Financial Report 2017–2018 Yale University

Yale University Financial Report 2017–2018

1 Highlights
2 Message from the President
4 Message from the Senior Vice President for Operations and the Vice President for Finance
6 Financial Results
6 Overview
9 Operating Revenue
13 Operating Expenses
14 Physical Capital
17 Endowment
21 Management's Responsibility for Financial Statements
22 Report of Independent Auditors
23 Consolidated Statement of Financial Position
24 Consolidated Statement of Activities
25 Consolidated Statement of Cash Flows
26 Notes to Consolidated Financial Statements
57 The President and Fellows of Yale University
57 The Officers of Yale University

Front cover
First-Year Scholars at Yale, summer 2018 cohort
For more information see *fsy.yale.edu*
Photograph by Kelly Jensen Sembos

Back cover
Pauli Murray and Benjamin Franklin colleges
Photograph by Michael Marsland

Yale

Highlights

Five-Year Financial Overview ($ in millions)	Fiscal Years 2018	2017	2016	2015	2014
Net Operating Results - Management View	$ 91	$ 115	$ 37	$ 17	$ 13
Financial Position Highlights:					
Total assets	$ 41,873	$ 39,194	$ 36,957	$ 36,972	$ 34,523
Total liabilities	9,616	10,208	10,419	9,587	8,722
Total net assets	$ 32,257	$ 28,986	$ 26,538	$ 27,385	$ 25,801
Endowment:					
Net investments, at fair value	$ 29,445	$ 27,217	$ 25,413	$ 25,543	$ 23,859
Total return on investments	12.3%	11.3%	3.4%	11.5%	20.2%
Spending from endowment	4.7%	4.8%	4.5%	4.5%	5.0%
Facilities:					
Land, buildings and equipment, net of accumulated depreciation	$ 5,092	$ 4,967	$ 4,779	$ 4,510	$ 4,413
Disbursements for building projects	$ 367	$ 395	$ 498	$ 302	$ 271
Debt	$ 3,785	$ 3,515	$ 3,534	$ 3,558	$ 3,320
Statement of Activities Highlights					
Operating revenues	$ 3,848	$ 3,648	$ 3,450	$ 3,382	$ 3,110
Operating expenses	3,658	3,481	3,344	3,175	3,037
Increase in net assets from operating activities	$ 190	$ 167	$ 106	$ 207	$ 73

Five-Year Enrollment Statistics	2018	2017	2016	2015	2014
First-Year Enrollment Class of:	'21	'20	'19	'18	'17
First-Year applications	34,154	31,445	30,236	30,932	29,610
First-Year admitted	2,316	1,988	2,034	1,950	2,031
Admissions rate	6.8%	6.3%	6.7%	6.3%	6.9%
First-Year enrollment	1,579	1,371	1,364	1,360	1,359
Yield	69.4%	70.3%	68.8%	71.5%	68.2%
Total Enrollment:					
Yale College	5,743	5,472	5,532	5,477	5,427
Graduate and professional schools	7,228	6,986	6,853	6,859	6,591
Total	12,971	12,458	12,385	12,336	12,018
Yale College Term Bill and Financial Aid:					
Yale College term bill	$ 66,900	$ 64,650	$ 62,200	$ 59,800	$ 57,500
Average grant award for students receiving aid	$ 53,703	$ 50,950	$ 48,294	$ 46,445	$ 44,785

Message from the President

Every day, Yale students, faculty, and staff work together to advance the university's mission, "improving the world today and for future generations through outstanding research and scholarship, education, preservation, and practice." Their contributions to campus life and learning are made possible through the careful stewardship of the university's resources, detailed in the 2017-2018 Financial Report. It is a privilege to present this report, and I share with you our accomplishments from the past year and my vision for Yale's future.

We have made remarkable progress on the academic investment strategy I announced in 2016. The cornerstones of our strategy are the arts, humanities, sciences, and social sciences. With a particular focus on faculty excellence and our educational mission, the bedrock of our university, each of our investments will ensure Yale continues as one of the world's leading research universities.

Our goal for the arts is to increase connections between our four great arts schools and the rest of the university. At Yale, unlike at conservatories, the arts cannot live in a silo but should enrich and inspire the entire community. We are focused on building connections—in the classroom and beyond—between the four schools, Yale College, and the rest of the university.

Yale is making a historic commitment to the humanities by transforming 320 York Street into a place that redefines the way faculty members, graduate students, and undergraduates work together. The new space will bring scholars across disciplines into closer proximity to one another, facilitating collaboration. Construction began this summer; in 2020, many different humanities departments and the Whitney Humanities Center will move into their new home. Extensive program support for the humanities will be available for cross-disciplinary projects. Following the two committees that planned 320 York, a new faculty committee is developing ideas to take advantage of the major investments that Yale is making in the humanities.

Our investments in the social science will focus on engaging with the world through data-intensive, policy-relevant research and education. Rigorous empirical scholarship and sophisticated conceptual work allow scholars and policymakers to tackle pressing global issues such as poverty, health care, migration, and extremism. In June, we announced the establishment of the Tobin Center for Economic Policy, named for the iconic Yale faculty member and Nobel laureate James Tobin, to foster evidence-based, cross-disciplinary research to define and inform policy debates. Housed in a new building, the center will convene faculty members, students, and visiting experts, provide research grants, and communicate its findings to a broad audience including policymakers and the general public. We expect to break ground on the Tobin Center's facility by early 2020.

The University-wide Committee on Data-Intensive Social Science is soliciting input from faculty members across campus, reviewing current strengths and resources, and evaluating how peer institutions are meeting challenges and opportunities in the social sciences. The committee will make recommendations regarding teaching, organizational structures, and key priorities for data-

intensive social science. Another faculty committee is exploring the future focus and scope of the Jackson Institute.

We are making our greatest investment by far in science and engineering to advance the frontier of possibility through research and education. We have already made significant progress toward enhancing our facilities for scientific education and innovation, including the renovation of the Sterling Chemistry Laboratory, the creation of the Greenberg Engineering Teaching Concourse, and the establishment of the new Tsai Center for Innovative Thinking at Yale (Tsai CITY).

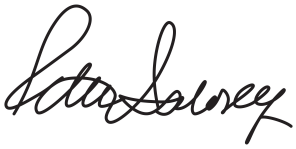
The construction of the new science building, which began last year, is the centerpiece of our academic strategy. As with the transformation of 320 York Street, this future landmark on Science Hill is designed to bring together new communities of scholars to produce insights and discoveries. This dynamic new space, scheduled to open in late 2019, will draw investigators and students from the wider campus to use shared core facilities that range from cryo-electron microscopy to the Quantitative Biology Institute. A new lecture hall—one of the largest on campus—will underscore our commitment to teaching and will bring students and faculty from beyond the sciences to gather on Science Hill.

Our long-range investments in science require careful planning. Last year, we convened the University Science Strategy Committee (USSC) to identify areas where Yale can lead in science and engineering. The USSC shared its report this spring. Along with other thoughtful recommendations, the committee identified five top-priority areas for investment: integrative data science, quantum science, neuroscience, inflammation, and environmental and evolutionary sciences.

Looking to the year ahead, we will continue to work collaboratively across the university to advance our shared goals for Yale's future. And we will take time to celebrate our history as well. Next year marks the 50th anniversary of coeducation in Yale College and the 150th anniversary of women as students at the university—an exciting opportunity to learn about and reflect on the extraordinary history of women at the Yale. This campus-wide celebration will include lectures, exhibitions, and performances throughout the academic year, bringing us together as a community to commemorate these important milestones in Yale's history.

As one of the world's greatest universities, Yale has a responsibility to harness our strengths and resources to address critical issues facing society. The careful management of our financial resources allows us to do this important work, empowering our faculty, students, and staff to create knowledge and understanding, truth and light, for our world. I am grateful to you—members of the Yale community—for your vital support.

Sincerely,



Peter Salovey
President
Chris Argyris Professor of Psychology

Message from the Senior Vice President for Operations and the Vice President for Finance

Strong Financial Results

The university finished the year ended June 30, 2018 with a surplus from operations on a generally accepted accounting principles (GAAP) and Management View basis. On a GAAP basis Yale generated a surplus of $190 million from operations. On a Management View basis – the way Yale looks at financial information for internal discussion and decision-making purposes (see page 7 for additional information) – Yale generated a surplus of $91 million from operations.

The balance sheet remains strong with $32 billion in net assets, which was an increase of $3.3 billion or 11.3% largely due to an increase in the Yale Endowment which had a 12.3% investment return for the year.

Revenue Growth

Each of Yale's three largest revenue sources – endowment spending, sponsored research, and medical services income, which together accounted for 79% of the university's revenues – demonstrated growth over the prior year, which contributed to the positive operating result.

Endowment income remains the largest source of revenue for the university's operations, contributing $1,282 million (33% of total revenues for the year) which grew by 4.6% over the prior year. This amount, which was authorized by the board of trustees as usual via the Endowment Spending Policy, aims to spend 5.25% of the endowment's value each year or roughly one quarter of the market value of the endowment every five years.

This significant annual spending of over $1 billion resulted from a policy that balances two competing goals: a) to provide a substantial source of revenue to fund students and scholars today through financial aid scholarships, endowed professorships, and other purposes; and b) to preserve the purchasing power of the endowment so that it will be available to support all future generations of students and scholars. This policy, which is based on sound principle and economic theory, is one of the most important management practices underpinning the university's current and future financial strength.

Medical services or patient care is the second largest source of revenue at Yale and finished the year at $962 million (25% of total revenue) or 6.3% above the prior year as a result of the continued expansion of Yale Medicine, one of the largest academic multi-specialty practices in the country. Sponsored research (21% of total revenue) is the university's third largest source of revenue and was $790 million or 2.8% above the prior year as faculty continued to secure highly competitive research funding from federal, state, and foundation sources.

Capital Spending Highlights

The 2017-18 fiscal year included $367 million in capital spending. The largest investments were in the sciences in support of President Salovey's academic priorities, including the Yale Science Building located on the previous site of the J.W. Gibbs laboratory and scheduled to open in the fall of 2019. During the year the university also completed the construction of two new residential colleges, Pauli Murray College and Benjamin Franklin College, which welcomed in August 2017 a new cohort of students as part of the first expansion of Yale College in nearly five decades. Other capital spending during the year included a major

renovation of the Hall of Graduate Studies as a future home for Humanities departments, the commencement of the Schwarzman Center renovation, the completion of graduate housing in the Broadway district, and the renovation of Baker Hall for the Law School which opened in the fall of 2018.

Tax Cuts and Jobs Act

In December 2017 the federal government enacted the Tax Cuts and Jobs Act, and the federal government is still in the process of clarifying a number of the provisions of this new law. While this means we do not know the impact with certainty, a number of items will negatively impact the university's finances – both in terms of taxes and also increased administrative complexity and cost. The increased taxes and administrative costs will result from provisions including the tax on net investment income (sometimes referred to in the press as the "endowment tax"), unrelated business taxable income modifications, taxation of certain employee benefits, and other provisions. We are actively monitoring and planning for the implementation of this new law. Please see Note 14 on Commitments and Contingencies for additional information.

Financial Statement Presentation and Preparation

This year's annual report includes changes that result from the adoption of accounting guidance related to the Presentation of Financial Statements for Not-for-Profit Entities issued by the Financial Accounting Standards Board. One of the primary differences in presentation is that the Statement of Activities and the Statement of Financial Position now present restrictions in two categories rather than three. Additional explanation is available in the Significant Accounting Policies section of the notes to the financial statements.

On July 1, 2017 the university went live on a new enterprise-wide financial system, Workday. This annual report is the first to be prepared with the new system which was the result of extensive and outstanding work by financial and administrative staff across the campus, and we continue to work on a number of areas to optimize the system for campus use. One result of this change is that the functional expenses presented in the notes have been prepared using a new method designed into the new system, and so a comparison to the prior year functional expenses is not meaningful.

Looking Ahead

As we noted last year, we have begun to identify resources to advance the president's academic priorities, in particular an increased investment in science where Yale must build on its strengths in order to remain a top research university in a future where scientific inquiry and discovery will play a significant role. We are also continuing to invest in faculty excellence, the arts, humanities, and social sciences. These investments will be important to strengthening Yale so it continues to educate leaders who will help shape the future. We look forward to providing updates in the years ahead.

In closing, we would like to thank Yale's alumni, faculty, students, staff, and friends who form a community that strives each day to make the world a better place through teaching, research, and leadership in all sectors of society. We are fortunate and grateful to be part of this inspiring community.

Jack F. Callahan, Jr.
Senior Vice President for Operations and
Chief Operating Officer

Stephen C. Murphy
Vice President for Finance and
Chief Financial Officer

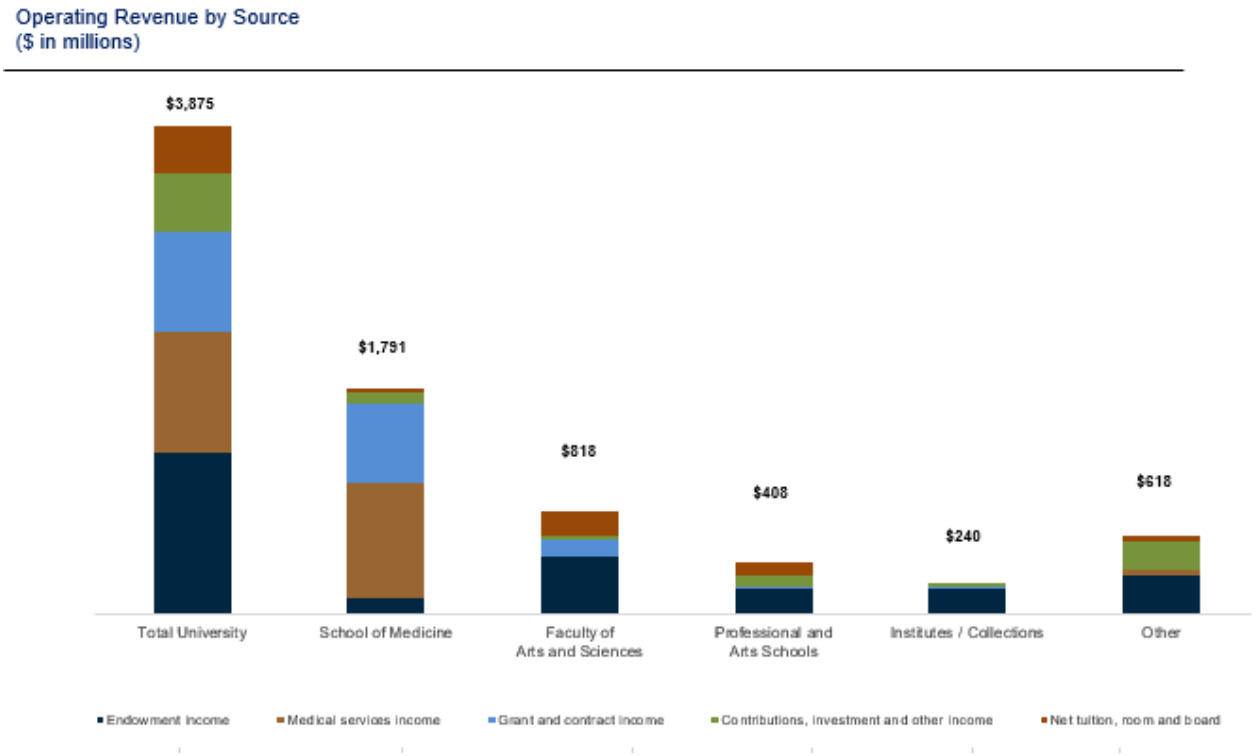
Financial Results

Overview

Yale University ("Yale" or the "university") manages its operations to achieve long-term financial equilibrium. It is committed to sustaining both the programs and the capital assets (endowment and facilities) supporting those programs over multiple generations. Endowment income, Yale's largest source of revenue, is allocated to the operating budget based on a spending policy that preserves the endowment asset values for future generations, while providing a robust revenue stream for current programs. Similarly, Yale's operating budget provides the major portion of the funds needed, through the capital replacement charge ("CRC"), to replenish the capital base necessary to ensure that buildings are maintained to support current programs.

