's ability to connect a greater number of these graduates to local Maryland employers could help reduce the impact of worker shortages.

Between 1994 and 2004, full-time undergraduate enrollment in Maryland's four-year public colleges and universities grew by 25 percent, and community college enrollment increased by 33 percent. According to projections from the Maryland Higher Education Commission (MHEC), growth in full-time enrollment at public, four-year institutions is expected to moderate to 17 percent between 2007 and 2016. Growth among full-time community college students is expected to drop to 21 percent over the same period. These projections are driven by predicted demographic shifts. They also account for the estimated impact of tuition increases, as well as changes in per capita disposable income.

Over the same period, graduate enrollment among public educational institutions is expected to rise 10 percent for full-time students and 55 percent for part-time students.⁴⁹ Increases in part-time enrollment will continue to be driven by enhanced opportunities for distance learning and online courses offered by traditional universities, as well as through programs such as the University of Maryland University College.

⁴⁸ Percentages refer to five-year averages based on information published in the Maryland Higher Education Commission's 2007 Trend Book.

⁴⁹ Maryland Higher Education Commission, 2007.

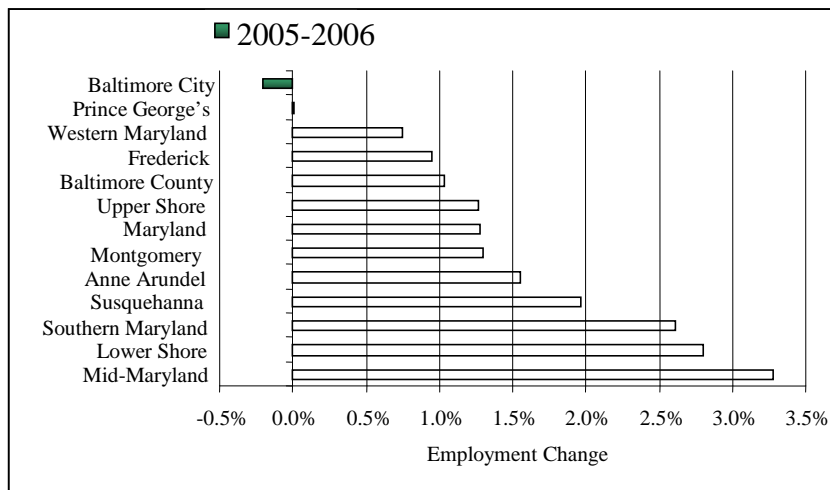
Maryland's Labor Demand

5.0 Maryland's Labor Demand

5.1 Industry Analysis

Between 2005 and 2006, Maryland's aggregate economy expanded by 31,932 employees, or 1.3 percent. The state's 2.5 million job holders enjoyed average weekly wages of \$887.⁵⁰ Maryland's rate of employment expansion during this period represents a deceleration from the 1.6 percent growth rate recorded between 2004 and 2005. Not only has Maryland's rate of employment growth slowed, but the state lags the nation, according to recent quarterly employment data. Maryland's 1.4 percent expansion, recorded between the second quarters of 2005 and 2006, ranks the state 27th in the nation and trails the 1.8 percent national average. Just a few years ago in 2004, Maryland consistently ranked in the top 15 states, according to this measure. This trend of decelerating employment growth would be cause for greater concern if not for the anticipated influx of tens of thousands of jobs to Maryland by 2011, due to the BRAC decisions. While the incoming jobs have the potential to grow Maryland's employment base, the challenge, which Maryland is addressing actively, is to fill the current and future need for workers. RESI anticipates that the state's economy will register annual rates of employment growth in the mid-one percent range in both 2006 and 2007. While not spectacular, this is by no means indicative of an economic downturn. Still, this trend of decelerating employment growth is an area analysts will be tracking closely in the near-term future.

Figure V: Employment Growth by WIA, 2005 to 2006⁵¹



Regional employment growth for the most recent period for which data are available (2005 to 2006) ranges from -0.2 percent in Baltimore City to 3.3 percent in Mid-Maryland. Other rapidly expanding WIA regions include the Lower Shore and Southern Maryland. Employment in both of these areas expanded at a pace of more than 2.0 percent between 2005 and 2006.

⁵⁰ The 2.5 million employment figure (as well as the additional employment figures contained in this section of the analysis) refers to Bureau of Labor Statistics Quarterly Covered Employment & Wage data. This data represents employment by place of work data and is reported to the Bureau of Labor Statistics by the Maryland Department of Labor, Licensing & Regulation (DLLR) and includes all workers covered by the Unemployment Insurance (UI) Law of Maryland and the unemployment compensation for federal employees (UCFE) program. This data series accounts for approximately 91 percent all civilian employment. Excluded from this data are the self-employed.

⁵¹ U.S. Bureau of Labor Statistics, Quarterly Census of Employment & Wages (QCEW) Data.

Maryland's Labor Demand

Employment Composition

Approximately 18.0 percent of the state's aggregate economy falls within the public sector, which is comprised of local, state and federal governments. As a whole, the public sector grew at a 1.6 percent clip, above the average for all major sectors, and pays higher than average weekly wages of \$1,029. With employment just above 125,000 in 2006, the federal government sector comprises 4.9 percent of the state's economy and pays average weekly wages of \$1,438, substantially higher than the average.

The importance of the federal government to the state's economy cannot be underestimated. The many federal laboratories and facilities located within and near Maryland, such as Goddard Space Flight Center and the Naval Air Systems Command at Patuxent River, have contributed greatly to Maryland's aerospace industry. The presence of the Food and Drug Administration (FDA) and the National Institutes of Health (NIH) has spurred growth among bioscience firms. The National Security Agency and Maryland's many military installations have been critical to building the state's base of defense-related businesses.

*Figure W: Maryland's Economic Composition, 2006*⁵²

SECTOR	EMPLOYMENT LEVEL	1-YEAR CHANGE IN EMPLOYMENT		WEEKLY WAGES
		ABSOLUTE	PERCENT	
AGGREGATE ECONOMY	2,529,671	31,932	1.3%	\$887
PUBLIC SECTOR	455,820	7,170	1.6%	\$1,029
Local Government	233,109	6,978	3.1%	\$848
State Government	97,530	826	0.9%	\$879
Federal Government	125,181	-634	-0.5%	\$1,438
PRIVATE SECTOR	2,073,851	24,762	1.2%	\$856
Retail Trade	299,508	906	0.3%	\$620
Healthcare & Social Assistance	295,006	8,871	3.1%	\$737
Professional, Scientific & Technical Services	219,155	5,236	2.4%	\$1,401
Accommodations & Food Services	193,278	-303	-0.2%	\$377
Construction	188,357	5,331	2.9%	\$926
Administrative & Support & Waste	157,299	1,275	0.8%	\$710
Manufacturing	136,328	-4,166	-3.0%	\$1,700
Finance & Insurance	109,595	-379	-0.3%	\$1,238
Wholesale Trade	94,927	677	0.7%	\$1,097
Other Services (Except Public Administration)	89,612	466	0.5%	\$585
Educational Services	54,007	-66	-0.1%	\$815
Transportation & Warehousing	65,867	2,237	3.5%	\$863
Real Estate & Rental Leasing	48,004	-299	-0.6%	\$886
Information	50,770	392	0.8%	\$1,218
Arts, Entertainment & Recreation	36,476	812	2.3%	\$644
Management of Companies & Enterprises	17,763	4,199	31.0%	\$1,696
Utilities	9,711	-38	-0.4%	\$1,709

⁵² RESI, U.S. Bureau of Labor Statistics, Quarterly Census of Employment & Wages (QCEW) Data.

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Agriculture, Forestry, Fishing & Hunting	5,031	-128	-2.5%	\$573
Mining	1,794	67	3.9%	\$884
Not Elsewhere Classified	1,362	-327	-19.4%	\$1,111

With employment in excess of 2.07 million, the private sector comprises the lion's share (82.0 percent) of Maryland's economy. One of the single largest private sector industries in the state is the Healthcare & Social Assistance sector. In 2006, employment in this sector expanded by 3.1 percent, to just over 295,000 employees. Retail Trade, Professional, Scientific & Technical Services, and Accommodations & Food Services also rank among the largest private sector employers within the state, each employing a significant proportion of Maryland workers.

Regional employment distributions across industries are fairly similar to that of the state as a whole, with a few notable exceptions. Both Southern Maryland (comprised of Calvert, Charles and St. Mary's counties) and Frederick, Prince George's and Montgomery counties boast high concentrations of public sector, and especially federal government, employment. Federal government employment comprises 9.2 percent of Southern Maryland's aggregate economy. The collective share for Frederick, Prince George's and Montgomery counties is 8.0 percent. Montgomery and Frederick counties have the highest proportion of employment within Professional, Scientific & Technical Services in the state, with shares of 14.0 percent and 13.5 percent respectively. Western Maryland and the Upper Shore are home to a significantly higher proportion of Manufacturing employment, with 11.3 and 12.3 percent, respectively. In both of these areas, the share of Manufacturing employment is more than double that of the state as a whole.

Western Maryland boasts the highest share of Transportation & Warehousing employment (4.2 percent). This is reflective of the way Washington County, in particular, has been able to leverage successfully the region's excellent transportation infrastructure, which includes access to three interstates (I-68, I-70 and I-81) and two railway lines (CSX Transportation and Norfolk Southern) to reinvent itself as a transportation hub. Washington County currently is home to 151 Transportation & Warehousing businesses, including the Staples Distribution Center.

Montgomery County leads the state in share of Information employment (3.3 percent) and boasts the highest concentration (1.5 percent) of employment within the Management of Companies & Enterprises sector. The Lower Shore employs a significantly large proportion of workers within the Accommodations & Food Services sector. Employment in this industry comprises 15.5 percent of the region's economy, compared to just 7.6 percent for Maryland as a whole.

Maryland's Labor Demand

Among the fastest growing Maryland employment sectors are high wage sectors such as Professional, Scientific & Technical Services, which expanded by more than 4,900 positions, or 2.3 percent, between the third quarters of 2005 and 2006. Also growing quickly were Management of Companies & Enterprises, with growth of more than 4,300 positions, and Wholesale Electronic Markets & Agents & Brokers, with growth of 2,314 positions. Each of these sectors pays weekly wages above \$1,300, well in excess of the \$858 average for all Maryland industries. Growth also is being led by Food & Beverage Stores, which expanded by 4,543 jobs, or 7.7 percent, and the demographically driven Nursing & Residential Care Facilities industry, with growth of 3,409 positions, or 5.7 percent. Specialty Trade Contractors also ranks high on the list.

