The U.S. Economy
Real Gross Domestic Product
2005Q1–2016Q1, Billions of 2009 Chained Dollars

2016Q1: $16.5 trillion; 0.5 percent

© Towson University, Division of Innovation and Applied Research

Source: Bureau of Economic Analysis (BEA)
U.S. Personal Consumption Expenditures
2005Q1–2016Q1, Billions of Chained 2009 Dollars

2016Q1:
$11.4 trillion; 1.9 percent
U.S. Gross Private Domestic Investment
2005Q1–2016Q1, Billions of Chained 2009 Dollars

2016Q1: $2.8 trillion; -1.6 percent

Source: BEA
U.S. Government Spending
2005Q1–2016Q1, Billions of Chained 2009 Dollars

2016Q1: $2.9 trillion; 1.2 percent
U.S. Net Exports
2005Q1–2016Q1, Billions of Chained 2009 Dollars

2016Q1: -$567.0 billion; -2.6 percent

Source: BEA
Manufacturing: Labor Productivity vs. Employment
Nation-wide, 1987-2016

Current level: 12.3 million

© Towson University, Division of Innovation and Applied Research
Source: BLS, RESI
Employment Growth by Educational Attainment

2014-2024

- No formal educational credential: $21,420, 6.9% growth
- High school diploma or equivalent: $36,210, 3.9% growth
- Some college, no degree: $33,870, 0.5% growth
- Postsecondary nondegree award: $35,660, 11.5% growth
- Associate's degree: $50,230, 8.7% growth
- Bachelor's degree: $70,400, 8.2% growth
- Master's degree: $66,420, 13.8% growth
- Doctoral or professional degree: $100,490, 12.2% growth

Source: BLS

© Towson University, Division of Innovation and Applied Research
National Private-Sector Employment Quality

<table>
<thead>
<tr>
<th>Wage Level</th>
<th>During Recession</th>
<th>Post-Recession</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Wage (over $52,300)</td>
<td>-533,973</td>
<td>1,288,197</td>
</tr>
<tr>
<td>Mid Wage ($34,660-$52,300)</td>
<td>-2,347,343</td>
<td>2,826,572</td>
</tr>
<tr>
<td>Low Wage (less than $34,660)</td>
<td>-1,517,770</td>
<td>3,927,918</td>
</tr>
</tbody>
</table>

Sources: BLS, National Employment Law Project (NELP), RESI
The Maryland Economy
Maryland Real Gross State Product
2005Q1-2015Q3, Millions of Chained 2009 Dollars

2015Q3: $328.1 billion
0.6 percent

Source: BEA
Employment by Sector
March 2016, Maryland

- Government: 503,000
- Health Care and Social Assistance: 359,400
- Retail Trade: 292,100
- Professional, Scientific, and Technical Services: 249,300
- Accommodation and Food Services: 230,000
- Administrative and Support and Waste Management and...: 163,800
- Mining, Logging, and Construction: 163,600
- Other Services: 117,900
- Manufacturing: 106,600
- Finance and Insurance: 101,000
- Transportation and Utilities: 88,300
- Wholesale Trade: 86,900
- Educational Services: 82,100
- Arts, Entertainment, and Recreation: 49,600
- Real Estate and Rental and Leasing: 46,800
- Information: 38,300
- Management of Companies and Enterprises: 24,900

Source: Bureau of Labor Statistics (BLS)
Maryland Private-Sector Employment Quality

- **High Wage (Over $52,300)**
  - During recession: 8,932
  - Post-recession: 15,020

- **Mid Wage ($34,660–$52,300)**
  - During recession: -59,058
  - Post-recession: 22,405

- **Low Wage (less than $34,660)**
  - During recession: 3,122
  - Post-recession: 47,079

Sources: BLS, NELP, RESI
RESI Employment Outlook
2008–2018, Maryland Total Nonfarm Employment Growth

Percent Change
-3.0% -2.0% -1.0% 0.0% 1.0% 2.0% 3.0%

Total Nonfarm Employment Growth

Source: RESI
© Towson University, Division of Innovation and Applied Research
Forecasted Employment Growth by Sector

2016-2018 Annual Average, Maryland

<table>
<thead>
<tr>
<th>Sector</th>
<th>Growth in Number of Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>12,579</td>
</tr>
<tr>
<td>Health Care and Social Assistance</td>
<td>7,564</td>
</tr>
<tr>
<td>Professional, Scientific, and Technical Services</td>
<td>4,822</td>
</tr>
<tr>
<td>Retail Trade</td>
<td>3,234</td>
</tr>
<tr>
<td>Administrative and Waste Management Services</td>
<td>3,052</td>
</tr>
<tr>
<td>Accommodation and Food Services</td>
<td>2,906</td>
</tr>
<tr>
<td>Total Government</td>
<td>2,700</td>
</tr>
<tr>
<td>Educational Services</td>
<td>1,781</td>
</tr>
<tr>
<td>Finance and Insurance</td>
<td>1,755</td>
</tr>
<tr>
<td>Real Estate and Rental and Leasing</td>
<td>1,362</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>866</td>
</tr>
<tr>
<td>Arts, Entertainment, and Recreation</td>
<td>328</td>
</tr>
<tr>
<td>Other Services, except Public Administration</td>
<td>207</td>
</tr>
<tr>
<td>Mining</td>
<td>27</td>
</tr>
<tr>
<td>Forestry, Fishing, and Related Activities</td>
<td>-69</td>
</tr>
<tr>
<td>Management of Companies and Enterprises</td>
<td>-155</td>
</tr>
<tr>
<td>Transportation and Warehousing</td>
<td>-225</td>
</tr>
<tr>
<td>Utilities</td>
<td>-227</td>
</tr>
<tr>
<td>Information</td>
<td>-714</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>-1,521</td>
</tr>
</tbody>
</table>