Fiscal Year 2018 Management View Results

The university budget structure is managed through 48 separate budget units that are combined into five categories for reporting purposes.



The largest unit is the School of Medicine, representing 46% of university total operating revenue. The School of Medicine engages in research, teaching, and clinical practice. Revenues for patient care services, net of contractual adjustments, are primarily based on negotiated contracts from managed care companies (35%), BlueCross BlueShield (26%), Medicare (20%), Medicaid (9%) and commercial insurance and others (10%). Additionally, approximately 32% of the School of Medicine's medical services income in 2018 represents revenue recognized as a result of the university's affiliation with Yale-New Haven

Hospital ("the Hospital"). Yale Medicine ("YM") is one of the largest academic multi-specialty practices in the country and the largest in Connecticut. As of June 30, 2018, YM was composed of 1,299 full-time and 241 part-time physicians providing services in over 100 specialty and subspecialty areas organized into 21 departments, engaging in research, and participating in teaching approximately 922 total students (excluding Ph.D. students) and 841 residents. The School of Medicine performs significant research for federal, state and corporate entities. Research funded by the federal government represents 76% of total research performed at the School of Medicine with the National Institutes of Health ("NIH") providing the largest component of that funding at 91%. The university has established policies and procedures to manage and monitor compliance with these important agreements. School of Public Health revenues are included in the figures reported for the School of Medicine.

The Faculty of Arts and Sciences includes Yale's undergraduate and graduate programs in the arts and sciences. During the 2017-2018 academic year, 5,743 undergraduate students were enrolled at Yale College. The undergraduate population is a diverse group attracted from across the United States and from many foreign countries. Foreign students account for approximately 11% of the undergraduate population. Yale College is dedicated to providing undergraduates with a liberal arts education that fosters intellectual curiosity, independent thinking, and leadership abilities. Students learn to think critically and independently and to write, reason, and communicate clearly in preparation for a spectrum of careers and vocations. During the 2017-2018 academic year, 2,958 students were pursuing their studies at the Graduate School of Arts and Sciences. Yale Graduate School of Arts and Sciences considers learning to teach to be an integral part of doctoral education and incorporates training and teaching opportunities into every program. Throughout the unique program of study crafted by graduate students and their faculty advisers, the university provides support that allows Ph.D. students to focus on their scholarship, successfully complete their degrees, and pursue rewarding careers.

The Professional and Arts Schools category includes the Divinity School, the Law School, the School of Art, the School of Music, the School of Forestry & Environmental Studies, the School of Nursing, the School of Drama, the School of Architecture, and the School of Management. During the 2017-2018 academic year, 3,348 students were pursuing their studies at one of Yale's professional schools. Institutes and Collections includes the libraries, museums and galleries, and large institutes with significant programmatic and financial activity across multiple academic units. First-hand encounters with Yale's collections are an integral part of teaching and learning across the university, helping students forge creative connections and inspiring tomorrow's leaders. The Other category includes Athletics and various administrative and support units.

The university ended the year with a surplus from operations of $91 million on a Management View basis. Actual operating revenues increased 5% and actual operating expenses, excluding transfers, increased 5% compared to 2017. Endowment income growth contributed to a strong revenue increase. Grant and contract income was higher than the prior year. In addition, the clinical practice continues to grow at a rapid pace.

The consolidated statement of activities in the audited financial statements is presented in accordance with accounting principles generally accepted in the United States of America ("GAAP"). GAAP recognizes revenue when earned and expenses when incurred. The Management View, used for internal decision-making, is focused more on resources available and used in the fiscal period presented. The Management View does not include certain expenses that are paid out over the long-term, such as unfunded defined benefit costs, and certain revenue that will not be received within the next fiscal year, such as pledged contribution revenue. Another significant difference is that the Management View

recognizes capital maintenance through a CRC and recognizes equipment purchases as expense in the year acquired versus the historical cost depreciation expensed in the consolidated statement of activities. The Management View includes the realized gains and losses on energy hedges and interest rate swaps used to manage exposure to energy and interest rate fluctuations. GAAP requires these realized gains and losses to be presented net of related unrealized gains and losses. The GAAP financial statements do not present fund balance transfers between the operating, physical, and financial categories, as the Management View does. The Management View presentation, along with a summary of the differences between the university's net operating results from the Management View to the GAAP View, is presented below.

Yale University Operating Results – Management View

for the years ended June 30, 2018 and 2017 ($ in thousands)

	June 30, 2018	June 30, 2017
Revenues:		
Tuition, room and board - gross	$ 680,077	$ 628,430
Tuition discount	(305,909)	(281,878)
Tuition, room and board - net	374,168	346,552
Grants and contract income	789,975	768,318
Medical services income	961,572	904,945
Contributions	156,244	161,349
Endowment income	1,280,991	1,225,833
Investment and other income	311,985	285,229
Total external income	**3,874,935**	**3,692,226**
Expenses:		
Faculty salaries	911,095	864,760
All other salaries	858,811	809,216
Employee benefits	568,287	532,377
Total salaries and benefits	**2,338,193**	**2,206,353**
Stipends and fellowships	101,550	98,647
Non-salary expenses	910,070	856,217
Interest, CRC and other amortization	337,529	349,848
Total expenses	**3,687,342**	**3,511,065**
Transfers	(96,645)	(65,844)
TOTAL NET OPERATING RESULTS (MANAGEMENT VIEW)	**90,948**	**115,317**
Summary of differences between the Management View and GAAP presentation of net operating results:		
Operating pledge activity	(18,308)	(19,376)
Expenses related to long-term liabilities	(8,142)	(40,533)
Capital funding, depreciation and disposals	(29,227)	(5,592)
Interest rate and energy hedge	42,360	47,799
Deferred investment income	16,185	3,620
Funding transfers	96,645	65,844
INCREASE IN NET ASSETS FROM OPERATIONS PER THE CONSOLIDATED STATEMENT OF ACTIVITIES (GAAP VIEW)	**$ 190,461**	**$ 167,079**

Fiscal Year 2018 GAAP Results

Operating Revenue

The university derives its operating revenue from the following sources: tuition, room and board (net of certain scholarships and fellowships), grants and contracts, medical services, endowment income, contributions, investment, and other income.

Net Tuition, Room and Board

Net tuition, room and board totaled $376 million in fiscal year 2018, an increase of 9% from 2017, and represented 10% of the university's total operating revenue. Tuition, room and board totaled $680 million in 2018, an increase of 8% from 2017. Of this amount, $592 million represents tuition, an 8% increase over 2017 due primarily to the increased enrollment in Yale College coupled with an increase in the related term bill, and $88 million represents revenue from room and board, which increased 9% from 2017. In accordance with GAAP, student income is presented net of certain scholarships and fellowships, which totaled $304 million and $283 million for 2018 and 2017, respectively.

Tuition for students enrolled in Yale College was $51,400, and room and board was $15,500, bringing the total term bill to $66,900 for the 2017-2018 academic year. The increase in the Yale College term bill was 3% over the 2016-2017 academic year.

The university maintains a policy of offering Yale College admission to qualified applicants without regard to family financial circumstances. This "need-blind" admission policy is supported with a commitment to meet in full the demonstrated financial need of all students throughout their undergraduate years with little or no student debt subsequent to graduation.

During the 2017-18 academic year, 52% of Yale College undergraduates received financial aid. In the Graduate School of Arts and Sciences, 94% received financial aid in the form of tuition discounts, stipends, and health insurance. In the professional schools, 78% received financial aid. In all, 71% of total university eligible students enrolled received some form of university-administered student aid in the form of scholarships, loans, or a combination of both scholarships and loans.

Grant and Contract Income

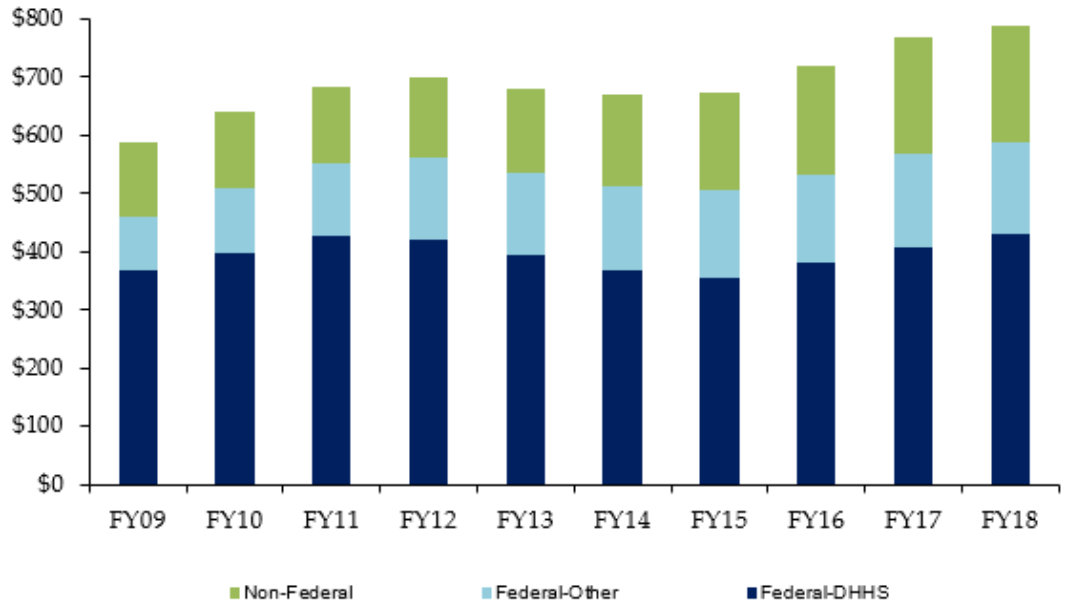
Grant and contract income totaled $790 million in fiscal year 2018, an increase of 3% from 2017, and represented 21% of the university's total operating revenue. The Yale School of Medicine, which received 80% of the university's grant and contract income in fiscal year 2018, reported an increase of 4% for 2018, while the remaining university units decreased by 2%.

Revenue recognized on grants and contracts from the federal government was $587 million, or 74%, of 2018 grant and contract income, supporting Yale's research and training programs. Included in the $587 million is the Department of Health and Human Services ("DHHS") funding of $429 million, primarily through the NIH, an increase of 5% compared to the prior year. The university also receives significant research funding from the National Science Foundation, the Department of Energy, the Department of Defense, and student aid awards from the Department of Education. Non-federal sources, which include foundations, voluntary health agencies, corporations, and the State of Connecticut, provided an additional $203 million in funding for research, training, clinical, and other sponsored agreements during 2018.

In addition to the reimbursement of direct costs charged to sponsored awards, sponsoring agencies reimburse the university for a portion of its facilities and administrative costs, which include costs related to research laboratory space, facilities, and utilities, as well as administrative and support costs incurred for sponsored activities. These reimbursements for facility and administrative costs amounted to $205 million in 2018 and $192 million in 2017. Recovery of facility and administrative costs associated with federally sponsored awards is recorded at rates negotiated with DHHS, the university's cognizant agency.

Grant and Contract Income

Ten-year trend analysis ($ in millions)

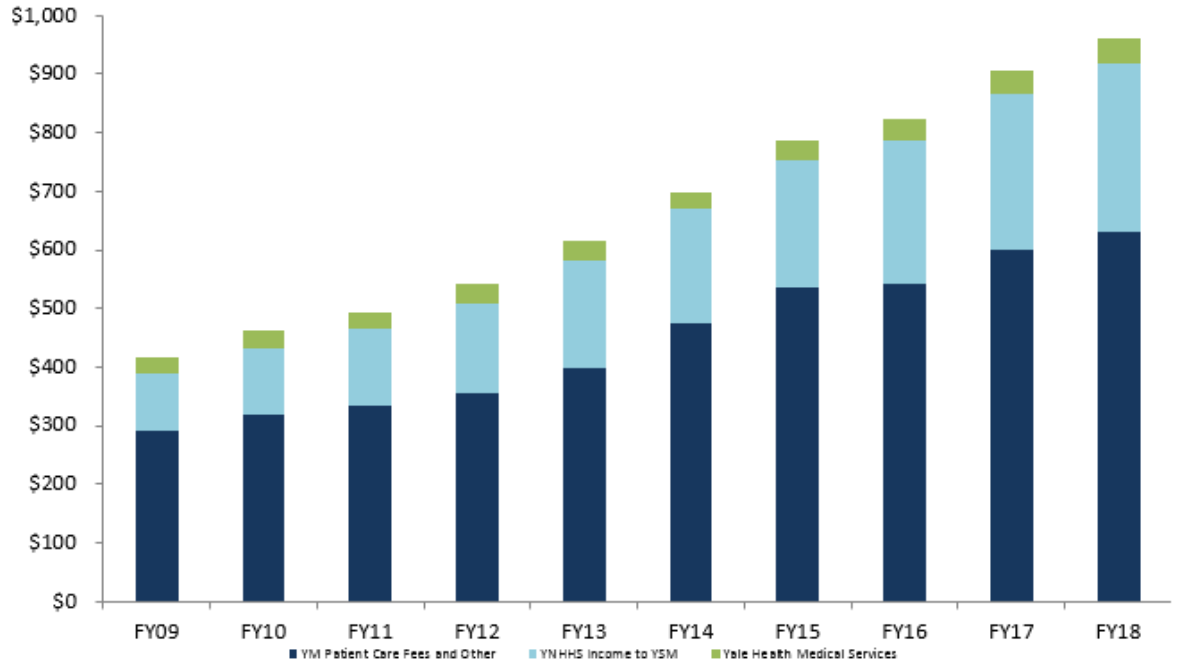


Medical Services Income

Medical services income totaled $962 million in fiscal year 2018, an increase of 6% from 2017, and represented 25% of the university's operating revenue. The largest portion of this revenue stream, $909 million, is derived from medical services provided by the School of Medicine's Yale Medicine ("YM"), one of the largest academic multi-specialty practices in the country and the largest in Connecticut. The strong investment in YM for physician leadership, recruitment and program development by the Hospital continued in fiscal year 2018 with support increasing by 9%, to a total of $289 million.

Medical services income generated by YM increased by $53 million over 2017, or 6%. The clinical activity increased 4% over 2017 due to new faculty hires and the continued focus on improving physician productivity. Other contributors to the clinical income growth include the growth of the multi-disciplinary Center for Musculoskeletal Care in Stamford and a new contractual agreement with Greenwich Hospital.