Figure X: Top Employment Gaining Maryland Industries, 2005:Q3 – 2006:Q3⁵³

RANK	INDUSTRY	EMPLOYMENT LEVEL	1-YEAR CHANGE IN EMPLOYMENT		WEEKLY WAGES
			ABSOLUTE	PERCENT	
1	Professional, Scientific, & Technical Services	219,324	4,920	2.3%	\$1,335
2	Food & Beverage Stores	63,824	4,543	7.7%	\$465
3	Management of Companies & Enterprises	18,065	4,337	31.6%	\$1,421
4	Nursing & Residential Care Facilities	63,235	3,409	5.7%	\$538
5	Specialty Trade Contractors	128,225	2,951	2.4%	\$850
6	Ambulatory Healthcare Services	95,508	2,635	2.8%	\$985
7	Hospitals	95,046	2,602	2.8%	\$896
8	Wholesale Electronic Markets & Agents & Brokers	12,827	2,314	22.0%	\$1,434
9	Food Services & Drinking Places	177,052	2,007	1.1%	\$295
10	Warehousing & Storage	10,747	944	9.6%	\$762
11	Building Material & Garden Equipment & Supplies Dealers	26,550	894	3.5%	\$609
12	Transit & Ground Passenger Transportation	8,838	815	10.2%	\$457
13	Clothing & Clothing Accessories Stores	30,520	788	2.7%	\$331
14	Construction of Buildings	45,944	718	1.6%	\$966
15	Couriers & Messengers	11,393	641	6.0%	\$726

⁵³ RESI, U.S. Bureau of Labor Statistics, Quarterly Census of Employment & Wages (QCEW) Data.

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Industries rapidly shedding jobs are led by a mix of retail, services and manufacturing sectors including General Merchandise Stores, which contracted by more than 6,900 positions, or 12.7 percent, between the third quarters of 2005 and 2006; Accommodations (loss of more than 2,700 positions); and Insurance Carriers & Related Activities (loss of 1,116 positions). The latter industry pays weekly wages approaching \$1,200, well in excess of the \$858 average for all Maryland industries. Manufacturing sectors comprise five of the most rapidly declining industries, including: Computer & Electronic Product Manufacturing; Primary Metal Manufacturing; Leather & Allied Product Manufacturing; Transportation Equipment Manufacturing; and Wood Product Manufacturing. Collectively, these industries shed nearly 2,600 jobs from the state's payrolls. It is important to note that, with the exception of Wood Product Manufacturing, these contractions are concentrated within high-paying sectors.

Figure Y: Top Employment Losing Maryland Industries, 2005:Q3 – 2006:Q3⁵⁴

RANK	INDUSTRY	EMPLOYMENT LEVEL	1-YEAR CHANGE IN EMPLOYMENT		WEEKLY WAGES
			ABSOLUTE	PERCENT	
1	General Merchandise Stores	47,619	-6,927	-12.7%	\$365
2	Accommodations	24,725	-2,729	-9.9%	\$428
3	Insurance Carriers & Related Activities	34,577	-1,116	-3.1%	\$1,173
4	Merchant Wholesalers, Durable Goods	52,555	-1,066	-2.0%	\$1,194
5	Sporting Goods, Hobby, Book, & Music Stores	13,161	-1,005	-7.1%	\$395
6	Merchant Wholesalers, Nondurable Goods	29,846	-1,002	-3.2%	\$941
7	Motion Picture & Sound Recording Industries	4,489	-695	-13.4%	\$444
8	Motor Vehicle & Parts Dealers	38,795	-659	-1.7%	\$842
9	Computer & Electronic Product Manufacturing	21,786	-653	-2.9%	\$1,659
10	Miscellaneous Store Retailers	18,947	-634	-3.2%	\$425
11	Rental & Leasing Services	13,595	-544	-3.8%	\$723
12	Primary Metal Manufacturing	3,583	-533	-12.9%	\$1,124
13	Leather & Allied Product Manufacturing	171	-489	-74.1%	\$911
14	Transportation Equipment Manufacturing	8,314	-465	-5.3%	\$1,164
15	Wood Product Manufacturing	3,567	-445	-11.1%	\$692

⁵⁴ RESI, U.S. Bureau of Labor Statistics, Quarterly Census of Employment & Wages (QCEW) Data.

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5.2 Base Realignment and Closure Commission (BRAC) Demand

The most recent round of BRAC decisions clearly will benefit Maryland's economy and will result in thousands of new high-skill, high-wage jobs moving into the state over the next five years. However, the anticipated influx of Department of Defense (DoD) and associated contractor positions – estimated at between 40,000 and 60,000 new jobs – presents its own set of challenges from a workforce development perspective.

The BRAC legislation mandates that several DoD units (comprised of more than 15,000 civilian DoD personnel) must move to Maryland by 2011. The extent to which current DoD employees will follow their jobs to Maryland is not clear. Recent estimates indicate that between 30 and 50 percent of the civilian employees working at Fort Monmouth, New Jersey plan to follow their jobs to Aberdeen.⁵⁵ Filling the gap with existing Maryland workers and recruiting new employees will present a significant workforce development challenge. This challenge will undoubtedly escalate as existing civilian DoD workers approach retirement. According to a report issued by the Pentagon in 2002, the average age of DoD employees is 45.2 years.

The size and scope of the DoD units moving to Maryland as a result of BRAC could be influenced by future and current workforce availability. In other words, if jobs go unfilled, they could very well be lost. The challenge for workforce development officials is to ensure that Maryland gains as many potential BRAC jobs as possible. The way to achieve this goal is to make sure that new positions are filled quickly. Implementing an efficient security clearance process is one way to work toward this goal.

Most important, the State's workforce development system must strive to ensure that Maryland's labor pool is ready and able to fill the types of jobs that BRAC will bring to Maryland. Both the Fort Monmouth and the Defense Information Systems Agency (DISA) units that are slated to move to Maryland report a high proportion of the following occupations:

- Electrical/electronics engineers
- Computer engineers
- Management and program analysts
- Computer scientists
- Information technology managers
- General engineers
- Telecommunications specialists

⁵⁵ September 28, 2007 presentation by Mark Fuhring, Deputy Director of Human Resources, CECOM Life Cycle Management Command.

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These occupations require a Bachelor's degree, mainly in the engineering and sciences fields, for entry-level positions. For higher grade positions, graduate education and/or a combination of work experience is required. Key skills associated with these positions include:

- Complex problem solving
- Critical thinking
- Judgment and decision making
- Systems evaluation⁵⁶
- Technology design⁵⁷

There will be ancillary effects of BRAC to be considered, as well. Specifically, the influx of BRAC personnel and contractors will drive significant construction activity and the demand for personal services. The influx also will ramp up demand for services workers such as construction managers and workers, day care workers and hospitality workers, among others. Community colleges in Harford and Anne Arundel counties already have begun to explore program needs associated with these occupations. According to a report produced by RESI in 2006, for every direct, on-base job⁵⁸ job that comes to Maryland, 1.96 additional spin-off jobs will be created.⁵⁹ This is an area that should be explored fully by workforce development professionals.

5.3 Demand for Science, Technology, Engineering and Mathematics (STEM) Workers

In recent years, upper-level degrees in science and engineering have been awarded to high proportions of foreign-born students. According to the National Academy of Science, 59 percent of U.S. engineering doctorates were awarded to foreign students in 2003.⁶⁰ In 2004, roughly 63 percent of the 147 doctoral degrees in engineering awarded by Maryland institutions went to foreign students, including a small number of non-U.S. citizens with permanent resident visa status and a much larger portion of non-U.S. citizens with temporary visa status.

This trend can benefit our economy, since many foreign-born people with doctorates remain in the country to work, at least for some period of time. America's ratio of natural sciences and engineering degrees awarded to our college age population (5.7 per 100) severely lags that of Japan (8 per 100), Europe (8-13 per 100), and Taiwan and South Korea (11 per 100). Recent evidence indicates, however, that U.S. institutions are facing greater competition from international schools for these students, a concern noted in the Maryland Higher Education Commission's 2004 plan. Increased immigration restrictions have not helped the situation. In 2000, Asian universities awarded 1.2 million of the world's science and engineering degrees (undergraduate, graduate and doctoral), while the U.S. awarded just 500,000.

⁵⁶ The U.S. Department of Labor defines systems evaluation as follows: Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.

⁵⁷ Technology design is defined as: Generating or adapting equipment and technology to serve user needs.

⁵⁸ Direct, on-base positions include civilian DoD positions, as well as embedded private defense contractors.

⁵⁹ RESI, Maryland Department of Business & Economic Development, 2006.

⁶⁰ National Academy of Science, p.7, 2007.

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It should be noted that a 2005 Duke University study presents the U.S. in a more competitive light.⁶¹ The study notes that previously published figures on the number of engineering or computer science graduates for the U.S., China and India are not necessarily comparable, due to differences in the types of programs and program length, etc. According to Duke's findings, when the number of degrees granted is normalized to account for population size (on a per one million citizen basis), the U.S. generates 750 technology specialists compared to 500 produced by China and 200 produced by India.

While the scope of the competition that U.S. higher educational institutions currently face is debatable, there is one point on which analysts agree: national and local economies will face greater demand for scientists and engineers going forward. Maryland's demand for workers in these sectors will be exacerbated further by demographics (as many current workers approach retirement) and by the impacts of BRAC, which will result in the movement of a significant number of science and engineering jobs to Maryland in the near future.

According to this measure, Maryland fares better than most states. After all, Maryland ranks second in the nation in our concentration of doctoral scientists and engineers,⁶² as well as in our number of employed Ph.D. scientists and engineers per 100,000 workers (938.5).⁶³ We are home to a multitude of federal and university research labs and rank second in the nation in terms of federal research and development spending and first in terms of university research dollars.⁶⁴ Still, given future demand, growing our base of science and engineering degrees must remain a high priority.

Various Maryland entities recognize this need, including GWIB's Aerospace Industry Steering Committee, which recommended several initiatives aimed at promoting science, technology, engineering and mathematics (STEM) education in Maryland. Among these is the recommendation for the creation of a STEM Center of Excellence, as well as the development of articulation agreements between high school pre-engineering programs and college programs. Industry internships and mentorships also are identified as a means to grow Maryland's supply of scientists and engineers.