© Towson University, Division of Innovation and Applied Research
Occupational Forecasting
OCCUPATIONAL FORECASTING

• Estimates the number of job openings (or growth/decline of openings) for a given occupation

• Is driven by economic factors/indicators
  • Business cycle

• Is driven by non-economic factors
  • Demographics
  • Technology changes
  • Policy changes.
Drivers of Occupational Change
Use of News Sources by Platform
1991-2012

Percentage of individuals in the U.S. who used the source "yesterday"
Volume of U.S. Mail vs. Percentage of Homes with Broadband
2000-2015
Law Openings vs. New Lawyers
2015-2017, Maryland

© Towson University, Division of Innovation and Applied Research
Sources: RESI, Maryland State Board of Law Examiners
Shortage in Construction Managers
2015-2017, Maryland

- **New Construction Management Openings**
- **Construction Management Graduates**

Growth in Construction Management Openings or Bachelor's Degree Completions

© Towson University, Division of Innovation and Applied Research

Sources: RESI, IPEDS
Shortage for Registered Nurses
2015-2017

New RN Openings
Average Number of New RNs

<table>
<thead>
<tr>
<th>Year</th>
<th>New RN Openings</th>
<th>Average Number of New RNs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: RESI, Maryland Board of Nursing
Unemployment Rate by Educational Attainment

2015

Unemployment Rate

- Doctoral degree: 1.7
- Professional degree: 1.5
- Master's degree: 2.4
- Bachelor's degree: 2.8
- Associate's degree: 3.8
- Some college, no degree: 5.0
- High school diploma: 5.4
- Less than a high school diploma: 8.0

Source: BLS
WHAT IS PROM?

Predictive Regional Occupational Matrix

- PROM is an industry-to-occupation tool.
- PROM provides occupation-level estimates, based on industry-level economic forecasts and economic impact analyses.
  - Eg: If the Healthcare and Social Assistance sector grows, will there be a need for more doctors, nurses, sonography technologists, phlebotomists, etc.?
- Predictions are custom tailored by state.
- Predictors include information such as:
  - Educational Requirements
  - Related Careers
    - For potential job changes
    - For career path planning
  - Wages.
Top Ten Occupations Overall
Maryland, Average Annual Growth (2017–2019)

- Construction Laborers: 1,259 jobs
- Registered Nurses: 836 jobs
- First-Line Supervisors of Construction Trades and Extraction Workers: 835 jobs
- Carpenters: 808 jobs
- Secretaries and Administrative Assistants, Except Legal, Medical, and Executive: 779 jobs
- Electricians: 703 jobs
- Plumbers, Pipefitters, and Steamfitters: 669 jobs
- Office Clerks, General: 489 jobs
- Nursing Assistants: 479 jobs
- Cashiers: 472 jobs

Increase in number of jobs

Sources: REMI PI+, RESI
**Bottom Ten Occupations Overall**

Maryland, Average Annual Loss (2017–2019)

- **First-Line Supervisors of Production and Operating Workers**
- **Postal Service Mail Carriers**
- **Team Assemblers**
- **Electrical and Electronic Equipment Assemblers**
- **Machinists**
- **Printing Press Operators**
- **Industrial Machinery Mechanics**
- **Packaging and Filling Machine Operators and Tenders**
- **Inspectors, Testers, Sorters, Samplers, and Weighers**
- **Farmworkers and Laborers, Crop, Nursery, and Greenhouse**

Decrease in number of jobs:

- 50
- 38
- 25
- 24
- 19
- 18
- 18
- 19
- 19
- 24
- 25
- 25
- 38
- 50

Sources: REMI PI+, RESI

© Towson University, Division of Innovation and Applied Research
Top Ten Job Zone 5 Occupations
Maryland, Average Annual Growth (2017–2019)

- Lawyers: 169
- Physicians and Surgeons, All Other: 152
- Medical and Health Services Managers: 142
- Physical Therapists: 77
- Financial Managers: 74
- Medical Scientists, Except Epidemiologists: 64
- Health Diagnosing and Treating Practitioners, All Other: 59
- Pharmacists: 57
- Healthcare Social Workers: 55
- Physician Assistants: 46