Medical Services Income
Ten-year trend analysis ($ in millions)



Contributions

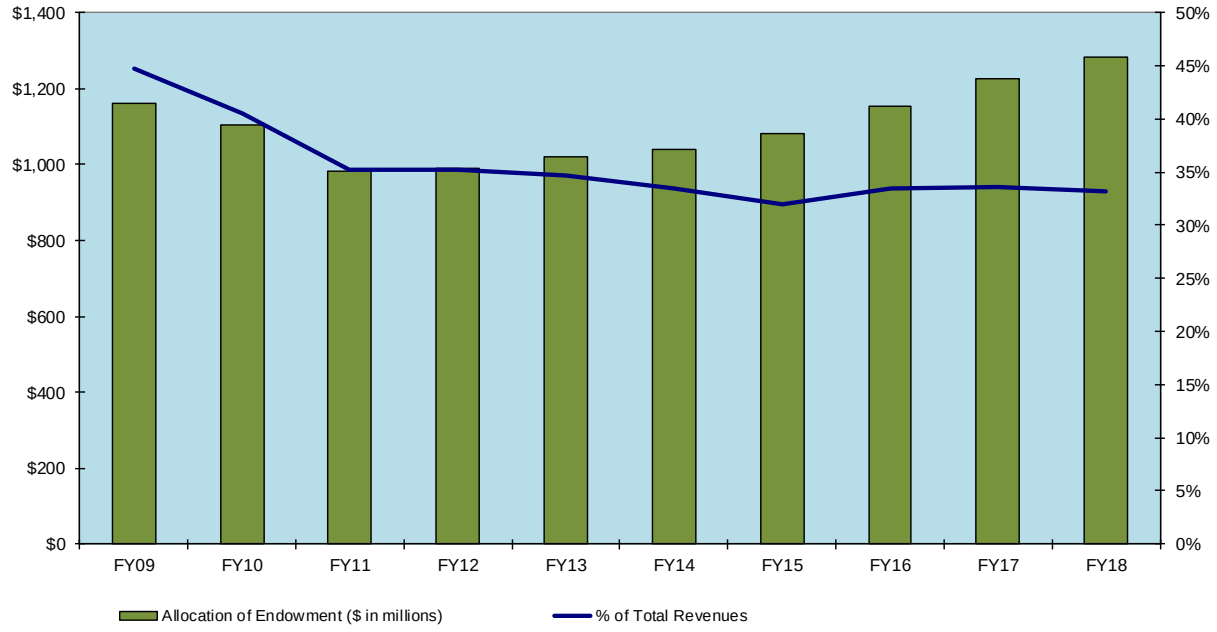
Donations from individuals, corporations, and foundations represent a vitally important source of revenue for the university. Gifts to the university provide necessary funding for current operations, for long-term investments in the university's physical infrastructure, and, in the case of gifts to the endowment, provide permanent resources for core activities for future generations. Gifts of $138 million in 2018 and $142 million in 2017, made by donors to support the operations of the university, are reflected as contribution revenue in the operating section of the consolidated statement of activities, whereas gifts to the university's endowment and for building construction and renovation are reflected as contribution revenue in the non-operating section. In aggregate, contributions included in the university consolidated financial statements total $361 million in 2018 compared to $497 million in 2017.

Certain gifts commonly reported in fundraising results are not recognized as contributions in the university's consolidated financial statements. For example, "in-kind" gifts such as works of art and books that will be maintained as part of the university's collections are not recognized as financial transactions in the consolidated financial statements. Grants from private, non-governmental sources (i.e., corporations and foundations) reported as gifts for fund raising purposes are included in the consolidated statement of activities as grant and contract income.

Allocation of Endowment Spending

Each year a portion of accumulated endowment investment returns is allocated to support operational activity. This important source of revenue represents 33% of total operating revenue in fiscal year 2018, and it remains the largest source of operating revenue for the university. The level of spending is computed in accordance with an endowment spending policy that has the effect of smoothing year-to-year market swings. Endowment investment returns allocated to operating activities increased by 5% in 2018 to $1.3 billion. Additional information on Yale's endowment spending policy is provided in the endowment section of this report and in the footnotes to the consolidated financial statements.

Allocation of Endowment Spending
as a percentage of total revenues, ten-year trend analysis



Other Investment Income

Other investment income includes interest, dividends, and gains on non-endowment investments.

Other Income

Other income primarily includes publications income, income from executive education and other non-degree granting programs, royalty income, admissions revenue relating to athletic events and drama productions, parking revenue, special event and seminar fees, and application and enrollment fees.

Operating Expenses

Operating expenses totaled $3.7 billion for 2018, representing a 5% increase over 2017. With 4,653 faculty, 1,222 postdoctoral associates, 4,619 managerial and professional staff, and 5,024 clerical, technical, service, and maintenance personnel, personnel costs are the single largest component (64%) of the university's total operating expenses (counts represent headcount as of fall 2017).

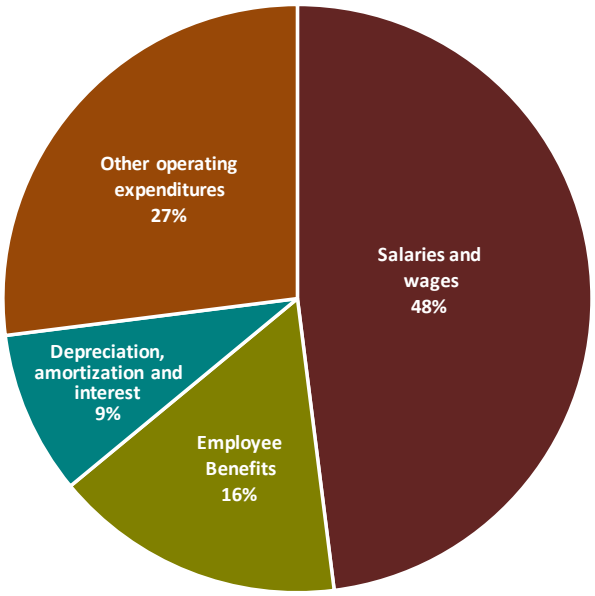
Personnel costs were $2.3 billion in 2018, a 5%, increase over 2017. Faculty salary expenses increased 5% which includes growth in clinical activities. Staff salaries and wages increased 6% from 2017 to 2018. The cost of providing employee benefits, including various pension, post-retirement health, and insurance plans in addition to Social Security and other statutory benefits, totaled $581 million for 2018, an increase of 3% from 2017. The largest driver of this increase are the costs for medical benefits.

Depreciation, amortization, and interest expenses increased 4% from 2017, primarily as a result of the two new residential colleges being placed into service in the beginning of fiscal year 2018.

Other operating expenses, including services, materials and supplies, and other expenses, increased 6% from 2017, primarily as a result of increased grant-funded and clinical activities in the School of Medicine.

Yale reports its operating expenses by natural classification in the consolidated statement of activities and discloses these operating expenses across functional classification in the notes to consolidated financial statements in accordance with GAAP.

Operating Expenses by Natural Classification

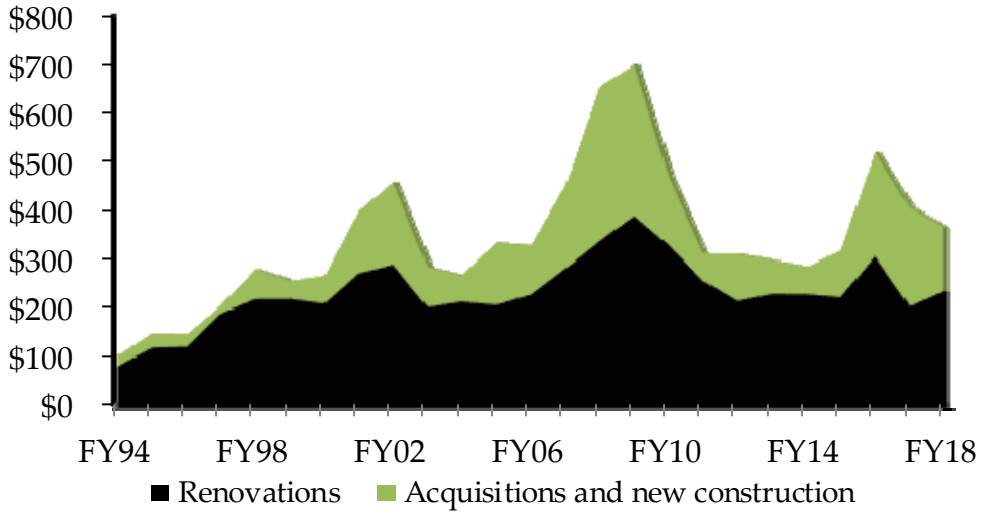


According to functional classification, the university spent 70% of its operating resources on programmatic support, 23% on patient care and other related services, and 7% on administrative and other institutional support. Patient care activities are integral to academic and learning experiences at the university.

Physical Capital

Capital spending on facilities in fiscal year 2018 totaled $367 million. This represents a decrease in spending of 7% compared to 2017.

Capital Spending by Year
(in 2018 dollars, in millions)



The largest share of the university's capital spending, 23%, was used to fund advances on Science Hill. The Yale Science Building will be a new laboratory facility for biological research and centralized research support. Located on the site previously occupied by the J.W. Gibbs Laboratory, the building will feature a rooftop greenhouse, aquatics and insect labs, state-of-the-art imaging technology, a quantitative biology center, innovative physics labs, and a 500-seat lecture hall. The lecture hall will be one of Yale's largest, and will serve the Peabody Museum, Science Hill, and all of campus. The project also includes new and existing concourse area renovations, and a new 10,000 gross square foot Kline Biology Tower Plaza Pavilion, along with plaza renovations, parking lot reconfiguration and landscaping. Construction began in April 2017 and is scheduled to be completed in the fall of 2019.

The university allocated 19% of its capital spending to complete projects previously underway for both undergraduate and graduate residences. Yale's newest additions to the residential college system, Pauli Murray College and Benjamin Franklin College, welcomed their first students in August 2017.

Spending also occurred to complete construction of graduate student housing in the Broadway district to provide replacement housing for units at the Hall of Graduate Studies to be displaced by a planned renovation and reprogramming. The building includes residential units and common areas, along with two floors of retail space. Construction began in July 2016 and was completed in June 2018.

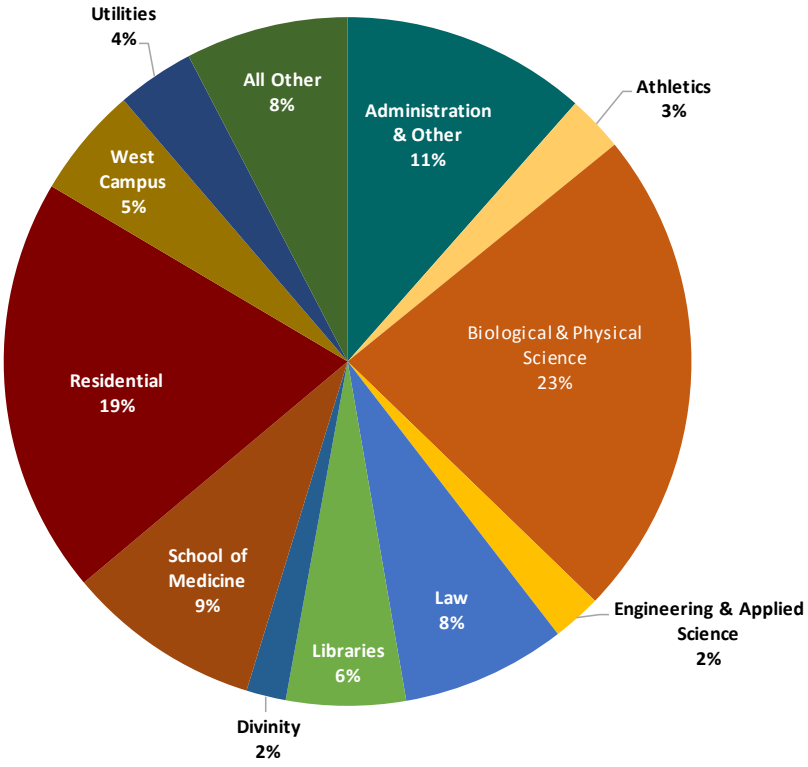
Capital spending at the School of Medicine, with investments in research space and modernization of facilities, accounted for approximately 9% of the university's 2018 capital expenditures.

Eleven percent of the university's capital spending for 2018 was invested in administrative and other building projects. The largest initiative in this category, the Schwarzman Center, will create Yale's first university-wide center for students from every school. The project will renovate the 114-year old complex that includes both Commons and the adjacent Memorial Hall to serve as the home of a world-class center devoted to student life and cultural programming, featuring state-of-the-art technology. The Schwarzman Center is expected to open in 2020.

Eight percent of the university's capital spending went toward expanding the physical campus of the Yale Law School. Baker Hall, located at 100 Tower Parkway, was renovated to add 137,000 square feet to the Law School campus, and contains residential suites, a three-tiered student center, a two-story lecture hall, and rooms for seminars, small groups, and the School's innovative interdisciplinary centers and programs. Construction began in July 2017 and was completed in August 2018.

The university's ambitious renovation and building plans were funded by a combination of gifts, debt, and funds from the operating budget. The university continues to rely heavily on the extraordinary generosity of its alumni and friends. Gifts for facilities in 2018 totaled $82 million. The university has been the beneficiary of an outstanding response from donors on the new construction of the Yale Science Building and Carol Roberts Field House, renovation of the Schwarzman Center, Becton Lower Level Teaching Laboratory, 320 York (Hall of Graduate Studies) and Baker Hall.

Capital Spending by Campus Area



An important source of funding for the capital program is debt provided through the Connecticut Health and Educational Facilities Authority ("CHEFA") which allows the university to borrow at tax exempt rates. This funding source is critical to keeping the cost of funding at lower levels which allows the university to maximize the use of its resources in the fulfillment of its mission of teaching and research. The university used the bond proceeds of $300 million from the issuance of CHEFA Series 2017C-2 debt in December 2017 to finance planned renovations and capital additions. The university continues to receive the highest bond ratings available: AAA from Standard and Poor's and Aaa from Moody's.

Recognizing the critical importance of maintaining its physical capital over many generations, the university allocates funds directly from the operating budget to a capital maintenance account. The annual equilibrium funding target for internal purposes is an estimate that is earmarked from annual operating funding sources to maintain Yale's facilities in good condition on a consistent basis, thus avoiding deferred maintenance. While not an exact science, an estimate of the full capital replacement equilibrium level for 2018 is $219 million. In 2018, most of this amount was funded with operating funds and capital gifts.

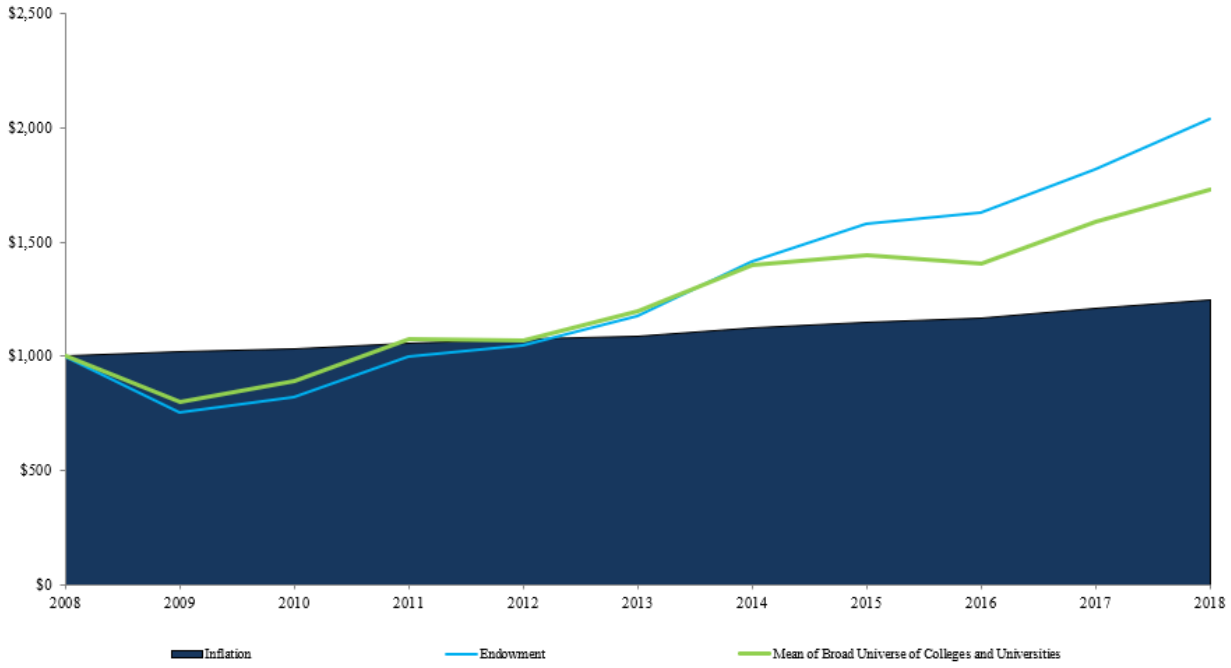
Endowment

The endowment provides the largest source of support for the academic programs of the university. To balance current and future needs, Yale employs investment and spending policies designed to preserve endowment asset values while providing a substantial flow of income to the operating budget. At June 30, 2018, net assets in the endowment totaled approximately $29.4 billion, after the allocation of endowment spending of $1.3 billion to the operating budget during the year.