The Maryland State Department of Education (MSDE) also is well aware of the need for more scientists and engineers, and began implementing Project Lead the Way (PLTW) in 2003-2004. PLTW is a pre-engineering program which aims to increase preparation among high schools students for higher education engineering programs. Forty-three (43) Maryland high schools in 16 school systems participate in the program, which allows students to enroll in such courses as Principles of Engineering, Computer Integrated Manufacturing, Civil Engineering and Aerospace Engineering. Maryland recently received the Joseph H. Oakley Excellence in Education Award for its PLTW progress. Maryland also will be piloting the newly-launched PLTW for the biomedical sciences curriculum. An aerospace PLTW program also is in the planning stages.

⁶¹ Duke University, 2005.

⁶² National Science Foundation, 2003.

⁶³ National Science Foundation, State Science & Technology Institute, 2003.

⁶⁴ Maryland Higher Education Commission, 2004.

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Another MSDE program that focuses on this area is the Super Stem Project, which partners higher education (the University of Maryland, Baltimore County) with the Baltimore County Public Schools and MSDE. The program is funded by the National Science Foundation and targets improving student achievement, teacher quantity and quality specifically within STEM programs.

5.4 The Demand for Basic and Applied Skills

The Conference Board, in collaboration with several other organizations, conducted a survey of U.S. firms in 2006 to determine how employers rate new entrants to the workforce.⁶⁵ The results were not positive. Overall, employers do not consider recent graduates (high school graduates, as well as graduates of two- and four-year institutions) to be adequately prepared for the workforce. Specifically, firms identified the following shortcomings among these populations:

Figure Z: Deficiencies of New Entrants to the U.S. Workforce as Specified by Employers⁶⁶

High School Graduates are:
• “Deficient” in the basic knowledge and skills of <i>Writing in English, Mathematics, and Reading Comprehension</i> ,
• “Deficient” in <i>Written Communications</i> and <i>Critical Thinking/Problem Solving</i> , both of which may be dependent on basic knowledge and skills,
• “Deficient” in <i>Professionalism/Work Ethic</i> , and
• “Adequate” in three “very important” applied skills: <i>Information Technology Application, Diversity</i> and <i>Teamwork/Collaboration</i> .
Two-Year and Four-Year-College Graduates are:
• Better prepared than high school graduates for the entry-level jobs they fill,
• “Deficient” in <i>Writing in English</i> and <i>Written Communications</i> , and
• “Deficient” in <i>Leadership</i> .

⁶⁵ The Conference Board.

⁶⁶ The Conference Board, p.11.

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GWIB's Industry Monograph for Maryland's Hospitality & Tourism Industry confirms these findings. The GWIB report identifies a critical mismatch between the "job-readiness" or basic skills required for the majority of occupations within the sector and the skill levels of new entrants to the field. The majority of occupations within this sector require basic skills and on-the-job training. In fact, only one occupation out of 35 requires a Bachelor's degree or higher (General and Operational Managers). Yet for the balance of occupations, employers are having difficulty finding workers with good active listening skills, service orientation and cultural awareness and sensitivity. Finding job entrants with the ability to read, write and understand standard and spoken English also is a critical priority for the industry. To address these issues, the report recommends creating a statewide resource network to advance basic skills and to support tax incentives for worker training in English as a Second Language, among other recommendations.

According to occupational projections updated by the Maryland Department of Labor, Licensing & Regulation (DLLR), the top four occupations in which we expect to see the greatest level of replacement openings between 2004 and 2014 include:⁶⁷

- Cashiers (33,780 replacement openings)
- Retail salespersons (31,670)
- Waiters and waitresses (21,585)
- Combined food preparation and serving workers (17,035)

This list is not surprising, as these occupations have been associated traditionally with limited career paths and high turnover rates. However, this list also brings the issue of basic skills to the forefront. Not only do these occupations rank high in terms of projected turnover, they also lead the state in terms of total projected job openings between 2004 and 2014. Using U.S. Department of Labor occupational data (O*NET)⁶⁸, one can determine that these occupations require basic skills (as defined by the Department of Labor), such as active listening, speaking, writing and reading comprehension.

The Conference Board also indicates that while both basic skills and applied skills⁶⁹ are paramount for new entrants to the workforce, applied skills tend to be rated as the most critical 21st century skills employers are seeking. The four top-rated skills are considered to be applied skills, according to the study. They include: (1) Professionalism/Work Ethic, (2) Oral and Written Communications, (3) Teamwork/Collaboration and (4) Critical Thinking/Problem Solving.

⁶⁷ Maryland Department of Labor, Licensing & Regulation, Office of Workforce Information and Performance and Office of Labor Statistics, 2007.

⁶⁸ The U.S. Department of Labor's online information system (O*NET). The O*NET online system provides occupational information, as well as information on key attributes and characteristics of workers and occupations.

⁶⁹ Examples of basic skills noted in the study include: reading comprehension, spoken and written English, mathematics, science, knowledge of a foreign language, etc. Applied skills include: lifelong learning/self direction, creativity/innovation, leadership, etc.

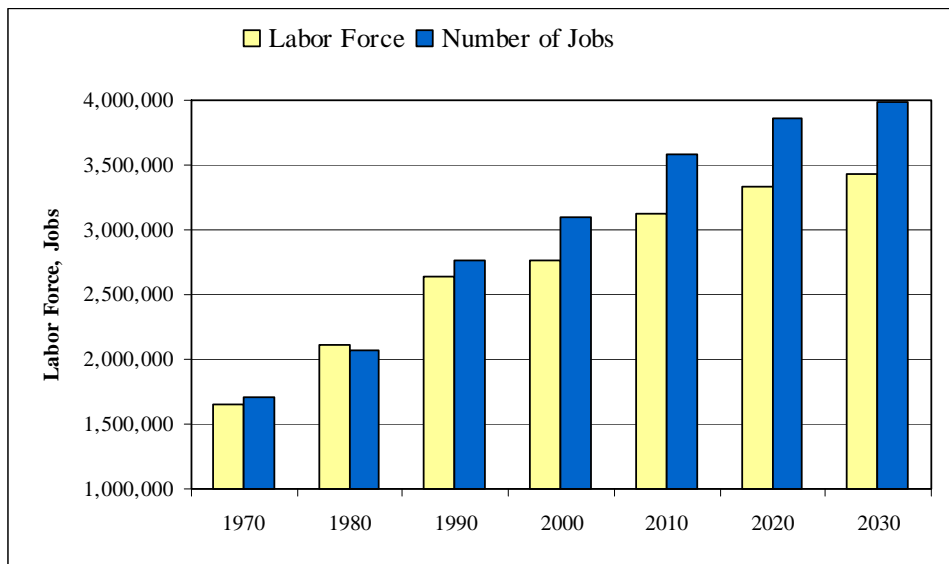
Looking Ahead: Identifying Gaps, Challenges and Opportunities

6.0 Looking Ahead: Identifying Gaps, Challenges and Opportunities

6.1 *The Gap between Maryland's Jobs and Labor Supply is Growing*

The gap between the size of Maryland's labor force and the state's inventory of jobs is widening.⁷⁰ The number of jobs in Maryland has outnumbered the state's resident labor force for several decades. In 1970, the gap was roughly 46,000. By 1990, this figure had more than doubled to nearly 120,000. By 2020, this gap is expected to exceed 528,000. The situation is not as dire as it appears to be on the surface, since workers residing in neighboring states will continue to fill some portion of these jobs; however, the widening gap certainly will translate into greater competition for available labor.

Figure AA: Historic and Projected Maryland Resident Labor Force and Jobs by Place of Work⁷¹



After 2010, labor force growth is expected to slow. Between 2010 and 2020, for example, the state's labor force is expected to increase by roughly 200,000 (down from expected growth of more than 360,000 over the previous decade). Much of the anticipated slowdown in labor force growth is attributable to the graying of our population. For years, experts have been anticipating the dramatic ways in which our aging workforce will affect national, state and local economies. The implications of this megatrend are enormous. They range from the need for employers to adapt to increasing generational diversity and generational differences in the workplace to the need for companies to ensure that knowledge and skills are retained as older workers retire. Maryland must confront the impacts of these demographic shifts, along with the rest of the nation.

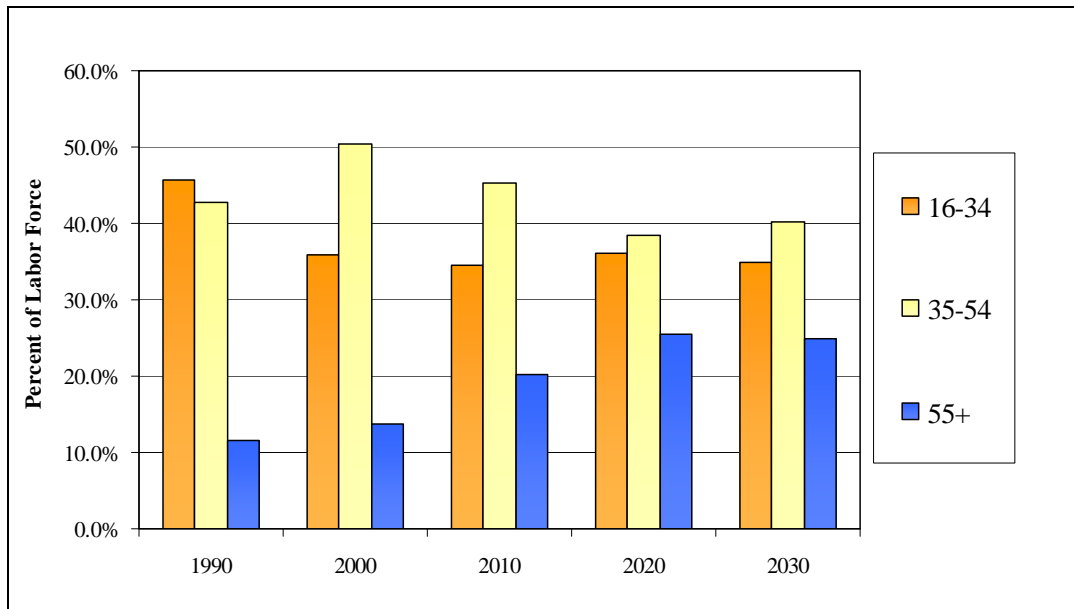
⁷⁰ The Maryland Department of Planning projects jobs by place of work using historical data released by the Bureau of Economic Analysis. These are jobs which are located in Maryland, but are filled by both state and non-state residents. The state's resident labor force also is projected by the Maryland Department of Planning based on historical Bureau of Economic Analysis data. Projections were updated in November 2006.

⁷¹ Maryland Department of Planning. November 2006.