Increase in number of jobs

Sources: REMI PI+, RESI
Bottom Ten Job Zone 5 Occupations
Maryland, Average Annual Growth (2017–2019)

Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary: 0.5
Curators: 0.5
Architecture Teachers, Postsecondary: 0.5
Orthotists and Prosthetists: 0.5
Animal Scientists: 0.3
Law Teachers, Postsecondary: 0.2
Materials Scientists: 0.2
Home Economics Teachers, Postsecondary: 0.2
Nurse Midwives: 0.0
Set and Exhibit Designers: 0.0
Top Ten Job Zone 4 Occupations
Maryland, Average Annual Growth (2017–2019)

Increase in number of jobs
Sources: REMI PI+, RESI
Bottom Ten Job Zone 4 Occupations
Maryland, Average Annual Loss (2017–2019)

-18  Editors
-15  Industrial Engineers
-13  Industrial Production Managers
-10  Producers and Directors
-6   Reporters and Correspondents
-5   Labor Relations Specialists
-2   Nuclear Engineers
-2   Materials Engineers
-1   Broadcast News Analysts
-1   Directors, Religious Activities and Education

Sources: REMI PI+, RESI
Top Ten Job Zone 3 Occupations
Maryland, Average Annual Growth (2017–2019)

- Registered Nurses: 836
- First-Line Supervisors of Construction Trades and Extraction Workers: 835
- Secretaries and Administrative Assistants, Except Legal, Medical, and Executive: 779
- Electricians: 703
- Plumbers, Pipefitters, and Steamfitters: 669
- Heating, Air Conditioning, and Refrigeration Mechanics and Installers: 329
- First-Line Supervisors of Office and Administrative Support Workers: 312
- Bookkeeping, Accounting, and Auditing Clerks: 283
- Medical Secretaries: 223
- Maintenance and Repair Workers, General: 194

Sources: REMI PI+, RESI
Bottom Ten Job Zone 3 Occupations
Maryland, Average Annual Loss (2017–2019)

- Machinists: -24
- Printing Press Operators: -19
- Industrial Machinery Mechanics: -19
- Aircraft Mechanics and Service Technicians: -8
- Prepress Technicians and Workers: -7
- Maintenance Workers, Machinery: -6
- Electrical and Electronics Repairers, Powerhouse, Substation, and Relay: -6
- Industrial Engineering Technicians: -5
- Computer- Controlled Machine Tool Operators, Metal and Plastic: -5
- Tool and Die Makers: -4

Decrease in number of jobs
Top Ten Job Zone 2 Occupations
Maryland, Average Annual Growth (2017–2019)

- Construction Laborers: 1,259
- Carpenters: 808
- Office Clerks, General: 489
- Nursing Assistants: 479
- Retail Salespersons: 437
- Janitors and Cleaners, Except Maids and Housekeeping Cleaners: 414
- Security Guards: 324
- Painters, Construction and Maintenance: 308
- Customer Service Representatives: 274
- Operating Engineers and Other Construction Equipment Operators: 263
Bottom Ten Job Zone 2 Occupations
Maryland, Average Annual Loss (2017–2019)

-60 -50 -40 -30 -20 -10 0

Decrease in number of jobs

Manicurists and Pedicurists
Industrial Truck and Tractor Operators
Food Batchmakers
Postal Service Mail Sorters, Processors, and Processing Machine Operators
Inspectors, Testers, Sorters, Samplers, and Weighers
Packaging and Filling Machine Operators and Tenders
Electrical and Electronic Equipment Assemblers
Team Assemblers
Postal Service Mail Carriers
First-Line Supervisors of Production and Operating Workers

Sources: REMI PI+, RESI

© Towson University, Division of Innovation and Applied Research
Top Ten Job Zone 1 Occupations
Maryland, Average Annual Growth (2017–2019)

Cashiers
Combined Food Preparation and Serving Workers, Including Fast Food
Waiters and Waitresses
Landscaping and Groundskeeping Workers
Food Preparation Workers
Dishwashers
Counter and Rental Clerks
Dining Room and Cafeteria Attendants and Bartender Helpers
Food Servers, Nonrestaurant
Cooks, Fast Food

Increase in number of jobs
0 100 200 300 400 500

Sources: REMI PI+, RESI
Bottom Ten Job Zone 1 Occupations
Maryland, Average Annual Loss (2017–2019)

Decrease in number of jobs

1. Farmworkers and Laborers, Crop, Nursery, and Greenhouse
2. Sewing Machine Operators
3. Meat, Poultry, and Fish Cutters and Trimmers
4. Slaughterers and Meat Packers
5. Logging Equipment Operators
6. Pressers, Textile, Garment, and Related Materials
7. Furniture Finishers
8. Grinding and Polishing Workers, Hand
9. Graders and Sorters, Agricultural Products
10. Farmworkers, Farm, Ranch, and Aquacultural Animals

Sources: REMI PI+, RESI
THANK YOU

Learn More About RESI’s Projects and Services

towson.edu/RESI

@RESIofTU

TUinnovates.com