Investment Performance

For the fiscal year ended June 30, 2018, the endowment earned a 12.3% investment return. During the past decade, the endowment earned an annualized 7.4% return, which added $757 million of value relative to a composite passive benchmark and $4.5 billion relative to the mean return of a broad universe of colleges and universities.

Growth of $1,000 Invested in the Yale Endowment 2008-2018



Endowment Spending

The endowment spending policy, which allocates endowment earnings to operations, balances the competing objectives of providing a stable flow of income to the operating budget and protecting the real value of the endowment over time. The spending policy manages the trade-off between these two objectives by using a long-term target spending rate combined with a smoothing rule, which adjusts spending in any given year gradually in response to changes in endowment market value.

The target spending rate approved by the Yale Corporation currently stands at 5.25%. According to the smoothing rule, endowment spending in a given year sums to 80% of the previous year's spending and 20% of the targeted long-term spending rate applied to the market value at the start of the prior year. The spending amount determined by the formula is adjusted for inflation and an allowance for taxes and

constrained so that the calculated rate is at least 4.0%, and not more than 6.5%, of the endowment's inflation adjusted market value at the start of the prior year. The smoothing rule and the diversified nature of the endowment mitigate the impact of short-term market volatility on the flow of funds to support Yale's operations.

The majority of endowment spending is allocated across multiple purposes, including financial aid and professorships, based on donor restrictions or internal designations by the university. Endowment spending that is neither restricted nor designated provides additional support for budgetary priorities, such as financial aid and professorships, as well as for other purposes to carry out the university's mission.

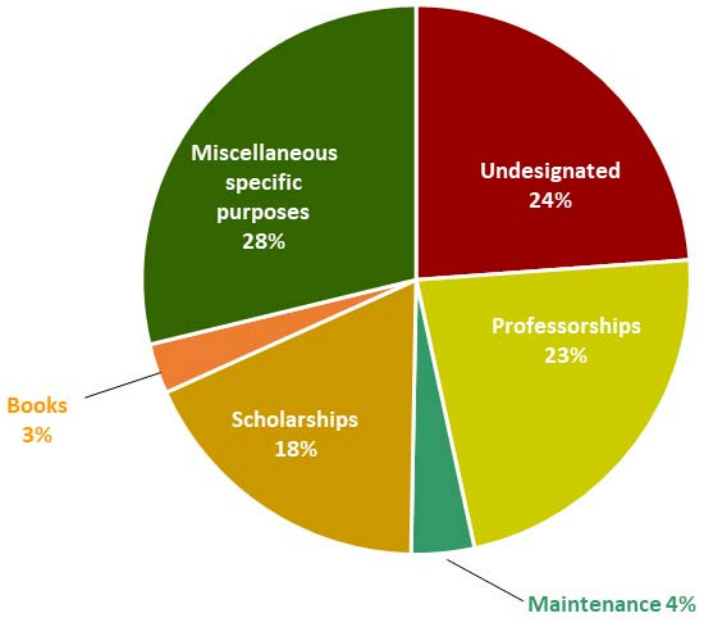
Asset Allocation

Asset allocation proves critical to successful endowment performance. Yale's asset allocation policy combines tested theory and informed market judgment to balance investment risks with the desire for high returns.

Both the need to provide resources for current operations and the desire to preserve the purchasing power of assets dictate investing for high returns, which leads the endowment to be weighted toward equity. In addition, the endowment's vulnerability to inflation directs the university away from fixed income and toward equity instruments. Hence, over 90% of the endowment is invested in assets expected to produce equity-like returns, through domestic and international securities, real assets, and private equity.

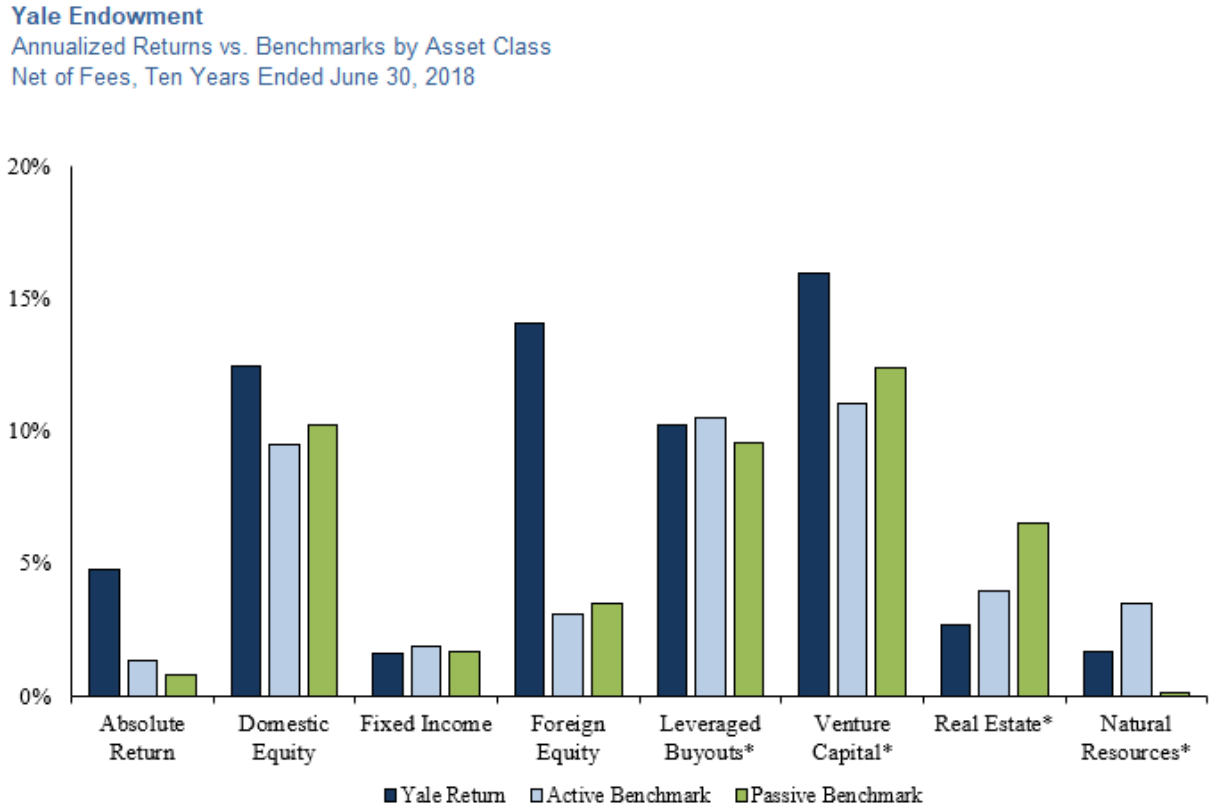
Over the past thirty years, Yale significantly reduced the endowment's exposure to traditional domestic marketable securities, reallocating assets to nontraditional asset classes. In 1988, nearly 75% of the endowment was committed to U.S. stocks, bonds, and cash. Today, domestic marketable securities account for approximately 8% of the portfolio, and private equity, absolute return strategies, real assets, and foreign equity represent around 92% of the endowment.

Endowment Spending Allocation



The heavy allocation to nontraditional asset classes stems from the diversifying power they provide to the portfolio as a whole. Alternative assets, by their nature, tend to be less efficiently priced than traditional marketable securities, providing an opportunity to exploit market inefficiencies through active management. Today's portfolio has significantly higher expected returns and lower volatility than the 1988 portfolio.

Asset Class	June 30, 2018	Current Target
Absolute Return	26.1%	26.0%
Venture Capital	19.0%	18.0%
Foreign Equity	15.3%	15.5%
Leveraged Buyouts	14.1%	15.0%
Real Estate	10.3%	9.5%
Bonds and Cash	4.7%	6.5%
Natural Resources	7.0%	6.5%
Domestic Equity	3.5%	3.0%
Total	100.0%	100.0%



*Yale's returns and active benchmarks are money-weighted.

Active Benchmarks

Absolute Return: Credit Suisse and Inverse Wilshire 5000 Composite
Domestic Equity: BNY Median Manager, U.S. Equity
Fixed Income: BNY Median Manager, Fixed Income
Foreign Equity: BNY Median Manager Composite, Foreign Equity
Leveraged Buyouts: Cambridge Associates Leveraged Buyouts Composite
Venture Capital: Cambridge Associates Global Venture Capital
Real Estate: Cambridge Associates Real Estate
Natural Resources: Cambridge Associates Natural Resources

Passive Benchmarks

Absolute Return: Barclays 9-12 Mo Treasury
Domestic Equity: Wilshire 5000
Fixed Income: Barclays 1-5 Year Treasury through September 2014, Barclays 1-3 Year Treasury thereafter
Foreign Equity: MSCI EAFE Investable Market Index / MSCI Emerging Markets Investable Market Index + MSCI China A-Share Investable Market Index, weighted according to target developed and emerging equity allocations
Leveraged Buyouts: Russell 2000 (75%) / MSCI ACWI ex-US Small-Cap Index (25%)
Venture Capital: Russell 2000 Technology (100%) through June 2010. Russell 2000 Technology (75%) / MSCI China Small Cap (17%) / MSCI India Small Cap (8%) thereafter
Real Estate: MSCI US REIT Index
Natural Resources: Custom Timber REIT basket / S&P OG Exploration & Production Index / Euromoney Global Mining Index, weighted according to target timber, oil and gas, and mining allocations, respectively

Endowment Summary

Yale continues to rely on the principles of equity orientation and diversification. These principles guide Yale's investment strategy, as equity orientation makes sense for investors with long time horizons and diversification allows the construction of portfolios with superior risk and return characteristics. The university's equity-oriented, well-diversified portfolio positions the endowment for long-term investment success.

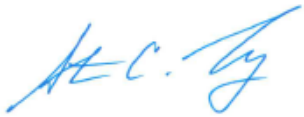
Management's Responsibility for Financial Statements

Management of the university is responsible for the integrity and reliability of the consolidated financial statements. Management represents that, with respect to the university's financial information, the consolidated financial statements in this annual report have been prepared in conformity with accounting principles generally accepted in the United States of America ("GAAP").

The accompanying consolidated financial statements have been audited by the university's independent auditors, PricewaterhouseCoopers LLP. Their audit opinion, on the following page, expresses an informed judgment as to whether the consolidated financial statements, considered in their entirety, present fairly, in conformity with GAAP, the consolidated financial position and changes in net assets and cash flows.

The university maintains a system of internal controls over financial reporting, which is designed to provide a reasonable assurance to the university's management and the Yale Corporation (the "Corporation") regarding the preparation of reliable published financial statements. Such controls are maintained by the establishment and communication of accounting and financial policies and procedures, by the selection and training of qualified personnel, and by an internal audit program designed to identify internal control weaknesses in order to permit management to take appropriate corrective action on a timely basis. There are, however, inherent limitations in the effectiveness of any system of internal control, including the possibility of human error and the circumvention of controls. Accordingly, even an effective internal control system can provide only reasonable assurance with respect to financial statement preparation. Furthermore, the effectiveness of the internal control system can change with circumstances.

The Corporation, through its Audit Committee comprised of members not employed by the university, are responsible for engaging the independent auditors and meeting with management, internal auditors, and the independent auditors to independently assess whether each is carrying out its responsibilities. Both the internal auditors and the independent auditors have full and free access to the Audit Committee.



Stephen C. Murphy
Vice President for Finance and
Chief Financial Officer

Report of Independent Auditors

To the President and Fellows of Yale University:

We have audited the accompanying consolidated financial statements of Yale University (the "University"), which comprise the consolidated statements of financial position as of June 30, 2018 and 2017 and the related consolidated statements of activities for the year ended June 30, 2018 and of cash flows for the years ended June 30, 2018 and 2017.

Management's Responsibility for the Consolidated Financial Statements
Management is responsible for the preparation and fair presentation of the consolidated financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility
Our responsibility is to express an opinion on the consolidated financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on our judgment, including the assessment of the risks of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, we consider internal control relevant to the University's preparation and fair presentation of the consolidated financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the University's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion
In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of Yale University as of June 30, 2018 and 2017 and the changes in its net assets for the year ended June 30, 2018 and its cash flows for the years ended June 30, 2018 and 2017 in accordance with accounting principles generally accepted in the United States of America.

Emphasis of Matter
As discussed in Note 1 to the consolidated financial statements, the University changed the manner in which it presents net assets and reports certain aspects of its financial statements as a not-for-profit entity in 2018. Our opinion is not modified with respect to this matter.

Other Matter
We previously audited the consolidated statement of financial position as of June 30, 2017, and the related consolidated statements of activities and of cash flows for the year then ended (not presented herein), and in our report dated October 23, 2017, we expressed an unmodified opinion on those consolidated financial statements. In our opinion, the information set forth in the accompanying summarized financial information as of June 30, 2017 and for the year then ended is consistent, in all material respects, with the audited consolidated financial statements from which it has been derived.

PricewaterhouseCoopers LLP

October 22, 2018

PricewaterhouseCoopers LLP, 185 Asylum Street, Suite 2400, Hartford, Connecticut 06103
T: (860) 241 7000, F: (860) 241 7458, www.pwc.com/us

Yale University Consolidated Statement of Financial Position

as of June 30, 2018 and 2017 ($ in thousands)

		2018		2017
Assets:				
Cash and cash equivalents	$	587,847	$	378,349
Accounts receivable, net		261,642		206,104
Contributions receivable, net		511,744		617,765
Notes receivable		115,596		121,190
Investments, at fair value		35,113,711		32,735,282
Other assets		190,753		168,985
Land, buildings and equipment, net of accumulated depreciation		5,091,691		4,966,849
Total assets	$	41,872,984	$	39,194,524
Liabilities:				
Accounts payable and accrued liabilities	$	430,183	$	396,181
Advances under grants and contracts and other deposits		133,512		136,586
Other liabilities		1,310,872		1,531,307
Liabilities under split-interest agreements		138,606		134,417
Bonds and notes payable		3,784,877		3,514,699
Liabilities associated with investments		3,791,731		4,464,604
Advances from federal government for student loans		26,088		30,572
Total liabilities	$	9,615,869	$	10,208,366
Net Assets:				
Net asssets without donor restrictions: Yale University	$	5,813,581	$	4,573,133
Net asssets without donor restrictions: non-controlling interests		713,343		260,202
Total net assets without donor restrictions		6,526,924		4,833,335
Net assets with donor restrictions		25,730,191		24,152,823
Total net assets	$	32,257,115	$	28,986,158
Total liabilities and net assets	$	41,872,984	$	39,194,524

The accompanying notes are an integral part of these consolidated financial statements.