Looking Ahead: Identifying Gaps, Challenges and Opportunities

The following chart details Maryland's historical, current and projected labor force composition by age. The proportion of adults age 55 years old and older who are active in the workforce is projected to increase from roughly 12 percent in 1990 to 26 percent by 2020. The proportion of Maryland's workforce comprised of adults age 35 to 54 years old, on the other hand, is expected to decrease from 43 percent to 39 percent over the same period. As previously mentioned, this trend is due to the graying of the population – there are simply fewer people making up Generations X and Y, compared to the size of the baby boomer generation.

Figure AB: Historic and Projected Proportion of Maryland's Labor Force by Age⁷²



⁷² Maryland Department of Planning. 2006.

Looking Ahead: Identifying Gaps, Challenges and Opportunities

6.2 *The Race to Preserve Institutional Knowledge*

The impacts of Maryland's aging population are not limited simply to the issue of filling jobs. Shifting demographics and the approaching retirement of older workers will place increased pressure on firms to preserve institutional knowledge. Simply put: companies and industry are scrambling to prevent "brain drain" for good reasons.

The dearth of qualified nuclear engineers and related workers illustrates this issue perfectly. According to the Nuclear Energy Institute (NEI), the U.S. nuclear industry faces a critical shortage of workers by 2010. In fact, NEI finds that less than eight percent of industry employees are younger than 32 years of age and more than half are age 47 or older. Expected shortages will affect a broad cross section of occupations within the industry, ranging from health physicists and plant operators to technicians, welders and maintenance workers.⁷³ The timing is especially problematic as the Nuclear Regulatory Commission expects an influx of applications for nearly three dozen new reactors by 2008, including Constellation Energy Group's application to build a new nuclear reactor at Calvert Cliffs.⁷⁴ Clearly, industry and workforce development professionals must ensure that institutional knowledge within this critical industry is preserved and a sufficient pipeline of future workers is developed.

The nuclear engineer example is not an isolated case. According to findings from GWIB's Aerospace Industry Initiative Workforce Summit, conducted in January 2006, 50 percent of the aerospace workforce in Maryland is expected to retire in the next 15 years. A 2002 Accenture publication notes that, "The vast majority of US and European chemical companies are concerned about problems posed by their aging workforce. Estimates that 50 percent of employees will become retirement eligible in a particular function in the next decade are not uncommon in the U.S. and Europe."⁷⁵ Maryland's Educational Services sector, which already is feeling the impact of critical shortages, ranks among those industries with a high proportion of older workers (roughly 18 percent are age 55 plus).⁷⁶ The Healthcare sector is another that has begun to feel the impact of an aging workforce. In 1998, nearly 24 percent of Maryland's registered nurses working in hospitals were between the ages of 48 and 57 years old, and another 19 percent were over the age of 58. By 2005, these proportions had grown to 28 and 25 percent, respectively.⁷⁷ According to GWIB's Healthcare Workforce Summit monograph, vacancy rates in 2002 for registered nurses (15.6 percent), radiation therapy technicians (21.1 percent) and licensed practical nurses (12.9 percent) at Maryland hospitals already are high. The issue of brain drain and shortages undoubtedly will be compounded as the demand for healthcare services increases due to the graying of the population.⁷⁸

⁷³ Nuclear Energy Institute, 2007.

⁷⁴ *Baltimore Sun*. *Constellation Energy files partial plan for reactor*. July 31, 2007.

⁷⁵ DeLong, page 3.

⁷⁶ Carroll, 2004.

⁷⁷ Maryland Board of Nursing.

⁷⁸ One recommendation developed from GWIB's Healthcare Workforce Summit involves transitioning retired military personnel to the private sector. Many of these personnel have accumulated vast experience and training but lack proper certification. ProVET (Providing Re-employment Opportunities to Veterans) is one program Maryland has launched in recent years to provide transition assistance for those veterans who are interested in securing private sector employment.

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6.3 Faculty/Teacher Shortages

It is not the intention of this analysis to minimize the significance of labor shortages already occurring in Maryland industry sectors – for example, that of registered nurses and other healthcare professionals. However, given that much already has been written about these shortages, this analysis instead targets the issue of faculty shortages.

Maryland’s need for teachers outstrips the state’s ability to produce and retain them. In 2005, school systems throughout the state hired roughly 8,000 teachers, of which 4,350 were beginning new hires. Only one-third (1,439) of the beginning new hires had graduated from Maryland colleges and universities.

Particular subjects facing current and future shortages include:

- Technology education
- Computer science
- English for Speakers of other Languages
- Foreign languages
- Mathematics
- Science
- Special education.

The issue of faculty shortages extends to higher education as well, and is affecting a range of Maryland industries, including the healthcare sector. As noted in GWIB’s HealthCare Monograph, “the amount of faculty and learning facilities is inadequate...” to train the state’s healthcare workforce. These shortcomings are evidenced by student waiting lists at local nursing schools.⁷⁹ Indeed, nursing programs, both locally and nationally, report an increase in the number of qualified nursing applicants being turned away due to a dearth of faculty and classroom/clinical space. In 2005, the number of applicants denied admission due to a lack of faculty or classroom and clinical space jumped to 29,424 nationally and 1,850 in Maryland.

According to a 2005 survey,⁸⁰ the state’s 24 nursing degree programs reported that 30.5 percent of full-time faculty positions were vacant. Local shortages are attributed to both the aging of the state’s faculty population, as well as the difficulties in growing the pool of potential educators. These difficulties range from structural barriers like limited local capacity of graduate programs in nursing education to market-driven trends (e.g., compensation for practicing nurses often exceeds that for nursing educators). These trends undoubtedly will be exacerbated as Maryland’s nursing faculty population continues to age and approach retirement. The average age of nursing faculty at Maryland institutions, as reported to the Board of Nursing in 2005, ranges from 42 to 55 years, and nationally, the average age of faculty retirement is 62.5 years.⁸¹

⁷⁹ Charting New Directions, Governor’s Healthcare Workforce Summit, page 13.

⁸⁰ Maryland Council of Directors of Associate Degree and Baccalaureate Programs Survey.

⁸¹ Nursing Faculty Shortage, Causes, Effects and Suggestions for Resolution, Maryland Statewide Commission on the Crisis in Nursing. 2005.

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6.4 *Increasing Age Diversity*

Business and industry also will need to accommodate increased age diversity in the workplace. According to a 2005 *Forbes* magazine article, “Employers need to examine whether their policies, programs, and practices are age neutral. For example, is the company offering dependent care geared only toward children when the workforce may be at an age where elder/parent care has more value?”⁸²

Adjusting to differences in generational attitudes and preferences in the workplace will present its own set of challenges. For instance, the chemical industry has become accustomed to low voluntary turnover among managers and professionals. As younger generation workers (Generation X and Y, in particular) replace retirees, the industry will need to adapt to an increased tendency for voluntary attrition as these workers tend to be more willing to seek out better job opportunities.⁸³ Many today consider employee loyalty to be a thing of the past, especially among today’s younger workers, who are perceived to be constantly on the prowl for bigger and better opportunities.

The aging of our population also has implications for education. As the age of students at post-secondary educational institutions rises and as workers continue to pursue lifelong learning, campuses and faculty increasingly will require additional flexibility in terms of location, timing, etc. MHEC recognized this need in their 2004 plan and set a goal to enhance alternative approaches for educational delivery – namely distance learning and regional higher education centers. The State’s academic institutions already have begun to respond to these needs, as evidenced by institutional expansion to satellite campuses, the expansion of 2+2 programs⁸⁴ and increased investments in and access to distance learning programs that are part of Maryland’s higher education system.

6.5 *Immigrants Continue to Grow Maryland’s Labor Supply*

Maryland’s workforce is expected to benefit from international migration at both ends of the employment spectrum, as immigrants fill low-wage, low-skill jobs, as well as high-wage, high-skill positions. Low-skill jobs, such as Combined Food Preparation & Serving Workers, for example, continue to rank among the top occupations demanded in Maryland. According to data published by the Urban Institute, immigrants comprise a disproportionately high share (20 percent) of low-wage workers in the U.S. Immigrant workers represent an especially large proportion of low-wage occupations within the farming and private household sectors. According to 2002 estimates, immigrants compose 37 and 42 percent of employment in these sectors, respectively.⁸⁵ The Pew Hispanic Center reports that short-term, unauthorized immigrants are concentrated heavily in the low-wage construction (including building and

⁸² Reeves, 2005.

⁸³ Accenture Institute for Strategic Change, 2002.

⁸⁴ 2+2 is a program in which the first two years of post-secondary education are completed at a community college and the remainder is completed at a partner, four-year institution.

⁸⁵ Capps, 2003.

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grounds cleaning and maintenance occupations) and hospitality industries (including food preparation and service occupations).⁸⁶

GWIB's Hospitality and Tourism monograph reveals the importance of this workforce to local industry. The report documents Maryland's reliance on immigrant workers, seasonal and otherwise, to fill a variety of occupations within this sector, ranging from food service occupations such as bartenders, hosts and hostesses, cooks, dishwashers, and food preparation workers to grounds keeping workers, desk clerks, receptionists, maids and housekeeping cleaners and security guards, etc. The report finds that the need for these workers outstrips supply. The limited number of H-2B worker visas, which allow for the temporary hiring of foreign workers, granted to Maryland businesses is not enough to fill the vacant positions.

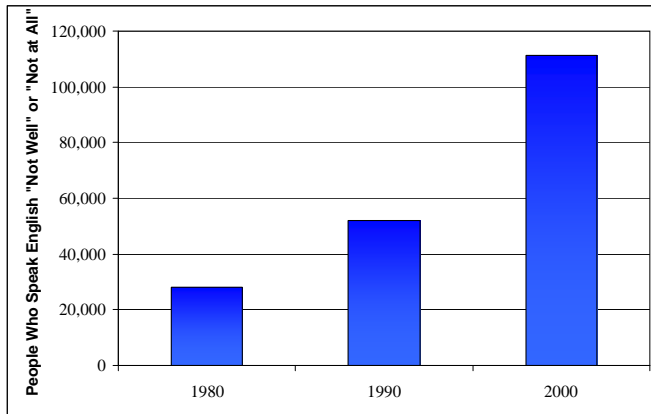
Other immigrant segments are expected to continue to fill high-wage, high-skill jobs in such occupations as scientists and engineers. The Migration Policy Institute analyzed Census 2000 data and found that one out of every five doctors in the U.S. is foreign born. Two of every five medical scientists, one of every five computer specialists and one of every six people in the engineering or science fields are foreign born. In addition, the proportion of foreign-born workers in other skilled fields, such as nursing, has grown significantly in recent years, a trend which is expected to continue.⁸⁷

⁸⁶ Pew Hispanic Center, 2006.