Yale University Consolidated Statement of Activities

for the year ended June 30, 2018 with summarized comparative totals for the year ended June 30, 2017 ($ in thousands)

	Without Donor Restrictions	With Donor Restrictions	2018	2017
Operating				
Revenues and releases:				
Net tuition, room and board	$ 375,652	$ -	$ 375,652	$ 345,322
Grant and contract income, primarily for research and training	789,975	-	789,975	768,292
Medical services income	961,572	-	961,572	904,945
Contributions	23,233	114,474	137,707	141,862
Allocation of endowment spending from financial capital	363,334	918,738	1,282,072	1,226,170
Other investment income	85,362	6,097	91,459	72,704
Other income	208,153	1,739	209,892	188,304
Total revenues	2,807,281	1,041,048	3,848,329	3,647,599
Net assets released from restrictions	1,013,732	(1,013,732)	-	-
Total revenues and releases	3,821,013	27,316	3,848,329	3,647,599
Expenses:				
Salaries and wages	1,745,322	-	1,745,322	1,649,551
Employee benefits	580,950	-	580,950	565,628
Depreciation, amortization and interest	333,205	-	333,205	319,322
Other operating expenditures	998,391	-	998,391	946,019
Total expenses	3,657,868	-	3,657,868	3,480,520
Increase in net assets from operating activities	163,145	27,316	190,461	167,079
Non-operating				
Contributions	7,588	215,609	223,197	355,195
Total endowment return	638,940	2,638,970	3,277,910	2,747,729
Allocation of endowment spending to operations	(163,588)	(1,118,484)	(1,282,072)	(1,226,170)
Other investment income	117,855	9,652	127,507	255,607
Change in funding status of defined benefit plans	313,884	-	313,884	246,399
Other (decreases) increases	(85,706)	52,635	(33,071)	(18,243)
Net assets released from restrictions	248,330	(248,330)	-	-
Increase in net assets from non-operating activities	1,077,303	1,550,052	2,627,355	2,360,517
Total increase in net assets - Yale University	1,240,448	1,577,368	2,817,816	2,527,596
Change in non-controlling interests	453,141	-	453,141	(79,870)
Total increase in net assets	1,693,589	1,577,368	3,270,957	2,447,726
Net assets, beginning of year	4,833,335	24,152,823	28,986,158	26,538,432
Net assets, end of year	$ 6,526,924	$ 25,730,191	$ 32,257,115	$ 28,986,158

The accompanying notes are an integral part of these consolidated financial statements.

Yale University Consolidated Statement of Cash Flows

for the years ended June 30, 2018 and 2017 ($ in thousands)

	2018	2017
Operating activities:		
Change in net assets	$ 3,270,957	$ 2,447,726
Adjustments to reconcile change in net assets to net cash used in operating activities:		
Depreciation and amortization	274,832	261,693
Unrealized gain on other investments	(161,318)	(292,691)
Net endowment investment gain	(2,890,256)	(2,414,284)
Change in non-controlling interests	(453,141)	79,870
Change in funding status of defined benefit plans	(313,884)	(246,399)
Non-operating contributions	(223,197)	(355,195)
Contributed securities	(121,351)	(184,108)
Proceeds from sale of donated securities	24,062	21,579
Other adjustments	(6,736)	22,775
Changes in assets and liabilities that provide (use) cash:		
Accounts receivable	(55,538)	17,756
Contributions receivable	18,500	576
Other operating assets	(706)	2,929
Accounts payable and accrued expenses	(40,788)	(54,484)
Advances under grants and contracts and other deposits	(3,074)	13,235
Other liabilities	93,449	146,182
Net cash used in operating activities	(588,189)	(532,840)
Investing activities:		
Student loans repaid	13,321	16,558
Student loans granted	(6,731)	(9,912)
Purchases related to capitalized software costs and other assets	(6,174)	(19,101)
Proceeds from sales and maturities of investments	10,436,387	10,736,542
Purchases of investments	(9,982,974)	(10,034,499)
Purchases of land, buildings and equipment	(349,452)	(400,313)
Net cash provided by investing activities	104,377	289,275
Financing activities:		
Proceeds from restricted contributions	310,718	284,799
Proceeds from sale of contributed securities restricted for endowment	97,290	162,529
Contributions received for split-interest agreements	7,898	5,621
Payments made under split-interest agreements	(16,168)	(16,454)
Proceeds from long-term debt	452,759	849,916
Repayments of long-term debt	(156,770)	(856,027)
Repayments to the Federal government for student loans	(2,417)	802
Net cash provided by financing activities	693,310	431,186
Net increase in cash and cash equivalents	209,498	187,621
Cash and cash equivalents, beginning of year	378,349	190,728
Cash and cash equivalents, end of year	$ 587,847	$ 378,349

The accompanying notes are an integral part of these consolidated financial statements.

Yale University
Notes to Consolidated Financial Statements

1. Significant Accounting Policies

a. General

Yale University ("Yale" or the "university") is a private, not-for-profit institution of higher education located in New Haven, Connecticut. The university is governed by the Yale Corporation (the "Corporation"), a body of nineteen Trustees consisting of the President, ten Successor Trustees who are Successors to the original Trustees, six Alumni Fellows, and the Governor and Lieutenant Governor of Connecticut, ex officio.

The university provides educational services primarily to students and trainees at the undergraduate, graduate and postdoctoral levels, and performs research, training and other services under grants, contracts and other similar agreements with agencies of the federal government and other sponsoring organizations. The university's academic organization includes Yale College, the Graduate School of Arts and Sciences, twelve professional schools and a variety of research institutions and museums. The largest professional school is the Yale School of Medicine, which conducts medical services in support of its teaching and research missions.

The university has been granted tax exempt status under section 501(c)(3) of the Internal Revenue Code.

b. Basis of Presentation

The consolidated financial statements of the university include the accounts of all academic and administrative departments of the university, and affiliated organizations that are controlled by the university.

Financial statements of private, not-for-profit organizations measure aggregate net assets and net asset activity based on the absence or existence of donor-imposed restrictions. Effective with the July 1, 2017 implementation of new guidance regarding the *Presentation of Financial Statements for Not-for-Profit Entities,* net assets are reported as without donor restrictions and with donor restrictions and serve as the foundation of the accompanying consolidated financial statements. Brief definitions of the two net asset classes are presented below:

Net Assets Without Donor Restrictions - Net assets derived from tuition and other institutional resources that are not subject to explicit donor-imposed restrictions. Net assets without donor restrictions also include board designated funds functioning as endowment.

Net Assets With Donor Restrictions - Net assets that are subject to explicit donor-imposed restrictions on the expenditure of contributions or income and gains on contributed assets, net assets from endowments not yet appropriated for spending by the Corporation and student loan funds. In addition, net assets with donor restrictions include restricted contributions from donors classified as funds functioning as endowment. The university records as net assets with donor restrictions the original amount of gifts which donors have given to be maintained in perpetuity. Restrictions include support of specific schools

or departments of the university, for professorships, research, faculty support, scholarships and fellowships, library and art museums, building construction and other purposes. When time and purpose restrictions expire, net assets with donor restrictions are reclassified to net assets without donor restrictions.

Measure of Operations - The university's measure of operations as presented in the consolidated statement of activities includes revenue from tuition (net of certain scholarships and fellowships) and fees, grants and contracts, medical services, contributions for operating programs, the allocation of endowment spending for operations and other revenues. Operating expenses are reported on the consolidated statement of activities by natural classification.

The university's non-operating activity within the consolidated statement of activities includes contributions to the university's endowment and for building construction and renovation, investment returns and other activities related to endowment, and long-term benefit plan obligation funding changes.

Liquidity - The university's financial assets available within one year of the balance sheet date for general expenditure as of June 30, 2018 are as follows, in thousands of dollars:

		2018
Total assets, at year end		$41,872,984
Less nonfinancial assets:		
	Land, buildings and equipment, net of accumulated depreciation	5,091,691
	Other assets	190,753
Financial assets, at year end		36,590,540
Less those unavailable for general expenditure within one year due to:		
	Contractual or donor-imposed restrictions:	
	Restricted by donor with time or purpose restrictions	452,734
	Subject to appropriation and satisfaction of donor restrictions including board designated endowments	32,855,805
	Other long-term notes receivable	115,596
	Other contractual restrictions	75,968
Financial assets available to meet cash needs for general expenditures within one year		$ 3,090,437

The university has $3,090.4 million of financial assets that are available within one year of the balance sheet date to meet cash needs for general expenditure consisting of cash of $587.8 million, accounts receivable of $261.6 million, contributions receivable of $59.0 million, and short-term investments of $2,182.0 million. In addition to these available financial assets, a significant portion of the university's annual expenditures will be funded by current year operating revenues including tuition, grant and contract income and medical services income. The university has a policy to structure its financial assets to be available as its general expenditures, liabilities, and other obligations come due. In addition, as part of its liquidity management, the university invests cash in excess of daily requirements in various short-term investments, including US government instruments.

Additionally, the university has board-designated funds of $5.0 billion. Although the university does not intend to spend from this endowment, other than amounts appropriated for general expenditure as part of its annual budget approval and appropriation process, amounts from its board-designated funds could be made available if necessary. However, both the board-designated funds and donor-restricted

endowments contain investments with lock-up provisions that would reduce the total investments that could be made available (refer to Note 2 for disclosures about investments).

c. Cash and Cash Equivalents

Cash and cash equivalents are recorded at cost, which approximates fair value, and include institutional money market funds and similar temporary investments with maturities of three months or less at the time of purchase. Cash and cash equivalents awaiting investment in the long-term investment pool are reported as investments and totaled $260.6 million and $114.5 million at June 30, 2018 and 2017, respectively. Cash and cash equivalents do not include cash balances held as collateral.

Supplemental disclosures of cash flow information include the following, in thousands of dollars:

		2018		2017
Cash paid during the year for interest	$	110,482	$	127,473
Noncash investing activities:				
Land, buildings and equipment purchases payable to vendor	$	35,718	$	31,054

d. Investments

Fair Value - The university's investments are recorded in the consolidated financial statements at fair value.

Fair value is a market-based measurement based on assumptions that market participants would use in pricing an asset or liability. As a basis for considering assumptions, a three-tier fair value hierarchy has been established which prioritizes the inputs used in measuring fair value. The hierarchy of inputs used to measure fair value and the primary methodologies used by the university to measure fair value include:

- *Level 1* – Quoted prices for identical assets and liabilities in active markets. Market price data is generally obtained from relevant exchange or dealer markets.
- *Level 2* – Inputs, other than the quoted prices in active markets, that are observable either directly or indirectly, such as quoted prices for similar assets or liabilities, quoted prices in markets that are not active, or other inputs that are observable.
- *Level 3* – Unobservable inputs in which there is little or no market data, requiring the university to develop its own assumptions.

Assets and liabilities measured at fair value are determined based on the following valuation techniques:

- *Market approach* – Prices and other relevant information generated by market transactions involving identical or comparable assets or liabilities; and
- *Income approach* – Techniques to convert future amounts to a single present amount based on market expectations, including present value techniques and option-pricing models.

The fair value of publicly traded fixed income and equity securities is based upon quoted market prices and exchange rates, if applicable. The fair value of direct real estate investments is determined from periodic valuations prepared by independent appraisers.

Investments are exposed to various risks, such as interest rate, market and credit risks. Due to the level of risk associated with certain investments, it is at least reasonably possible that changes in the values of investments will occur in the near term and that such changes could materially affect the amounts reported in the university's financial statements.

Derivatives - Derivative financial instruments in the investment portfolio include interest rate swaps, equity swaps, credit default swaps, commodity swap contracts, and currency forward contracts which are recorded at fair value with the resulting gain or loss recognized in the consolidated statement of activities.

Resell and Repurchase Agreements - Cash paid relating to resell agreements is generally collateralized by federal agency and foreign debt securities. The university takes possession of the underlying collateral and monitors the value of the underlying collateral to the amount due under the agreement. Cash received under repurchase agreements is collateralized by investments in asset backed securities, corporate debt, federal agency debt, and foreign debt securities. Collateral fair value is monitored to the amounts due under the agreements.

Management Fees - The university records the cost of managing its endowment portfolio as a decrease in non-operating activity within the applicable net asset class in the consolidated statement of activities. Management fees consist of the internal costs of the university's Investments Office (the "Investments Office"), outside custodian fees, and fees for external investment managers and general partners. Effective with the July 1, 2017 implementation of new guidance regarding the *Presentation of Financial Statements for Not-for-Profit Entities,* certain internal costs, primarily of the university's tax department, are no longer recorded as a decrease in investment return in non-operating activity.

Total Return - The university invests its endowment portfolio and allocates the related earnings for expenditure in accordance with the total return concept. A distribution of endowment return that is independent of the cash yield and appreciation of investments earned during the year is provided for program support. The university has adopted an endowment spending policy designed specifically to stabilize annual spending levels and to preserve the real value of the endowment portfolio over time. The spending policy attempts to achieve these two objectives by using a long-term targeted spending rate combined with a smoothing rule, which adjusts spending gradually to changes in the endowment's fair value. An administrative charge is assessed against the funds when distributed.

To the extent that a donor restricted endowment fund falls below its historic dollar value a deficit would exist and it would be reported as a reduction of net assets with donor restrictions. Spending from an endowment fund in a deficit position would continue under the spending policy so long as the fund is impaired less than 30% relative to its historical dollar value. There were no funds in a deficit position at June 30, 2018.

The university uses a long-term targeted spending rate of 5.25%. The spending amount is calculated using 80% of the previous year's spending and 20% of the targeted long-term spending rate

applied to the fair value two years prior. The spending amount determined by the formula is adjusted for inflation and constrained so that the calculated rate is at least 4.0% and not more than 6.5% of the endowment's fair value. The actual rate of spending for 2018 and 2017, when measured against the previous year's June 30th endowment fair value, was 4.7% and 4.8%, respectively.

The university determines the expected return on endowment investments with the objective of producing a return exceeding the sum of inflation and the target spending rate. Asset allocation is the key factor driving expected return. Yale's asset allocation policy combines tested theory and informed market judgment to balance investment risks with the need for high returns. Both the need to provide resources for current operations and the desire to preserve the purchasing power of assets leads the endowment to be weighted toward equity.

The university manages the majority of its endowment in its Long Term Investment Pool (the "Pool"). The Pool is unitized and allows for efficient investment among a diverse group of funds with varying restricted purposes. In addition to university funds, the Pool includes assets of affiliated entities where the university has established investment management agreements.

e. Land, Buildings and Equipment

Land, buildings, and equipment are generally stated at cost. Buildings leased under capital leases are recorded at the lower of the net present value of the minimum lease payments or the fair value of the leased asset at the inception of the lease. Annual depreciation is calculated on a straight-line basis over useful lives, or over the lease term for capital leases, ranging from 15 to 50 years for buildings and improvements and 4 to 15 years for furnishings and equipment.

f. Other Assets

Other assets include insurance receivable, capitalized software costs, deferred expenses, and inventories. Capitalized software costs are amortized on a straight line basis over the estimated useful lives of the software, ranging from 5 to 10 years.

g. Collections

Collections at Yale include works of art, literary works, historical treasures, and artifacts that are maintained in the university's museums and libraries. These collections are protected and preserved for public exhibition, education, research, and the furtherance of public service. Collections are not capitalized; purchases of collection items are recorded as operating expenses in the university's consolidated statement of activities in the period in which the items are acquired.

h. Split-Interest Agreements

The university's split-interest agreements with donors consist primarily of charitable gift annuities, pooled income funds, and irrevocable charitable remainder trusts for which the university serves as trustee. Assets are invested and payments are made to donors and/or other beneficiaries in accordance with the respective agreements.

Contribution revenues for charitable gift annuities and charitable remainder trusts are recognized at the date the agreements are established. In addition, the fair value of the estimated future payments to be made to the beneficiaries under these agreements is recorded as a liability. For pooled income funds,

contribution revenue is recognized upon establishment of the agreement at the fair value of the estimated future receipts, discounted for the estimated time period until culmination of the agreement.

i. Beneficial Interest in Trust Assets

The university is the beneficiary of certain perpetual trusts and charitable remainder trusts held and administered by others. The estimated fair values of trust assets are recognized as assets and as gift revenue when reported to the university.

j. Net Tuition, Room and Board

Tuition, room and board revenue is generated from an enrolled student population of approximately 13,000. Net tuition, room and board revenue from undergraduate enrollment represents approximately 59.7% of total net tuition, room and board revenue in 2018.

The university maintains a policy of offering qualified applicants admission to Yale College without regard to financial circumstance, as well as meeting in full the demonstrated financial need of those admitted. Student need in all programs throughout the university is generally fulfilled through a combination of scholarships and fellowships, loans and employment during the academic year. Tuition, room and board revenue has been reduced by certain scholarships and fellowships in the amounts of $304.4 million and $283.1 million in 2018 and 2017, respectively.

k. Contributions

Unconditional promises to give that are expected to be collected within one year are recorded at their net realizable value. Amounts expected to be collected in future years are recorded at the present value of estimated future cash flows, which includes estimates for potential uncollectible receivables. The discount on those contributions is computed using an interest rate that reflects fair value applicable to the year in which the promise is received. Amortization of the discount is included in contribution revenue. Conditional promises to give are not recorded as support until such time as the conditions are substantially met.

l. Grant and Contract Income

The university receives grant and contract income from governmental and private sources. In 2018 and 2017, grant and contract income received from the federal government totaled $586.6 million and $567.1 million, respectively. The university recognizes revenue associated with the direct costs of sponsored programs as the related qualified costs are incurred. Recovery of facilities and administrative costs of federally sponsored programs is at rates negotiated with the university's cognizant agency, the Department of Health and Human Services.

m. Medical Services Income

The university has agreements with third-party payers, including health maintenance organizations that provide payment for medical services at amounts different from standard rates established by the university. In 2018 and 2017, income from medical services totaled $418.4 million and $404.0 million for insurance companies, $139.2 million and $128.2 million for Medicare, and $61.6 million and $48.0 million for Medicaid, respectively. Medical services income is reported net of contractual allowances from

third-party payers and others for services rendered, and further adjusted for estimates of uncollectible amounts.

n. Net Assets Released from Restrictions

Net assets released from restriction are based upon the satisfaction of the purpose for which the net assets were restricted or the completion of a time stipulation. Restricted operating activity including contributions and net investment return earned, which are restricted, are reported as net assets with donor restrictions and reclassified to net assets without donor restrictions when any donor-imposed restrictions are satisfied. Non-operating restricted net assets associated with building costs are reclassified to net assets without donor restrictions when the capital asset is placed in service.

o. Self-Insurance

The university self-insures at varying levels for unemployment, disability, workers' compensation, property losses, certain healthcare plans, general and professional liability; and obtains coverage through a captive insurance company for medical malpractice and related general liability losses. Insurance is purchased to cover liabilities above self-insurance limits. Estimates of retained exposures are accrued.

p. Estimates

The preparation of financial statements in accordance with accounting principles generally accepted in the United States of America ("GAAP") requires management to make estimates and judgments that affect the reported amounts of assets and liabilities and disclosures of contingencies at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period.

Significant estimates made by management include the valuation of alternative investments, the estimated net realizable value of receivables, estimated asset retirement obligations, liabilities under split-interest agreements, and the actuarially determined employee benefit and self-insurance liabilities. Actual results could differ from those estimates.

q. Recent Authoritative Pronouncements

On July 1, 2017, the university adopted new guidance regarding the *Presentation of Financial Statements for Not-for-Profit Entities*. This guidance requires the university to collapse the three-category (unrestricted, temporarily restricted, and permanently restricted) classification of net assets into two categories: with donor restrictions and without donor restrictions. In addition, the new guidance requires the university to make certain expanded disclosures relating to (1) the liquidity of financial assets, and (2) expenses by both their natural and functional classification in one location in the financial statements. As a result of implementing this standard prior year amounts for temporarily restricted and permanently restricted net assets were combined as net assets with donor restrictions.

The Financial Accounting Standards Board has issued standards that the university must consider for adoption over the next two years. Those standards include the following: (1) *Clarifying the Scope and Accounting Guidance for Contributions Received and Contributions Made* effective for the fiscal year ending June 30, 2019, (2) *Revenue from Contracts with Customers* effective for the fiscal year ending June 30, 2019, and (3) *Leases* effective for the fiscal year ending June 30, 2020. The *Contributions* standard aims to assist entities in (a) evaluating whether transactions should be accounted for as contributions or exchange transactions and (b) determining whether a contribution is conditional. Under *Revenue from*

Contracts with Customers, recognition of revenue from customer contracts is a principles-based framework. The *Leases* standard aims to increase transparency and comparability among organizations by recognizing lease assets and lease liabilities on the balance sheet and disclosing key information about leasing arrangements. The university is currently evaluating the impact of the adoption of these standards on its consolidated financial statements.

r. Summarized 2017 Financial Information

The 2018 consolidated financial statements include selected comparative summarized financial information for 2017. Such information does not include sufficient detail to constitute a presentation in conformity with GAAP. Accordingly, such information should be read in conjunction with the university's 2017 financial statements, from which the summarized financial information was derived.

2. Investments

The university endowment maintains a diversified investment portfolio with a strong orientation to equity investments and strategies designed to take advantage of market inefficiencies. The university's investment objectives are guided by its asset allocation policy and are achieved in partnership with external investment managers operating through a variety of investment vehicles, including separate accounts, limited partnerships and commingled funds. The university's heavy allocation to non-traditional asset classes, such as absolute return (hedge strategies), private equity (venture capital and leveraged buyouts), real estate, and natural resources (timber, energy and minerals), generates return potential and diversification in the portfolio.

The components of endowment and non-endowment investments, net of related liabilities at June 30 are presented below, in thousands of dollars:

		2018		2017
Endowment investments:				
Long term investment pool	$	29,088,879	$	26,764,512
Other		356,057		452,127
Total net endowment investments		29,444,936		27,216,639
Non-endowment investments:				
Long term investment pool		350,000		350,000
Bonds		549,866		452,120
Derivatives		(174,542)		(337,238)
Other		438,377		328,955
Total non-endowment investments		1,163,701		793,837
Net investments, at fair value	$	30,608,637	$	28,010,476

As described in Note 1d, investments are recorded at fair value. The following tables summarize the fair values of the university's investments by major type and related liabilities as of June 30, in thousands of dollars:

2018	Level 1	Level 2	Level 3	Total
Investments, at fair value:				
Cash and cash equivalents	$ 614,547	$ -	$ -	$ 614,547
Fixed income:				
US government securities	1,988,449	58,759	58	2,047,266
Foreign government securities	12,934	162,459	-	175,393
Corporate and other securities	30,676	1,998,181	337,352	2,366,209
Total fixed income	2,032,059	2,219,399	337,410	4,588,868
Common stock:				
Domestic	1,496,324	42,298	22,024	1,560,646
Foreign	1,820,450	80,550	93,150	1,994,150
Total common stock	3,316,774	122,848	115,174	3,554,796
Other equity investments:				
Venture capital	-	-	169,949	169,949
Natural resources	-	-	210,163	210,163
Total other equity investments	-	-	380,112	380,112
Other investments	741,675	941,655	336,374	2,019,704
Total leveled investments, at fair value	$ 6,705,055	$ 3,283,902	$ 1,169,070	11,158,027
Investments at net asset value				23,955,684
Total investments				35,113,711
Liabilities associated with investments:				
Securities sold, not yet purchased	$ 382,815	$ 333,560	$ -	716,375
Repurchase agreements	-	832,610	-	832,610
Other liabilities	299,524	698,425	1,244,797	2,242,746
Total liabilities associated with investments	$ 682,339	$ 1,864,595	$ 1,244,797	3,791,731
Non-controlling interests				713,343
Net investments				$ 30,608,637

2017	Level 1	Level 2	Level 3	Total
Investments, at fair value:				
Cash and cash equivalents	$ 534,184	$ -	$ -	$ 534,184
Fixed income:				
US government securities	1,931,553	80,482	58	2,012,093
Foreign government securities	34,350	174,358	8,826	217,534
Corporate and other securities	47,188	2,089,536	317,076	2,453,800
Total fixed income	2,013,091	2,344,376	325,960	4,683,427
Common stock:				
Domestic	1,704,312	23,740	16,487	1,744,539
Foreign	1,822,149	83,126	102,044	2,007,319
Total common stock	3,526,461	106,866	118,531	3,751,858
Other equity investments:				
Venture capital	-	-	115,075	115,075
Natural resources	-	-	256,235	256,235
Total other equity investments	-	-	371,310	371,310
Other investments	606,774	874,968	335,638	1,817,380
Total leveled investments, at fair value	$ 6,680,510	$ 3,326,210	$ 1,151,439	11,158,159
Investments at net asset value				21,577,123
Total investments				32,735,282
Liabilities associated with investments:				
Securities sold, not yet purchased	$ 523,892	$ 334,063	$ -	857,955
Repurchase agreements	-	882,678	-	882,678
Other liabilities	571,193	843,277	1,309,501	2,723,971
Total liabilities associated with investments	$ 1,095,085	$ 2,060,018	$ 1,309,501	4,464,604
Non-controlling interests				260,202
Net investments				$ 28,010,476

While not part of a leveling category, fair values for certain investments held are based on the net asset value ("NAV") of such investments as determined by the respective external investment managers, including general partners, if market values are not readily ascertainable. These valuations necessarily involve assumptions and methods that are reviewed by the Investments Office.

Investments at NAV as of June 30, in thousands of dollars, include:

	2018	2017
Absolute return	$ 5,707,245	$ 5,055,020
Domestic	898,522	905,622
Foreign	2,593,255	2,184,966
Leveraged buyout	4,310,722	4,019,098
Natural resources	1,720,329	1,484,315
Real estate	3,012,179	3,107,295
Venture capital	5,713,432	4,820,807
Total investments, at NAV	$ 23,955,684	$ 21,577,123

Assets and liabilities of investment companies that are controlled by the university are consolidated for reporting purposes. Certain consolidated subsidiaries are controlled but not wholly owned by the

university. The portion of a consolidated entity's net assets that is not owned by the university is reported as a non-controlling interest.

The fair value of consolidated investment company assets and liabilities included in the university's financial statements, in thousands of dollars, include:

		2018		2017
Consolidated investment company assets	$	5,467,241	$	5,311,031
Consolidated investment company liabilities		1,965,031		2,255,348
	$	3,502,210	$	3,055,683

Level 3 investments are valued by the university or by its external investment managers using valuation techniques standard in the industry in which they operate. The Investments Office reviews these valuation methods and evaluates the appropriateness of these valuations each year. In certain circumstances, when the general partner does not provide a valuation or the valuation provided is not considered appropriate, the Investments Office will determine those values.

The following table summarizes quantitative inputs and assumptions used for Level 3 investments at June 30, 2018 for which fair value is based on unobservable inputs that are not developed by external investment managers. Significant increases or decreases in these unobservable inputs may result in significantly higher or lower valuation results.

Asset Class		Fair Value (in 000's)	Valuation Technique	Significant Unobservable Input	Range	Weighted Average
Equity Securities	$	115,174	Market comparables	Enterprise value to EBITDA	2.0x - 10.0x	3.9x
				Multiple of revenue	.7x	.7x
			Discounted Cash Flow	Discount rate	16.0% - 30.0%	20.0%
			Dealer pricing	Indicative quotes	NA	NA
Fixed Income Securities	$	337,410	Market comparables	Enterprise value to EBITDA	2.5x - 5.2x	4.2x
				Discount rate	10.0% - 15.0%	14.0%
			Liquidation model	Recovery rate	0.0% - 100.0%	69.0%
				Liquidity probability	0.0% - 100.0%	30.0%
			Discounted cash flow	Discount rate	10.0% - 30.0%	13.0%
			Dealer pricing	Indicative quotes	NA	NA
Natural Resources	$	210,163	Discounted cash flow	Discount rate	6.0% - 10.0%	8.0%
Trusts	$	200,371	Net present value	Discount rate	3.5%	3.5%
Other Investments	$	305,952	Potential tax liability	Applicable tax rate	10.0% - 20.0%	10.0%
			Write-off	Recovery rate	0.0% - 90.0%	80.0%
			Dealer pricing	Indicative quotes	NA	NA
			Option pricing model	Implied volatility	45.0% - 55.0%	50.0%
			Market comparables	Price per acre	$8,834.00 - $9,164.00	$9,000.00
Liabilities	$	(1,244,797)	Various methods	University pooled unit market value	$ 3,668.04	$ 3,668.04

The valuation process for investments at NAV and those categorized in Level 3 of the fair value hierarchy includes evaluating the operations and valuation procedures of external investment managers and the

transparency of those processes through background and reference checks, attendance at investor meetings, and periodic site visits. In determining the fair value of investments, Investments Office staff reviews periodic investor reports, interim and annual audited financial statements received from external investment managers, and material quarter over quarter changes in valuation; and assesses the impact of macro market factors on the performance. The Investments Office meets with the Corporation's Investment Committee quarterly to review investment transactions and monitor performance of external investment managers.

Realized gains and losses are reported in total endowment return, net of fees. Included in net realized and unrealized gain (loss) in Level 3 reported below were unrealized gains of $36.7 million and unrealized losses of $114.9 million that relate to assets held at June 30, 2018 and 2017, respectively.

The tables below present the change in fair value measurements for the university's Level 3 investments during the years ended June 30, in millions of dollars:

2018	Venture Capital	Natural Resources	Other	Liabilities	Total
Beginning balance	$ 115	$ 256	$ 780	$ (1,310)	$ (159)
Realized and unrealized gain (loss), net	38	12	25	(40)	35
Purchases	3	18	132	(10)	143
Sales	(1)	(2)	(118)	103	(18)
Transfers in	21	-	69	(2)	88
Transfers out	(6)	(74)	(99)	14	(165)
Ending balance	$ 170	$ 210	$ 789	$ (1,245)	$ (76)

2017	Foreign Equity	Venture Capital	Natural Resources	Other	Liabilities	Total
Beginning balance	$ 383	$ 85	$ 200	$ 850	$ (1,191)	$ 327
Realized and unrealized gain (loss), net	-	(16)	(4)	(47)	(61)	(128)
Purchases	-	3	84	135	(54)	168
Sales	-	(2)	(2)	(101)	5	(100)
Transfers in	-	45	-	85	(12)	118
Transfers out	(383)	-	(22)	(142)	3	(544)
Ending balance	$ -	$ 115	$ 256	$ 780	$ (1,310)	$ (159)

The transfers out of Level 3 consist primarily of investments reclassified from Level 3 to investments at NAV due to the use of the practical expedient for certain limited partnership investments.