⁸⁷ Kaushal, 2006.

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Figure AC: Maryland Population Who Speak English “Not Well” or “Not at All”



From a workforce development perspective, the movement of immigrants into Maryland will require increased investment in English as a Second Language (ESL) programs. According to the decennial census data, the percentage of people who reported to the Census Bureau that they spoke English “not well” or “not at all” increased nearly 74 percent since 1990 (Figure AC). Of the more than 246,000 persons who indicated that they spoke English “less than very well,” 44

percent reported Spanish as their native language, while another 26 percent indicated an Asian language (particularly Korean, Chinese, and Vietnamese) as their native language. Much of this population represents non-English speaking immigrants who present new challenges in terms of labor force training and education. Recognizing this need, organizations such as U.S. Hispanic Youth Entrepreneur Education (USHYEE), in partnership with the Maryland State Department of Education (MSDE) and colleges and universities within the state, are working together to provide Hispanic youth with scholarships, along with technical and life skills that will encourage this segment of the population to seek higher education opportunities.

The state’s growing immigrant population has the potential to fill another significant role in Maryland’s economy. As commerce and industry become more global, knowledge of a foreign language is becoming increasingly critical to local businesses. In fact, a recent survey of U.S. employers confirms that speaking a foreign language is expected to be a highly demanded skill in the 21st century. Survey results indicate that while only 11 percent of employers currently rate this skill as “very important,” approximately two-thirds indicate that knowledge of a foreign language will increase in importance over the next five years. In fact, knowledge of a foreign language was singled out as the top basic skill expected to increase in importance.⁸⁸ In 2005, 14.5 percent of Marylanders age five and older spoke a language other than English at home,⁸⁹ a trend that clearly will benefit the state in its efforts to meet foreign language needs.

⁸⁸ The Conference Board, p.11.

⁸⁹ U.S. Census Bureau, American Community Survey, 2005.

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6.6 Adult Education and Engaging Workers with Barriers to Employment

Today's jobs and the jobs of tomorrow will require an increasingly complex array of skills, including but not limited to verbal, mathematical, organizational and interpersonal skills. This further complicates matters for the one million potential Maryland workers who have barriers to employment. They include Maryland's veteran population, people with lower literacy, ex-offenders, people with disabilities and those receiving unemployment insurance benefits.⁹⁰ Preparing these workers for the jobs of the future presents another challenge for the State's workforce development system. As previously mentioned, these populations are a potentially untapped labor supply. If workforce development professionals can help this population transition more fully into the workforce, tight labor market conditions may be alleviated.

Veterans Population

As of 2005, more than 427,000 people, or 11.9 percent of the state's population 18 and over, were veterans. The vast majority of Maryland veterans (89 percent) are male. Not surprisingly, female veterans tend to be younger than their male counterparts. A total of 77.6 percent of female veterans are between 18 and 54 years of age, compared to 37.2 percent of male veterans.⁹¹

Ex-Offenders

The number of offenders released from Maryland Department of Public Safety and Correctional Services facilities in 2006 approached 14,000. Approximately six out of 10, or 8,685 people, were released in Baltimore City. As of April 2007, nonviolent offenders constituted 42.6 percent of the nearly 23,000 inmates housed in Maryland facilities. More than 20 percent of this population is age 25 or under, and another 17.1 percent are between 25 and 30 years of age. Nearly 3,400 of them, or 14.9 percent of this population, are serving a sentence of 36 months or less.

Transitioning ex-offenders into the workforce is critical, not only from a workforce development perspective, but from a public safety perspective as well. To the extent that this population can become engaged in the workforce, the likelihood of recidivism is expected to decline.

Lower Literacy Population

According to a report released recently by the U.S. Department of Education, roughly 20.6 percent of Maryland's adult population (or 730,000) was eligible for adult education services as of 2000. This population includes individuals who "lack sufficient mastery of basic educational skills to enable the individuals to function effectively in society;" lack a high school diploma or equivalent; or (are) "...unable to speak, read, or write the English language." Specifically, this

⁹⁰ Examples of other population segments that could be targeted include homeless persons, welfare recipients and youth out of school, among others.

⁹¹ U.S. Census Bureau. American Community Survey, 2005.

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population includes those adults age 16 or older who lack a high school diploma and who are not enrolled in school and adults who speak English as a second language and who have rated their ability to speak English as “well,” “not well,” or “not at all.”⁹²

The vast majority of this adult education population (60.1 percent) is of working age (from 16 to 59 years old), yet in 2000, well over half of them (348,717 persons) did not participate in the state’s labor force. Another 28,484 reported they were unemployed. Basic literacy and English as a Second Language instruction is needed to help transition this group more fully into the workplace. More than 105,000 of Maryland’s adult education population speak English as a second language, and nearly half of this group (51,952) identify themselves as speaking English “not well” or “not well at all.”⁹³

People with Disabilities

Maryland is home to more than 376,000 working age (from 16 to 64) people with disabilities. Only about 43 percent of these people are employed, compared to 78 percent for the remainder of the state’s working age population.⁹⁴ The low employment rate for people with disabilities, combined with the fact that many of them can become employed, with or without accommodations, are reasons that the GWIB views people with disabilities as an untapped workforce.

Unemployed Persons and Persons Receiving Unemployment Insurance Benefits

As of August 2007, the number of unemployed Marylanders is on track to approach last year’s level of roughly 116,000 persons. This population includes people who are not working but who are actively seeking work. They are counted as part of Maryland’s labor force. Though the number of unemployed people in Maryland has been on the decline since 2004, they still represent a substantial potential labor pool.

More than 18,000 initial unemployment claims were filed in Maryland in June 2007. The extent to which the State can link these persons with employment opportunities will help to decrease the number of people filing for initial and continuing unemployment insurance claims and will help increase Maryland’s available labor pool.

⁹² U.S. Census Bureau. *Profiles of the Adult Education Target Population, Information from the 2000 Census*. December, 2005.

⁹³ U.S. Census Bureau. *Profiles of the Adult Education Target Population, Information from the 2000 Census*. December, 2005.

⁹⁴ U.S. Census Bureau, 2006 American Community Survey.

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7.0 Recommendations

This section of the analysis highlights a number of emerging challenges that will test the state's economic and workforce strengths over the next one to five years and provides priority recommendations to address these challenges.

7.1 Science, Technology, Engineering and Mathematics (STEM) Industries are Struggling to Attract, Recruit and Retain Workers

As in other industries, many of Maryland's science, technology, engineering and mathematics (STEM) industries face a looming retirement cliff as skilled baby boomers begin to retire and leave the workforce. Compounding the problem is anecdotal and other evidence which suggests that the pool of qualified technical students graduating from college is actually diminishing. The state's aerospace industry serves as a prime example. According to the GWIB Aerospace Industry Steering Committee, in 2006, nearly eight out of every 10 Maryland aerospace workers was age 51 or over, and 50 percent of the current aerospace workforce is set to retire by 2020.

Recommendation: Increase opportunities for young people to become aware of and enter science, technology, engineering and mathematics (STEM) careers.

One way to meet the need for workers in science, technology, engineering and mathematics (STEM) careers is to expand middle- and high school-level students' interaction with STEM professionals through expanded internship and mentorship programs. GWIB's Aerospace Monograph also identifies the need to encourage STEM-related field trips and other applied activities and to invite industry professionals to classes or school activities. The Johns Hopkins University's Applied Physics Lab's (APL) Mentor Program is a perfect example of such interaction. The program is conducted in conjunction with the Howard County Public Schools and other nearby schools, and pairs high school students with volunteer APL professional staff. The program enables students to work on science projects with their mentors during the school year.

Encouraging qualified, underrepresented population segments (i.e., females and minorities) to pursue studies in science and mathematics is another way to boost interest. APL and a number of university partners are involved in a program that targets this issue. The Maryland Mathematics, Engineering Science Achievement program (MESA) is a pre-college program in which MESA partners work directly with teachers and schools in order to encourage K-12 interest in STEM fields. The program targets minorities and females.

Recommendation: Expand and enhance pre-college programs such as Project Lead the Way.

Expanding programs such as MSDE's Project Lead the Way (PLTW) is another approach. PLTW is a pre-engineering program which aims to increase preparation among high school students for higher education engineering programs. Forty-three (43) Maryland high schools in 16 school systems participate in the program, which allows students to enroll in such courses as: Principles of Engineering, Computer Integrated Manufacturing, Civil Engineering and

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Aerospace Engineering. Maryland soon will pilot the newly-launched PLTW for a biomedical curriculum. An aerospace PLTW program also is in the planning stages.

7.2 Maryland Continues to Face Growing Teacher and Faculty Shortages

The state continues to confront shortages among teachers and faculty. Maryland's need for teachers outstrips our ability to produce and retain them. In 2005, roughly 8,000 new teachers were hired in the state of Maryland. Of the 4,390 teachers who were new hires, only 1,439 (33%) were graduates of Maryland colleges and universities⁹⁵ Subjects with current and future teacher shortages include: technology education, computer science, English for Speakers of other Languages, foreign languages, mathematics, science (including physical science, physics, chemistry and earth/space science) and special education.

The issue of faculty shortages extends to higher education as well, and is affecting a number of Maryland industries, including the healthcare sector. As noted in GWIB's HealthCare Monograph, "the amount of faculty and learning facilities is inadequate..." to train the state's healthcare workforce. These shortcomings are evidenced by student waiting lists for local nursing schools.⁹⁶ Nursing programs, both locally and nationally, report an increase in the number of qualified nursing applicants being turned away due to a dearth of faculty and classroom/clinical space. In 2005, the number of applicants denied admission for these reasons totaled 29,424 for the nation and 1,850 in Maryland.

According to a 2005 survey⁹⁷, Maryland's 24 nursing degree programs reported that 30.5 percent of full-time faculty positions were vacant. Local shortages can be attributed to both the aging of the state's population, as well as difficulties in growing the pool of potential educators. These difficulties range from structural barriers, such as the limited local capacity of graduate programs in nursing education, to market-driven trends (e.g., compensation for practicing nurses often exceeds that for nursing educators). These trends will undoubtedly be exacerbated as Maryland's nursing faculty population continues to age and approach retirement. The average age of nursing faculty at Maryland institutions, as reported to the Board of Nursing in 2005, ranges from 42 to 55 years, and the average age nationally for faculty retirement is 62.5 years.⁹⁸

Recommendation: Enhance teacher retention through the expansion and enhancement of Professional Development School (PDS) networks.