Agreements with external investment managers include certain redemption terms and restrictions as noted in the following table:

Asset Class	Fair Value (in 000's)	Remaining Life	Unfunded Commitment (in 000's)	Redemption Terms	Redemption Restrictions
Absolute Return	$ 5,707,245	No Limit	$ 374,009	Redemption terms range from monthly with 30 days notice to annually with 90 days notice.	Lock-up provisions range from none to 5 years.
Domestic Equity	898,522	No Limit	100,000	Redemption terms range from monthly with 3 days notice to annually with 90 days notice.	Lock-up provisions range from none to 7 years.
Foreign Equity	2,593,255	No Limit	72,000	Redemption terms range from monthly with 15 days notice to closed end structures not available for redemption.	Lock-up provisions range from none to 7 years.
Leveraged Buyout	4,310,722	1-25 years	3,849,054	Closed end funds not eligible for redemption.	Not redeemable.
Venture Capital	5,883,381	1-25 years	1,527,196	Redemption terms range from 2 years with 3 years notice to closed end structures not available for redemption.	Not redeemable.
Real Estate	3,012,179	1-25 years	1,626,315	Closed end funds not eligible for redemption.	Not redeemable.
Natural Resources	1,930,492	1-35 years	416,089	Closed end funds not eligible for redemption.	Not redeemable.
Total	$ 24,335,796		$ 7,964,663		

The university enters into resell agreements (where securities are purchased under agreements to resell) and into repurchase agreements (where securities are sold under an agreement to repurchase). All resell agreements and repurchase agreements are carried at their contractual value which approximates fair value. Resell and repurchase agreements are presented gross in the university's consolidated statement of financial position as investment assets and liabilities associated with investments.

The table below illustrates the exposure for these financial instruments at June 30, 2018, in thousands of dollars, where enforceable netting agreements are in place:

	Assets	Liabilities
Resell and repurchase agreements	$ 545,367	$ 832,610
Amounts contractually eligible for offset	(502,375)	(502,375)
Collateral	(21,475)	(330,235)
Net exposure for resell and repurchase agreements	$ 21,517	$ -

The fair value of fixed income securities of $601.0 million was provided at June 30, 2018 to collateralize securities sold, not yet purchased.

The university may employ derivatives and other strategies to (1) manage against market risks, (2) arbitrage mispricings of related securities, and (3) replicate long or short positions more cost effectively.

The university does not invest in derivatives for speculation. The fair value of derivative positions held at June 30, 2018 and related gain (loss) for the year, in thousands of dollars, were as follows:

	Assets	Liabilities	Gain (Loss)
Endowment:			
Credit default swaps	$ 96,881	$ (88,577)	$ 17,299
Interest rate swaps	37,696	(84,118)	4,936
Other	71,692	(25,248)	(12,934)
	206,269	(197,943)	9,301
Other:			
Interest rate swaps	25,171	(212,017)	118,970
Energy swaps	-	(526)	(2,397)
	25,171	(212,543)	116,573
Gross value of derivatives	231,440	(410,486)	$ 125,874
Other-counterparty netting	(131,663)	131,663	
Net collateral (received)/posted	(57,875)	213,782	
Total net exposure for derivatives	$ 41,902	$ (65,041)	

Derivatives are reported as other investments and other liabilities for fair value leveling purposes. The university initiates derivatives under legally enforceable master netting agreements. The net exposure for derivatives is presented above net of these master netting agreements and required collateral.

Credit default swaps

Credit default swaps are used to simulate long or short positions that are unavailable in the market or to reduce credit risk where exposure exists. The buyer of a credit default swap is obligated to pay to the seller a periodic stream of payments over the term of the contract in return for a contingent payment upon occurrence of a contracted credit event. As of June 30, 2018, the total notional amount of credit default swap contracts for buy protection amounts to $2.1 billion and the notional amount related to sell protection is $1.2 billion.

Interest rate swaps

Interest rate swaps are used to manage exposure to interest rate fluctuations. The notional amount of contracts that pay based on fixed rates and receive based on variable rates at June 30, 2018 were $13.2 billion. The notional amount of contracts that pay based on variable rates and receive based on fixed rates were $13.3 billion at June 30, 2018.

Energy swaps

Energy swaps are used in connection with settling planned purchases of energy consumption and adjusting market exposures.

Derivative assets are reported as investments in the consolidated statement of financial position and derivative liabilities are reported as liabilities associated with investments. Gains and losses on derivatives used for investing are reported as part of total endowment return and gains and losses related to

university debt management and energy consumption are reported as other investment income in the consolidated statement of activities as non-operating activity.

Derivatives held by limited partnerships and commingled investment trusts in which Yale invests pose no off-balance sheet risk to the university due to the limited liability structure of the investments.

Certain investment transactions, including derivative financial instruments, necessarily involve counterparty credit exposure. Such exposure is monitored regularly by the university's Investments Office in accordance with established credit policies and other relevant criteria.

Endowment investments include beneficial interests in outside trusts of $156.4 million and $150.3 million at June 30, 2018 and 2017, respectively. Non-endowment investments include Connecticut Health and Educational Facilities Authority ("CHEFA") proceeds available for approved construction and campus renovation projects of $76.0 million and $0 million at June 30, 2018 and June 30, 2017, respectively.

The following investments held under split-interest agreements are included in the endowment investment portfolio, in thousands of dollars:

	2018	2017
Charitable gift annuities	$ 227,170	$ 208,804
Charitable remainder trusts	107,652	107,913
Pooled income funds	9,524	10,384
	$ 344,346	$ 327,101

Split interest liabilities reported in the consolidated statement of financial position total $138.6 million and $134.4 million at June 30, 2018 and June 30, 2017, respectively, and are recorded at fair value using Level 2 measurements.

The university has agreements with certain affiliates to invest in the Pool. The obligation to these affiliates included in other liabilities within liabilities associated with investments is $1,171.7 million at June 30, 2018. The largest balance recorded is for Yale-New Haven Health System ("YNHHS") with $931.7 million invested at June 30, 2018.

A summary of the university's total investment return as reported in the consolidated statement of activities is presented below, in thousands of dollars:

	2018	2017
Investment income	$ 387,654	$ 333,445
Realized and unrealized gain, net of investment management fees	2,890,256	2,414,284
Total endowment return	3,277,910	2,747,729
Other investment income	218,966	328,311
	$ 3,496,876	$ 3,076,040

Endowment investment returns totaling $1,282.1 million and $1,226.2 million were allocated to operating activities in 2018 and 2017, respectively, using the spending policy described in Note 1d.

3. Accounts Receivable

Accounts receivable from the following sources were outstanding at June 30, in thousands of dollars:

	2018	2017
Medical services, net	$ 117,706	$ 99,097
Grant and contracts	107,143	63,825
Affiliated organizations	64,494	55,083
Publications	5,345	4,436
Other	24,216	18,128
	318,904	240,569
Less: Allowance for doubtful accounts	(57,262)	(34,465)
	$ 261,642	$ 206,104

Medical services receivables are net of contractual allowances and charity adjustments, of $118.2 million and $105.2 million at June 30, 2018 and 2017, respectively. Receivables, net of contractual adjustments, for medical services are primarily based on negotiated contracts with insurance companies (36%), Medicare (12%), Medicaid (4%), payments due directly from patients (38%) and commercial insurance and others (10%). The university assesses credit losses on all accounts receivable on a regular basis to determine the allowance for doubtful accounts.

The university and Yale-New Haven Hospital ("the Hospital") are parties to an affiliation agreement that establishes guidelines for the operation of activities between these two separate organizations. These guidelines set forth each organization's responsibility under the common goal of delivering comprehensive patient care services. The university provides professional services from faculty of the Yale School of Medicine and a variety of other administrative and clinical services. The net receivable from the Hospital amounted to $50.8 million and $43.9 million at June 30, 2018 and 2017, respectively. Balances are settled in the ordinary course of business. The university recognized $289.2 million in revenue and incurred $93.5 million in expenses related to activities with the Hospital during the period ended June 30, 2018.

4. Contributions Receivable

Contributions receivable consist of the following unconditional promises to give as of June 30, in thousands of dollars:

	2018	2017
Purpose:		
Endowment	$ 186,688	$ 200,381
Capital purposes	135,678	214,217
Operating programs	390,164	419,282
Gross unconditional promises to give	712,530	833,880
Less: Discount to present value	(136,574)	(141,289)
Allowance for uncollectible accounts	(64,212)	(74,826)
	$ 511,744	$ 617,765

Amounts due in:		
Less than one year	$ 230,971	$ 316,356
One to five years	211,038	258,336
More than five years	270,521	259,188
	$ 712,530	$ 833,880

Discount rates used to calculate the present value of contributions receivable ranged from 0.33% to 7.0% at June 30, 2018 and 2017.

At June 30, 2018, the university had conditional pledges of approximately $93.7 million that depend on the occurrence of future and uncertain events. Conditional pledges are recognized when the condition is met.

5. Notes Receivable

Notes receivable at June 30, in thousands of dollars, include:

	2018	2017
Institutional student loans	$ 47,211	$ 46,815
Federally-sponsored student loans	27,117	31,899
Notes receivable	52,548	53,537
	126,876	132,251
Less: Allowance for doubtful accounts	(11,280)	(11,061)
	$ 115,596	$ 121,190

Student Loans

Institutional student loans include donor funds restricted for student loan purposes and university funds made available to meet demonstrated need in excess of all other sources of student loan borrowings. Interest accrues at fixed rates upon loan disbursement.

Management regularly assesses the adequacy of the allowance for credit losses for student loans by performing ongoing evaluations of the student loan portfolio, including such factors as the differing

economic risks associated with each loan category, the financial condition of specific borrowers, the level of delinquent loans, and, where applicable, the existence of any guarantees or indemnifications. Federally-sponsored loans represent amounts due from current and former students under certain federal loan programs. Loans disbursed under these programs can be assigned to the federal government in certain non-repayment situations. In these situations, the federal portion of the loan balance is guaranteed. Federally-sponsored student loans have mandated interest rates and repayment terms subject to restrictions as to their transfer and disposition.

Amounts received from the federal government to fund a portion of the federally-sponsored student loans are ultimately refundable to the federal government and have been reported as advances from federal government for student loans in the consolidated statement of financial position. The recorded value of student loan instruments approximates fair value.

Notes Receivable

The university and the Hospital entered into an agreement under which the Hospital will reimburse the university over a 40-year term for advances made relating to the construction of Hospital facilities. The payment includes interest based on the 5-year Treasury bill plus 175 basis points, which resets every 5 years. In 2015, the interest rate was reset, and the monthly payment was adjusted accordingly.

6. Other Assets

Other assets at June 30, in thousands of dollars, include:

	2018	2017
Insurance receivable	$ 97,364	$ 69,131
Software costs, net of accumulated amortization	47,430	54,601
Deferred expenses	30,996	30,479
Inventories	14,963	14,774
	$ 190,753	$ 168,985

Amortization expense related to other assets included in operating expenses amounted to $13.7 million and $15.8 million in 2018 and 2017, respectively.

7. Land, Buildings and Equipment

Land, buildings and equipment at June 30, less accumulated depreciation, in thousands of dollars, are as follows:

		2018		2017
Land and real estate improvements	$	137,053	$	137,053
Buildings		6,889,549		6,249,094
Buildings under capital leases		50,058		50,058
Equipment		618,119		606,536
		7,694,779		7,042,741
Less: Accumulated depreciation and amortization		(2,962,493)		(2,708,478)
		4,732,286		4,334,263
Construction in progress		359,405		632,586
	$	5,091,691	$	4,966,849

Depreciation expense included in operating expenses amounted to $259.6 million and $242.0 million in 2018 and 2017, respectively. Amortization expense on capital lease assets amounted to $1.9 million and $1.9 million in 2018 and 2017, respectively.

8. Other Liabilities

Other liabilities consist of obligations of the university that will be paid over extended periods and consist of the following, in thousands of dollars:

		2018		2017
Employee benefit obligations	$	977,271	$	1,243,692
Compensated absences		65,440		64,837
Asset retirement obligations		39,100		39,100
Financial aid grant obligations		59,774		61,259
Other		169,287		122,419
	$	1,310,872	$	1,531,307

Included in employee benefit obligations are defined benefit plan liabilities in excess of plan assets. These liabilities amounted to $815.5 million at June 30, 2018 and $1,103.9 million at June 30, 2017 (see Note 11).

9. Bonds and Notes Payable

Bonds and notes payable outstanding at June 30, in thousands of dollars, include:

	Effective Interest Rate June 30, 2018	Calendar Year of Maturity	Outstanding Balance 2018	Outstanding Balance 2017
CHEFA tax-exempt bonds:				
Series S	1.10%	2027	$ 135,865	$ 135,865
Series T	1.65%	2029	125,000	125,000
Series U	1.00%	2033	250,000	250,000
Series V	0.86%	2036	200,000	200,000
Series X	1.80%	2037	125,000	125,000
Series 2010A	2.24%	2025/2049	379,975	529,975
Series 2013A	1.00%	2042	100,000	100,000
Series 2014A	1.30%	2048	250,000	250,000
Series 2015A	1.38%	2035	300,000	300,000
Series 2016A	1.62%	2042	399,320	399,320
Series 2017A	5.00%	2042	170,920	170,920
Series 2017B	5.00%	2029/2037	224,200	224,200
Series 2017C	5.00%	2040/2057	383,380	-
Total CHEFA bonds			3,043,660	2,810,280
Medium-term notes	7.38%	2096	125,000	125,000
Medium-term notes Series B	2.09%	2019	250,000	250,000
Commercial paper	1.50%	2018	181,445	181,445
Capital leases - buildings	5.75%	2032	39,623	41,090
U.S. Department of Energy	2.71%	2029	48,797	53,717
Other notes payable	7.85%	2020	1,020	1,404
Principal amount			3,689,545	3,462,936
Less: Bond issue costs			(13,271)	(14,224)
Plus: Unamortized premiums and discounts, net			108,603	65,987
			$ 3,784,877	$ 3,514,699

CHEFA Tax-Exempt Bonds

The university borrows at tax-exempt rates through CHEFA, a conduit issuer. CHEFA debt is a general unsecured obligation of the university. Although CHEFA is the issuer, the university is responsible for the repayment of the tax-exempt debt.

Series S bonds bear interest at a money market municipal rate and are outstanding for varying interest rate periods of 270 days or less and mature July 2027. The bonds may be converted from the money market mode to other variable rate modes or to a fixed rate mode at the discretion of the university.

Series T bonds consist of $125 million Series T-2 bonds maturing July 2029. In February 2017, the Series T-2 bonds were remarketed from an interest rate of 0.60% that expired in January 2017 to a fixed term rate of 1.65% through February 2020. In June 2017, $125 million in Series T-1 bonds bearing interest at a fixed rate of 4.70% and maturing July 2029, were defeased and redeemed by new Series 2017B (see Series 2017B below).

Series U bonds, maturing July 1, 2033, bear interest at a fixed rate of 1.00% through February 5, 2019.

Series V bonds bear interest at a daily rate and mature on July 1, 2036. The bonds may be converted from a daily rate period to other variable rate modes or to a fixed rate mode at the discretion of the university.

Series X bonds consist of $125 million Series X-2 maturing July 1, 2037. In February 2018, the Series X-2 bonds were remarketed from an interest rate of 0.90% that expired in January 2018 to a fixed rate of 1.80% through January 2021. In June 2017, $125 million in Series X-3 bonds, bearing interest at a fixed rate of 4.85% and maturing July 1, 2037, were defeased and redeemed by new Series 2017B (see Series 2017B below).