It appears that faculty/teacher retention, especially at the primary and secondary levels, can be improved through access to quality Professional Development School (PDS) networks. One example is Towson University's PDS network, which has been recognized at both the state and national levels as a successful model that relies on a partnership between a college or university and local school systems. PDS networks aim to enhance and improve teacher quality through

⁹⁵ Maryland State Department of Education, 2006.

⁹⁶ Charting New Directions, Governor's Healthcare Workforce Summit, page 13.

⁹⁷ Maryland Council of Directors of Associate Degree and Baccalaureate Programs Survey.

⁹⁸ Nursing Faculty Shortage, Causes, Effects and Suggestions for Resolution, Maryland Statewide Commission on the Crisis in Nursing. 2005.

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continuous professional development. The network targets all stages of a teacher's career, offering professional development activities throughout the entire career. An analysis of Towson University's PDS network in 2001 showed that its teacher-graduates were retained at a much higher rate than other new teachers. According to the study, schools within the PDS network were associated with teacher retention rates of 80 percent after four years and 71 percent after five years. This compares to non-PDS network retention rates of 45 and 34 percent, respectively.⁹⁹

7.3 Maryland's Growing Immigrant Population: Opportunities and Challenges

Population shifts are impacting the demographic makeup of the state in ways that will have dramatic impacts on employer needs and workforce development. Between 2000 and 2006, immigrants accounted for more than half (51.6%) of Maryland's population growth. As of 2006, immigrants account for 12% of the state's population.

Maryland's workforce is expected to benefit from international migration at both ends of the employment spectrum, as immigrants fill low-wage, low-skill jobs, as well as high-wage, high-skill positions. From a workforce development perspective, this movement into Maryland will require increased investment in English as a Second Language (ESL) programs. According to decennial census data, the percentage of people who report to the Census Bureau that they speak English "not well" or "not at all" has increased nearly 74 percent since 1990. Much of this population represents non-English speaking immigrants who present new challenges in terms of labor force training and education.

Despite the pressing need for adult literacy services in Maryland, demand continues to severely outstrip supply. According to MSDE, funding constraints dictate that a small percentage of annual demand is being met, resulting in annual waiting lists of up to 5,000 people. Many of the people on waiting lists (47 percent) are waiting for access to ESL programs.¹⁰⁰

Recommendation: Enhance and expand access to community English as a Second Language (ESL) programs.

Not only is there a need for improved access to English as a Second Language programs, but MSDE also notes the need to improve the quality of the state's ESL programs. In 2005, Maryland's adult education programs offered 40 hours of instruction per student, which is not adequate for beginner or even intermediate English learners to become proficient. Many of these ESL students lack advanced literacy skills in their native language, and thus require additional, intensive classroom time. MSDE notes that a program that offers more than 100 hours of classroom time would better meet the needs of this population.

Recommendation: Enhance and support initiatives and partnerships that encourage a broad spectrum of education opportunities for immigrant populations.

⁹⁹ Pilato, Maryland State Department of Education.

¹⁰⁰ Maryland State Department of Education, December 2005.

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Many of Maryland's foreign-born workers are highly educated and possess applicable skills; however many of Maryland's immigrants are at the opposite end of the educational spectrum. As of 2006, 43% percent of Maryland's immigrants held at least a Bachelor's degree, compared with 34% of U.S. natives in Maryland. At the same time, 18% of immigrants in Maryland did not have a high school diploma or its equivalent, compared to 12% of U.S. born Maryland residents.¹⁰¹

Organizations such as U.S. Hispanic Youth Entrepreneur Education (USHYEE), in partnership with MSDE and colleges and universities within the state, are working together to provide Hispanic youth with scholarships, along with technical and life skills that will encourage this segment of the population to seek higher education opportunities.

Recommendation: *Coordinate efforts to promote Maryland's access to seasonal immigrant (H-2B) and skilled immigrant (H-1B) workers.*¹⁰²

Seasonal, immigrant worker shortages have adversely affected Maryland businesses for some time. In 2005, the national cap of 66,000 H-2B visas, which allow foreign nationals to temporarily enter the U.S. and take advantage of seasonal or peak load employment opportunities, was filled just a few months into the federal fiscal year. As a result, the lion's share of Maryland businesses were prevented from applying for the estimated 7,000+ temporary workers needed to sustain Maryland's seasonal businesses. A diverse group of Maryland industries are affected by the seasonal worker shortage, including tourism and hospitality-driven businesses, and agriculture and seafood processing firms, as well as other types of service firms, such as landscaping businesses.

The State has recognized the importance of this issue. In fact, local political leaders continue to be actively involved in drafting legislation to increase the national cap and exempt returning seasonal workers from being subject to it. GWIB's Hospitality & Tourism Monograph emphasizes Maryland's need for seasonal immigrant workers and recommends that a state liaison office for immigration issues be established. The GWIB report notes that, in addition to being actively involved in immigration policy and advocacy, the liaison office could work to connect foreign-born workers with Maryland businesses in need of temporary workers.

A liaison office also could coordinate efforts to increase the availability of H-1B workers. The H-1B visa program targets highly-skilled internationals who work in professional fields such as computing, finance, law and healthcare, among others. The national cap for H-1B visas has fluctuated in recent years, jumping from 65,000 in the late 1990s to 195,000 in 2000 and then dropping back to 65,000 in fiscal year 2003. As with H-2B visas, annual quotas are met early in the year. According to the Migration Policy Institute, one out of every five doctors in the U.S. is foreign born. Two of every five medical scientists, one of every five computer specialists and

¹⁰¹ U.S. Census Bureau, 2006 American Community Survey, calculations based upon Maryland residents age 25 and over

¹⁰² It should be noted that this recommendation in no way advocates filling BRAC and other positions which require security clearances with H-1B and H-2B workers. Given security clearance requirements, filling these jobs with foreign nationals is simply not possible.

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one of every six persons in engineering or science fields are foreign born. Given current and expected shortages among the science, engineering, technology and mathematics (STEM) fields, it makes sense to explore expanding the H-1B visa option.

7.4 The Need for Increased Labor Force Participation

The state's low jobless rate (3.9 percent in 2006) signifies not only that Maryland's economy is healthy, but also that local labor market conditions remain tight. Most economists agree that an unemployment rate in the range of 3.5 to 4.5 percent is indicative of an economy operating at full employment, and Maryland's jobless rate continues to fall within that range. In fact, the state has not recorded an unemployment rate above the 4.5 percent mark since July 2003.

Tight labor market conditions have the potential to aggravate labor shortages and apply upwards pressure on wages. Since nearly one-sixth of Maryland's existing labor force is expected to retire in the next decade, these conditions are likely to worsen going forward. Continued local labor supply shortages makes leveraging our underutilized and potential labor supply all the more important. There is an opportunity to address this issue by tapping adult population segments that are underrepresented in the workforce, including veterans, ex-offenders, and the state's disabled and lower literacy populations.

According to a report released recently by the U.S. Census Bureau, roughly 17.5 percent of the state's adult population (or nearly 618,000 persons) was eligible for adult education services as of 2000. This population includes individuals who "lack sufficient mastery of basic educational skills to enable the individuals to function effectively in society."¹⁰³ Specifically, this population includes those adults age 16 or older who lack a high school diploma and who are not enrolled in school. In order to more fully integrate them into the state's labor force, we need to expand access to basic literacy instruction, GED services and English as a Second Language (ESL) classes.

Recommendation: *Enhance opportunities for adult education (i.e., basic literacy, GED services, and ESL classes).*

Despite the pressing need for adult literacy services, demand continues to severely outstrip supply. According to MSDE, funding constraints dictate that only three to five percent of annual demand for these services is being met, resulting in annual waiting lists of up to 5,000 people. The majority of those on waiting lists include people seeking ESL instruction and Adult Basic Education (ABE). If the State can increase the availability of these educational programs, Maryland's economy will benefit.

¹⁰³ U.S. Census Bureau. *Profiles of the Adult Education Target Population, Information from the 2000 Census*. December, 2005.

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Recommendation: *Future study is necessary to identify the education and related needs of additional adult population segments.*

While the needs of Maryland's lower literacy population have been identified, there exists a lack of comprehensive information on other population segments which may not be participating fully in the state's workforce. A thorough study is needed to identify the demographic, economic and social characteristics of each Maryland population segment (i.e., veterans, ex-offenders, disabled population, etc.). With this information, the education and hard or soft skill levels of these populations could be identified, in addition to the identification of barriers preventing them from participating more fully in the workplace. A synthesis of this information also would help to identify specific occupations that could serve as an entrée to career tracks for each of these population segments.

Recommendation: *Create a statewide resource network to advance basic skills.*

Basic skills are in demand. In fact, the Maryland Department of Labor, Licensing & Regulation projects that the top four occupations expected to see the greatest level of replacement openings between 2004 and 2014 include:¹⁰⁴

- Cashiers (33,780 replacement openings)
- Retail salespersons (31,670)
- Waiters and waitresses (21,585)
- Combined food preparation and serving workers (17,035)

These occupations require such basic skills as active listening, speaking, writing and reading comprehension.

A recent GWIB report targeting Maryland's Tourism & Hospitality sector identifies a critical mismatch between the "job-readiness" or basic skills required for most occupations in the sector and the skill levels of new entrants to the field. The majority of occupations in this sector require basic skills and on-the-job training, yet employers are having difficulty finding workers with good active listening skills, service orientation and cultural awareness and sensitivity. Finding job entrants with the ability to read, write and understand standard and spoken English also is a critical priority for the industry. To address these issues, the report recommends creating a statewide resource network to advance basic skills.

¹⁰⁴ Maryland Department of Labor, Licensing & Regulation, Office of Workforce Information and Performance and Office of Labor Statistics, 2007.

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1. BRAC Requires a Pipeline of Qualified Workers

Not all of the current BRAC personnel will move to Maryland along with their jobs. Since the average civilian DoD worker is 45 years old, many current workers will approach retirement in the near-term future. The short-term implications of this trend are highly relevant, given that the size and scope of the DoD BRAC units moving to Maryland could be influenced by current and near-term future workforce availability. In other words, if jobs go unfilled, they could very well be lost through downsizing or reconfiguration of BRAC units. The challenge for workforce development officials is to ensure that Maryland realizes as many potential BRAC jobs as possible. The way to achieve this goal is to make sure that new positions are filled quickly.

The state's workforce development system must strive to ensure that Maryland's labor pool is ready and able to fill the types of jobs that BRAC will yield. Both the Fort Monmouth and Defense Information Systems Agency (DISA) units that are slated to move to Maryland report a high proportion of the following occupations:

- Engineers (specifically, electronics/electrical engineers, computer engineers, software engineers and engineers in general);
- Managers (federal contract managers, logistics managers, inventory managers and information technology managers);
- Computer scientists;
- Telecommunications specialists;
- Analysts (budget analysts and management/program analysts); and
- Technical writers and editors.

These occupations require a Bachelor's degree, mainly in the engineering and sciences fields, for entry-level positions. For higher grade positions, graduate education and/or a combination of work experience is required. Key skills associated with these positions include:

- Complex problem solving
- Critical thinking
- Judgment and decision making
- Systems evaluation¹⁰⁵
- Technology design¹⁰⁶

¹⁰⁵ The U.S. Department of Labor defines systems evaluation as follows: Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.

¹⁰⁶ Technology design is defined as: Generating or adapting equipment and technology to serve user needs.

Recommendations

Recommendation: *Actively recruit retired government personnel and veterans to fill vacant BRAC positions.*

Fort Monmouth is currently in the process of actively recruiting up to 2,000 Maryland workers to fill BRAC positions by 2011. Retired government personnel and veterans (especially those with security clearances) stand out as a potential labor pool worth cultivating in order to help the bases meet recruitment needs and fill any foreseeable gaps in the immediate future.

Recommendation: *Increase interest, recruitment and retention in BRAC-related fields*

Since many of the BRAC jobs will require an educational background in science, technology, engineering and mathematics (STEM) fields, and since graduation levels in many of these fields have been flat to negative in Maryland, we must generate an interest in these fields before students enter college.

Maryland has developed several new or planned initiatives at the high school level that, if proven successful, could serve as models to be deployed elsewhere in order to ensure that Maryland is developing an adequate pipeline of BRAC workers. One such initiative is the Homeland Security and Emergency Preparedness Magnet Program at Joppatowne High School in Harford County. The program, which was launched in the fall of 2007, consists of three curricular tracks, including Criminal Justice/Law Enforcement, Information/Communications and Technology, and Homeland Security Sciences. The curricular content of these tracks is often applied. For example the Information/Communications and Technology track enables students to attain certification in both Cisco and SPACESTARS professional programs. While the program aims to prepare high school students for careers in the homeland security field, it also is designed to create a network linking students with government and industry partners.

The Science and Mathematics Academy at Aberdeen High School is another example. This program, funded with federal, state and local funds, was launched in fall 2004 after several years of planning. The program originated with the Army Alliance and other professionals affiliated with Aberdeen Proving Ground (APG). A critical program component provides students with the opportunity to interact regularly with professional scientists and mathematicians. Another unique feature allows high school seniors to perform original research with the guidance of a program mentor.

Recommendation: *Identify labor and education needs for spin-off BRAC jobs.*

The influx of BRAC personnel and contractors to Maryland will result not only in significant construction activity, but also increased demand for personal services. According to a report produced by RESI in 2006, for every direct, on-base job¹⁰⁷ that comes to Maryland, 1.96 additional spin-off jobs will be created.¹⁰⁸ Specifically, Maryland will experience a rapidly growing demand for construction managers and workers, day care workers and hospitality workers, among others. Local community colleges in Harford and Anne Arundel counties

¹⁰⁷ Direct, on-base positions include both civilian DoD positions as well as embedded, private defense contractors.

¹⁰⁸ RESI of Towson University, Maryland Department of Business & Economic Development, 2006.

Recommendations

already have begun to explore program needs associated with such occupations. This is an area that should be explored fully by workforce development professionals.

7.5 There Is a Shortage of Workers with Security Clearances

The number of positions requiring security clearances, as well as the level of security clearances required for existing contracts, has increased dramatically since September 11, 2001. This increased demand has exacerbated processing times and resulted in a frenzy of competition and “poaching” from the limited pool of cleared workers, many of whom are concentrated within science, technology, engineering or mathematics (STEM) fields. Not only is the security clearance process a lengthy and onerous one, but it is costly as well. Processing delays can cause jobs to remain unfilled for months on end, and the cost of sponsorship is quite high.

Recommendation: *Spread the word, set up a pre-screening model and expand internship opportunities.*

The issue of security clearances is a tricky one, since the process is federally driven and thus largely outside the State’s control. Still, Maryland can begin to address the security clearance issue by disseminating information. An awareness campaign, especially targeting high school and college students, is needed to get the word out. We must emphasize the multitude of job opportunities available to Maryland’s youth and inform them what they need to do (or rather avoid) in order to obtain positions requiring security clearances.

Also key to resolving Maryland’s excess clearance demand is to spearhead the clearance process by targeting prospective workers while they are still students. To achieve this goal, a pre-screening model could be developed, whereby prior to graduation, college students begin the security clearance process. A Towson University study, performed on behalf of DBED, notes, however, that such a model would enhance the process only if the federal government addresses process issues at the national level.¹⁰⁹ Once the model is in place, matching funds could be established (between defense contractors and other organizations, as well as private and/or public sources) in order to sponsor students to begin the security clearance process.

Expanded internship prospects represent another area of opportunity to get the word out and encourage student interest in positions that require security clearances. The Johns Hopkins University’s Applied Physics Lab (APL) summer internship program is one such example. APL funds and processes interim student clearances for temporary summer positions. APL also funds the full clearance process for students who remain with the lab beyond the summer.

¹⁰⁹ Division of Economic and Community Outreach of Towson University, Maryland Department of Business & Economic Development, 2006.

Recommendations

7.6 *Skilled Professionals Needed*

A review of emerging and expected labor force conditions in Maryland makes it clear that there is a need for the state to grow, attract and *retain* skilled professionals of all types (not just STEM and BRAC-related workers). There is a need to attract and retain these professionals both as workers and residents in Maryland. Admittedly, this particular finding overlaps with previously mentioned findings (i.e., the need for STEM and BRAC workers). The evidence is so compelling that the authors of this report felt that a separate recommendation is justified.

Recent migration trends in Maryland bring this issue to the forefront. In each of the three most recent years for which data are available (2004 through 2006), the state has recorded negative net migration. In other words, more people are moving out of the state than are moving in. Between 2005 and 2006, for instance, net domestic migration outflows exceeded 25,000 people, offsetting the 21,000-person gain due to international migration.¹¹⁰ In other words, in a single year, 25,000 residents left Maryland and were replaced by 21,000 immigrants.

This exodus of Maryland residents has significant implications for the state's workforce. Many of the residents leaving the state are skilled professionals who are being replaced increasingly by less educated immigrants. Certainly many new immigrants to Maryland are highly educated, but the amount of time during which these skilled immigrants will remain in Maryland's workforce is not certain. In addition, many of the state's out-migrants continue to commute to Maryland for work. How long will these workers put up with longer commutes? After all, the state has a notoriously lengthy average commute time of 30.6 minutes, second only to that of New York City (30.9 minutes).

The state's rate of population growth is slowing. Between 2020 and 2030, Maryland's population is expected to grow by five percent, compared to 20 percent growth between 1970 and 1980. Maryland's population is aging, as nearly one-fifth of the state's working age population is set to retire by 2020. The trend in migration, coupled with the state's slowing population growth, aging population and increasingly tight labor market conditions, all point to the same conclusion. Maryland needs to ensure that our pool of skilled professionals grows in step with the demand.

¹¹⁰ U.S. Census Bureau.

Recommendations

***Recommendation:** Launch a campaign to attract and retain skilled professionals.*

Nations such as India and China and even mid-Atlantic cities and states, such as Philadelphia and West Virginia, have made concerted efforts to not only grow and retain skilled professionals, but to entice these workers to return to their home cities/states/nations. This analysis recommends that a campaign be developed to both attract and retain skilled professionals in Maryland.

A public-private coalition is recommended to spearhead such a campaign, which would target skilled professionals of all ages. As a start, the initiative could target the emerging pipeline of professional workers – namely college students. The campaign could be two-pronged, focusing on retaining Maryland college students in the state’s workforce, as well as attracting college students from other areas to Maryland. After all, the survey data suggest that nearly four out of every 10 Bachelor’s degree graduates of Maryland institutions elect to work outside the state. The campaign could target additional locales with a significant presence of colleges and universities (i.e., Greater Boston, Research Triangle Park, Greater Philadelphia, etc.) in an effort to attract current students to Maryland after graduation. Such a campaign should incorporate incentives for first-time homebuyers and affordable housing currently offered in Maryland.

Closing

8.0 Closing

Marylanders live and work in a state characterized by a healthy, diverse economy and low unemployment. The state's highly educated workforce and the presence of and proximity to federal agencies and laboratories also are major advantages. Maryland's excellent quality of life continues to attract workers and residents to the state. In order to meet the many challenges posed by a rapidly changing demographic and economic landscape, Maryland must be prepared to preserve and build on these existing strengths.

This report highlights a number of current and predicted labor force trends that will drive the future of Maryland's labor and jobs markets. These trends pose several challenges to the state that will require the attention of educators, workforce development professionals, the business community and residents alike. Tackling these challenges through a combination of public and private initiatives will serve to enable Maryland to maintain its existing strengths and enhance the state's ability to compete in an ever-changing global economy. Hopefully the trends and recommendations highlighted in this report will aid in this effort.

References

References

American Community Survey. U.S. Census Bureau. 2005.

Altbach, P., R. Berdahl, and P. Gumport. *American Higher Education in the Twenty-First Century*. 2nd ed. Johns Hopkins University Press, April 2005.

America's Career InfoNet. <http://www.acinet.org>

Associated Press State & Local Wire. "Limit on Seasonal Workers Vexes Employers." February 28, 2005. Lexis-Nexis.

Baltimore Business Journal. "Lift Cap on Temporary Visa Program." American City Business Journals, Inc. July 30, 2004.

Baltimore Sun. "Constellation Energy Files Partial Plan for Reactor." Bloomberg News. July 31, 2007.

Barlow, ED. "Storm Warnings and What You Can Do To Prepare." 2006 Governor's Workforce Conference, Maryland. May 8, 2006.

Brugger, Robert. J. *Maryland, A Middle Temperament: 1634-1980*. Johns Hopkins University Press, 1988.

Buhler, Patricia M. "The New Workforce: Five Sweeping Trends That Will Shape Your Company's Future." *AMA Business Brief*. www.amanet.org

Bureau of Labor Statistics. "High-paying Occupations with Many Openings, Projected 2002-12." *Occupational Outlook Quarterly*, Spring 2004.
<http://www.bls.gov/opub/ooq/2004/spring/oochart.pdf>

Campbell, Doug. "The Illegal Immigrant Effect." *Region Focus*. 2006.

Campbell, Paul R. "Population Projections for States, by Age, Sex, Race, and Hispanic Origin: 1995-2025." U.S. Census Bureau, Population Division. 1996.

Capps, Randy, Michael Fix, Jeffrey Passel, Jason Oust and Dan Perez-Lopez. "Immigrant Families and Workers: A Profile of the Low Wage Immigrant Workforce." Urban Institute. November 2003.

Carroll, Nick and C. Taeuber. "A Profile of Older Workers in Maryland." U.S. Department of Commerce, Economics and Statistics Administration. U.S. Census Bureau. August 2004.

Conte and Carr. "Outline of the U.S. Economy." U.S. Department of State.
<http://usinfo.state.gov/>

References

- Cox, Michael, R. Alm, and N. Holmes. "Where the Jobs Are." *The New York Times*. May 13, 2004, late edition. ProQuest Information and Learning Company.
<http://proquest.umi.com/pqdweb?did=636777401&sid=5&Fmt=3&clientId=41150&RQT=309&VName=PQD>
- De Long, David W. "Confronting the Chemical Industry Brain Drain: A Strategic Framework for Organizational Knowledge Retention." Accenture-Institute for Strategic Change, April 2002.
- Division of Economic and Community Outreach. "BRAC Government and Corporate Need for Workers with Security Clearances." Towson University. June 2006.
- "Domestic Net Migration in the United States: 2000 to 2004." U.S. Census Bureau. April 2006.
- Drucker, Peter. "The Future Has Already Happened." *Futurist* 32, no. 8 (1998): 16. MAS Ultra-School Edition.
- Duderstadt, James J. "Leading Higher Education in an Era of Rapid Change." July 2001.
- ElBoghady, Dina. "DISA Fights Turnover with Telecommuting." *The Washington Post*. January 25, 2006.
- Fahrenthold, David A. "Maryland Crab Industry Angles for Help; Seasonal Worker Cap, Job Abundance Leave Seafood Processors Short-Staffed." *The Washington Post*. February 28, 2005. Lexis-Nexis.
- Federal Reserve Bank of Dallas. "2003 Annual Report: The Evolution of Work."
www.dallasfed.org
- Franz, Maximilian. "Commentary: The Chesapeake Tradition." *The Daily Record*. May 7, 2002. Lexis-Nexis.
- Gereffi, Gary and V. Wadhwa. "Framing the Engineering Outsourcing Debate: Placing the United States on a Level Playing Field with China and India." Master of Engineering Management Program, Duke University. December 2005.
- Goldstein, Mark. "Maryland's Changing Demographics." Presentation on behalf of the Maryland Department of Planning. June 2006.
- Governor's Workforce Investment Board, 2003. "Governor's Healthcare Workforce Summit Monograph." Maryland Department of Labor, Licensing & Regulation.
- Governor's Workforce Investment Board, 2006. "Maryland Aerospace Industry Monograph." Maryland Department of Labor, Licensing & Regulation.

References

Governor's Workforce Investment Board, 2007. "Maryland Hospitality & Tourism Industry Monograph." Maryland Department of Labor, Licensing & Regulation.

H1Base. "H1-B Visa Information & Service Center." <http://h1base.com/page.asp?id=312>

Hankin, Harriet. *The New Workforce*. New York. AMACOM, 2005.

Heller, Barbara R. "Maryland's Nursing Shortage: A Workforce Crisis." University of Maryland. March 2003.

Hewitt Associates, LLC. "Workforce Planning in the 21st Century - Back to the Future?" *International Report*. October 2003.

Huether, David. "The Case of the Missing Jobs." National Association of Manufacturers. http://www.nam.org/s_nam/doc1.asp?CID=201416&DID=236655

Karoly, Lynn A. and Constantijn W. A. Panis. *The 21st Century at Work: Forces Shaping Lifelong Learning Trends: A Profile of Continuing Higher Education*. 7th ed. University Continuing Education Association. April 2002.

Kaushal, Neerja and Michael Fix. "The Contributions of High-Skilled Immigrants." Migration Policy Institute. July 2006.

Keller, Michael J. "A Study of the Capacity of Maryland's Teacher Preparation Programs." Maryland Higher Education Commission. March 2006.

Kobell, Rona and C. Guy. "Work-visa Limit Snags Shore Employers; Business Relying on Immigrant Labor Might Not Have Anyone to Do the Work." *The Sun*. January 24, 2005, final edition. ProQuest.

Lasater, Beth and Barbara Elliot. "Profiles of the Adult Education Target Population." Center for the Research in Education, RTI International. December 2005. <http://www.ed.gov/about/offices/list/ovae/pi/AdultEd/census1.pdf>

Lorefice, Alejandro A. "Just in Time Manufacturing: Introduction and Major Components." New York, 1998.

Lyons, Michael and Pearson, Ian. *Business 2010 Mapping the New Commercial Landscape*. London, 2003.

Maryland Board of Nursing. <http://www.mbon.org/main.php>

Maryland Career and Workforce Information. <http://dllr.state.md.us>

Maryland Department of Business & Economic Development. *Economic Pulse*. January-February 2007.

References

- Maryland Department of Business & Economic Development. "Largest Employers in Maryland." March 2006.
- Maryland Department of Labor, Licensing & Regulation. "Maryland's Demand-Driven Two-Year Workforce Investment Plan." July 2005-June 2007.
- Maryland Department of Labor, Licensing & Regulation. Office of Workforce Information and Performance and Office of Labor Statistics. March 2007.
- Maryland Governor's Workforce Investment Board. "Governor's Healthcare Workforce Summit Monograph." August 2003. <http://www.mdworkforce.com/lib/pdf/hcmonograph.pdf>
- Maryland Higher Education Commission. "Enrollment Projections 2007-2016 Maryland Public Colleges and Universities." June 2007.
- Maryland Higher Education Commission. "Trends in Degrees Awarded at Maryland Higher Education Institutions." March 2005.
- Maryland Higher Education Commission. "Trends in Enrollment by Program, Maryland Higher Education Institutions." April 2005.
- Maryland Higher Education Commission. "2004 Maryland State Plan for Postsecondary Education." December 2004.
- Maryland Higher Education Commission. *2006 Trend Book*, 1, 3, 19-24, 29-32, 49-54, 78-84, 91-93. August 2006.
- Maryland Higher Education Commission. *2005 Data Book*, 1. August 2004.
- Maryland Higher Education Commission. *2006 Data Book*, 1. August 2005.
- Maryland Higher Education Commission. *2007 Data Book*, 1, 7, 14-16, 38. August 2006.
- Maryland State Department of Education. "Stepping Up to the Future: Adult Literacy Challenges at Work, at Home, and in the Maryland Community." December 2005.
- Maryland Independent College and University Association Connection. "Learn About the Five Facts." <http://www.micuaconnection.com/myths.asp>
- Maryland Independent College and University Association. "Fast Facts About MICUA: 2007 – Enrollment Counts." 2002. <http://www.micua.org/ffenrollmentcounts.pdf>
- McGee, Marianne Kolbasuk and Alice LaPlante. "Talent Search: The Myths, Facts, and Emotions That Will Keep the H1-B Visa Issue From Going Away." *InformationWeek*. July 23, 2007. Lexis Nexis.

References

Mittuch, Eugene W. *Averting a Pending Department of Defense Civilian Personnel Crisis: The Need for a Corporate Recruiting Strategy*. May 2002.

<http://www.stormingmedia.us/89/8946/A894604.html>

National Academy of Science. "Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future." 2006.

National Center on Education and the Economy. "Tough Choices Tough Times: The Report of the New Commission on the Skills of the American Workforce." 2007.

http://www.skillscommission.org/pdf/exec_sum/ToughChoices_EXECSUM.pdf

National Science Foundation. 2003. <http://www.nsf.gov/>

Nuclear Energy Institute. "Nuclear Energy Industry Initiatives Target Looming Shortage of Skilled Workers." January 2007. www.nei.org

OECD. "What Schools for the Future?" October 2001.

Pew Hispanic Center. "Fact Sheet: The Labor Force Status of Short Term Unauthorized Workers." April 2006.

Pilato, Virginia. "MSDE; and The Impact of Different Models of Teacher Preparation on Teacher Retention: A Progress Report," presented by Dr. Tom Proffitt and Ms. Karen Schafer, Towson University.

Pisarski, Alan. "Community in America." Transportation Research Board. 2006.

RAND Corporation. "The Future Workforce and Workplace in the United States." 2004.

Reeves, Scott. "An Aging Workforce's Effect On U.S. Employers." *Forbes*, September 29, 2005, www.Forbes.com

RESI, study performed on behalf of the Maryland Department of Business & Economic Development. *Jobs and Household Allocations and Expected Tax Revenues*.

Snyder, Thomas D. "Digest of Education Statistics 2005." National Center for Education Statistics. June 2006. http://nces.ed.gov/programs/digest/d05/ch_3.asp

Sparshott, Jeffrey. "Bay Firms Depend on Foreign Workers." *The Washington Times*. June 1, 2005. Lexis-Nexis.

States News Service. "Mikulski Scores Senate Victory for America's Small Businesses." April 19, 2005. Lexis Nexis.

References

The Conference Board, Partnership for 21st Century Skills, Corporate Voices for Working Families, and Society for Human Resource Management. "Are They Really Ready To Work?" 2006. http://21stcenturyskills.org/documents/FINAL_REPORT_PDF09-29-06.pdf

Therrien, Roger, C. Bridges, R. Meyerhoff, and J. Baker. "Connecticut Workforce Demands and the Implications for Education." *Connecticut Department of Labor*, July 2003.

Three Rivers Workforce Investment Board. "Managing the Changing Workforce in Southwestern Pennsylvania." Executive Summary. June 2006. <http://www.trwib.org/reports/aging/execsummary.pdf>

Towards Knowledge Societies. UNESCO Publishing. 2005.

UMD. "Protecting Maryland's Competitive Edge," An Action Summit Hosted by the University of Maryland. April 2006. <http://www.competitive-edge.umd.edu/snapshot.html>

U.S. Department of Education. "State Nonfiscal Survey of Public Elementary/Secondary Education." National Center for Education Statistics. November 2005. http://nces.ed.gov/programs/projections/tables/table_25CT.asp?referrer=table#notes

VisaPro. "Frequently Asked Questions." <http://faq.visapro.com/H2B-Visa-FAQ3.asp#Q1>