Series 2010A bonds consist of 1) $80 million Series 2010A-1 bonds, subject to an optional redemption by the university starting July 2018, bearing interest at a fixed rate of 5.00% and maturing July 2025; 2) $150 million Series 2010A-2 bonds, subject to an optional redemption by the university starting July 2018, bearing interest at a fixed rate of 5.00% and maturing July 2040. In December 2017 Series 2010A-2 bonds were defeased and redeemed by a new Series 2017C-1 (see Series 2017C-1 below); 3) $150 million Series 2010A-3 bonds, maturing July 2049, were remarketed from an interest rate of 0.875% that expired in February 2018 to a fixed rate of 1.80% through February 2021; and 4) $150 million Series 2010A-4 bonds bearing interest at a fixed rate of 1.20% through January 2019 and maturing July 2049. These bonds include a net premium of $4.4 million as of June 30, 2018. In July 2018, Series 2010A-1 bonds were redeemed by Series 2018A bonds, in the amount of $67.6 million, at a fixed rate of 5.00%, maturing in July 2025.

Series 2013A bonds had an initial fixed interest rate of 1.35% through July 2016. In July 2016, they were remarketed to a new fixed rate of 1.00% through June 30, 2019. The bonds mature July 2042.

Series 2014A bonds consist of $250 million maturing in July 2048. Series 2014A bonds were remarketed from an initial fixed interest rate of 0.80% that expired in July 2017 to a fixed interest rate of 1.3% through February 2020.

Series 2015A bonds, maturing in July 2035, were remarketed in July 2018 from an initial fixed interest rate of 1.38% to a fixed interest rate of 2.05% through July 2021.

Series 2016A bonds were issued in July 2016 to redeem Series Z-1 bonds and consist of 1) $150 million Series 2016A-1 bearing a fixed interest rate of 1.00% through June 30, 2019; and 2) $249.3 million Series 2016A-2 bonds bearing a fixed rate of 2.00% through June 30, 2026. Both bond series mature July 2042.

Series 2017A bonds were issued in June 2017 to refund Series Z-2 and Series Z-3 and consist of 1) $85.5 million Series 2017A-1 bonds and 2) $85.5 million Series 2017A-2 bonds. Both bond series mature July 2042 and bear interest at a fixed rate of 5.00% through June 30, 2022. These bonds include a net premium of $23.3 million as of June 30, 2018.

Series 2017B bonds were issued in June 2017 to refund T-1 and Series X-3 and consist of 1) $112.1 million Series 2017B-1 bonds maturing July 2029 and 2) $112.1 million Series 2017B-2 bonds maturing July 2037. Both bond series bear interest at a fixed rate of 5.00% through June 30, 2020. These bonds include a net premium of $17.2 million as of June 30, 2018.

Series 2017C-1 bonds were issued in December 2017 to refund Series 2010A-2 and consist of $123.3 million bonds maturing July 2040. The bonds bear interest at a fixed rate of 5% through January 2028. These bonds include a net premium of $28.0 million as of June 2018. Series 2017C-2 bonds were issued in December 2017 and consist of $260.1 million bonds maturing July 2057. The bonds bear interest at a fixed rate of 5% through January 2023. These bonds include a net premium of $35.9 million as of June 2018.

Notes Payable

Medium-term notes bear interest at a fixed rate of 7.38% and mature in 2096, with an optional redemption provision in the year 2026. The discount associated with these notes was $277.6 thousand at June 30, 2018.

Medium-term notes Series B bear interest at a fixed rate of 2.09% and mature in April 2019.

Commercial paper consists of notes issued in the short-term taxable market and is sold at a discount from par. The maturities of individual notes are issued in ranges from one day to no more than one year, and fall on average in a range of thirty to sixty days.

Certain lease agreements entered into by the university qualify as capital leases with obligations of $39.6 million and $41.1 million at June 2018 and 2017, respectively. The agreements call for the university to lease the buildings through 2032.

The university financed a wind energy project, Record Hill Wind, LLC, through a financing arrangement with the U.S. Department of Energy. The financing arrangement is non-recourse debt to the university and bears interest at rates ranging from 2.24% to 2.78%.

Scheduled maturities of the debt obligations, in thousands of dollars, are as follows:

2019	$	437,262
2020		7,044
2021		6,913
2022		6,927
2023		7,108
Thereafter		3,224,291

Certain CHEFA Series are subject to tender by bondholders. To the extent all bonds subject to tender could not be remarketed, $2.6 billion of bonds scheduled for maturity between 2029 and 2057 would be due when tendered.

Total interest expense incurred on indebtedness was $58.1 million and $57.6 million in 2018 and 2017, respectively. Interest capitalized to land, buildings and equipment totaled $4.1 million and $6.5 million in 2018 and 2017, respectively. Amortization expense related to bond issue costs included in operating expenses amounted to $1.0 million and $2.0 million in 2018 and 2017, respectively.

10. Retirement Plans – Defined Contribution

The university maintains defined contribution plans for faculty and certain staff employees. Participants may direct employee and employer contributions to the Teachers' Insurance and Annuity Association ("TIAA") and College Retirement Equities Fund ("CREF"), as well as other investment options. Retirement expense for this plan was $115.9 million and $109.2 million in 2018 and 2017, respectively.

11. Pension and Postretirement Plans – Defined Benefit

The university has a noncontributory, defined benefit pension plan for staff. The staff pension plan provides payments based on the employee's earnings and years of participation.

In addition, the university provides postretirement benefits including health benefits based on years of service, life insurance, and a pay-out of unused sick time. While the university's subsidy of the cost of comprehensive health care benefits differs among retiree groups, substantially all employees who meet minimum age and service requirements and retire from the university are eligible for these benefits. Non-faculty employees are paid 50% of unused sick time and receive life insurance benefits upon retirement from active status.

The university uses a June 30th measurement date for its defined benefit plans.

The following table sets forth the pension and postretirement plans' funded status that is reported in the consolidated statement of financial position at June 30, in thousands of dollars:

	Pension		Postretirement	
	2018	2017	2018	2017
Change in benefit obligation:				
Benefit obligation, beginning of year	$ 1,699,411	$ 1,659,645	$ 1,196,520	$ 1,214,141
Service cost, excluding assumed administrative expenses	60,804	61,937	49,398	54,064
Interest cost	66,797	64,794	46,567	47,262
Benefit payments	(74,401)	(45,190)	(28,946)	(26,348)
Assumption changes	(92,081)	(34,527)	(44,346)	(79,419)
Actuarial gain	(2,022)	(7,248)	(81,202)	(13,180)
Benefit obligation, end of year	$ 1,658,508	$ 1,699,411	$ 1,137,991	$ 1,196,520
Change in plan assets:				
Fair value, beginning of year	$ 1,329,042	$ 1,167,334	$ 463,027	$ 432,540
Actual return on plan assets	153,370	148,223	56,987	54,528
University contributions	81,844	61,175	3,934	3,413
Benefits and expenses paid	(77,073)	(47,690)	(30,157)	(27,454)
Fair value, end of year	$ 1,487,183	$ 1,329,042	$ 493,791	$ 463,027
Funded Status	$ (171,325)	$ (370,369)	$ (644,200)	$ (733,493)

Benefit Obligation

The benefit obligation represents the actuarial present value of future payments to plan participants for services rendered prior to that date, based on the pension benefit formula. In calculating the value, the participants' compensation levels are projected to retirement.

The accumulated benefit obligation differs from the benefit obligation above in that it does not consider assumptions about future compensation levels. It represents the actuarial present value of future payments to plan participants using current and past compensation levels. The accumulated benefit

obligation for the pension plan was $1,447.0 million at June 30, 2018 and $1,441.4 million June 30, 2017, respectively.

The staff pension plan was amended during fiscal year 2018 to offer participants who terminated prior to October 31, 2017, and had not yet commenced pension payments, an opportunity to take their benefit as a lump sum.

The post retirement plan benefit obligation was reduced in the amount of $66.2 million due to the change to the Medical Advantage Preferred Provider Organization for 2019. This amount is included as an actuarial gain.

Assumptions used in determining the year end obligation of the pension and postretirement plans are:

	2018	2017
Weighted-average discount rate - all plans except unused sick pay plan	4.30%	4.00%
Weighted-average discount rate - unused sick pay plan	4.00%	3.50%
Increase in future compensation levels	3.20%	3.28%
Projected health care cost trend rate (pre-65/post-65)	7.08% / 6.89%	7.30% / 6.48%
Ultimate trend rate (pre-65/post-65)	4.50% / 4.31%	4.50% / 4.27%
Year ultimate trend rate is achieved	2028	2028
Mortality	RP2014 Aggregate, Scale MP2014	RP2014 Aggregate, Scale MP2014

The health care cost trend rate assumption has a significant effect on the amounts reported. For the fiscal year ended June 30, 2018, a one percent change in the health care cost trend rate would affect 2018 as follows, in thousands of dollars:

	One percent Increase	One percent Decrease
Effect on 2018 postretirement service and interest cost	$ 23,500	$ (16,300)
Effect on postretirement benefit obligation at June 30, 2018	165,300	(120,700)

Changes in assumptions during the year resulted in a decrease to the pension benefit obligation and a decrease to the postretirement benefit obligation at June 30, 2018, as follows, in thousands of dollars:

	Pension	Postretirement	Total
Salary increase rates	$ (26,435)	$ (696)	$ (27,131)
Inflation	39	852	891
Discount rate	(82,240)	(66,645)	(148,885)
Demographic changes	16,555	22,143	38,698
	$ (92,081)	$ (44,346)	$ (136,427)

Net Periodic Benefit Cost

Net periodic benefit cost for the plans includes the following components, in thousands of dollars:

	Pension		Postretirement	
	2018	2017	2018	2017
Service cost	$ 60,804	$ 61,937	$ 49,398	$ 54,064
Administrative expenses	2,500	2,300	1,100	1,100
Interest cost	66,797	64,794	46,567	47,262
Expected return on plan assets	(103,010)	(93,258)	(33,930)	(32,440)
Net amortization:				
Prior service cost	3,343	3,572	50	50
Net loss	10,123	16,027	7,586	15,530
Net periodic benefit cost	$ 40,557	$ 55,372	$ 70,771	$ 85,566

The service cost component of net periodic benefit cost is included in employee benefits as a part of operating expenses in the consolidated statement of activities. The components of net periodic benefit cost, other than service cost, are included in other increases (decreases), which is reported as non-operating activity in the consolidated statement of activities.

Assumptions used in determining the net periodic benefit cost of the pension and postretirement plans are:

	2018	2017
Weighted-average discount rate	4.00%	4.00%
Expected long-term rate of return	7.75%	7.75%
Compensation increase	3.28%	3.75%
Health care cost increase (pre-65/post-65)	7.30% / 6.48%	6.75% / 6.45%
Ultimate trend rate (pre-65/post-65)	4.50% / 4.27%	5.00% / 5.00%
Year ultimate trend rate is achieved	2028	2024
Mortality	RP2014 Aggregate, Scale MP2014	RP2014 Aggregate, Scale MP2014

The funded status consists of the cumulative unfunded net periodic benefit cost and the cumulative change in funding status of defined benefit plans. The components of the change in funding status of defined benefit plans, which is reported in non-operating results, for the year ended June 30, in thousands of dollars, include:

2018	Pension	Postretirement	Total
Unrecognized net actuarial loss	$ (144,292)	$ (148,490)	$ (292,782)
Amortization of unrecognized obligation	(13,467)	(7,635)	(21,102)
	$ (157,759)	$ (156,125)	$ (313,884)

2017	Pension	Postretirement	Total
Unrecognized net actuarial loss	$ (96,540)	$ (114,681)	$ (211,221)
Amortization of unrecognized obligation	(19,598)	(15,580)	(35,178)
	$ (116,138)	$ (130,261)	$ (246,399)

The cumulative amounts of these adjustments reported as deductions to net assets in the consolidated statement of financial position at June 30, in thousands of dollars, include:

2018	Pension	Postretirement	Total
Unrecognized net actuarial loss	$ 117,508	$ 74,544	$ 192,052
Unrecognized prior service cost	17,387	22	17,409
	$ 134,895	$ 74,566	$ 209,461

2017	Pension	Postretirement	Total
Unrecognized net actuarial loss	$ 271,923	$ 230,620	$ 502,543
Unrecognized prior service cost	20,731	71	20,802
	$ 292,654	$ 230,691	$ 523,345

Amounts recorded as an adjustment at June 30, 2018 that are expected to be amortized into non-operating activity during fiscal year 2019, in thousands of dollars, include:

	Pension	Postretirement	Total
Net actuarial loss	$ -	$ -	$ -
Prior service cost	3,343	21	3,364
	$ 3,343	$ 21	$ 3,364

Actuarial gains or losses and prior service costs resulting from plan amendments are amortized over the average remaining years of service of active participants.

Plan Assets

The defined benefit plan assets are valued utilizing the same fair value hierarchy as the university's investments as described in Note 1d.

The following table summarizes the fair values of investments by major type held by the staff pension plan at June 30, in thousands of dollars:

	Level 1	Level 2	Level 3	2018	2017
Investments, at fair value:					
Cash and cash equivalents	$ 23,399	$ -	$ -	$ 23,399	$ 37,878
US government securities	116,965	-	-	116,965	104,423
Equity investments:					
Domestic	17,040	-	-	17,040	27,973
Foreign	6,151	40,646	-	46,797	47,182
Total equity investments	23,191	40,646	-	63,837	75,155
Limited partnerships:					
Natural resources	-	-	12,101	12,101	13,357
Total limited partnerships	-	-	12,101	12,101	13,357
Total leveled investments	$ 163,555	$ 40,646	$ 12,101	216,302	230,813
Investments at NAV				1,270,982	1,098,404
Total investments, at fair value				1,487,284	1,329,217
Liabilities associated with investments	$ 42	$ 59	$ -	101	175
Net investments, at fair value				$ 1,487,183	$ 1,329,042

The following table summarizes the fair values of investments by major type held by the retiree health plan at June 30, in thousands of dollars:

	Level 1	Level 2	Level 3	2018	2017
Investments, at fair value:					
Cash and cash equivalents	$ 14,066	$ -	$ -	$ 14,066	$ 29,646
US government securities	19,492	-	-	19,492	22,451
Equity investments:					
Domestic	8,203	-	-	8,203	5,451
Foreign	6,494	7,059	-	13,553	14,895
Total equity investments	14,697	7,059	-	21,756	20,346
Limited partnerships:					
Natural resources	-	-	1,008	1,008	2,792
Total limited partnerships	-	-	1,008	1,008	2,792
Total leveled investments	$ 48,255	$ 7,059	$ 1,008	56,322	75,235
Investments at NAV				443,352	399,531
Total investments, at fair value				499,674	474,766
Liabilities associated with investments	$ 3,530	$ 29	$ -	3,559	9,926
Net investments, at fair value				$ 496,115	$ 464,840

The table below represents the change in fair value measurements for Level 3 investments held by the staff pension plan and the retiree health plan for the plans' year ended June 30, 2018, in thousands of dollars:

	Pension	Retiree Health
Beginning balance	$ 13,357	$ 2,792
Unrealized gain	667	32
Purchases	1,317	-
Transfer out	(3,240)	(1,816)
Ending balance	$ 12,101	$ 1,008

The investment objective for the pension and retiree health plans seeks a positive long-term total return after inflation to meet the university's current and future plan obligations. Asset allocations for both plans combine tested theory and informed market judgment to balance investment risks with the need for high returns. Plan asset allocations by category at June 30 are as follows:

	Pension		Retiree Health	
	2018	2017	2018	2017
Absolute return	28.2%	27.1%	27.5%	24.8%
Domestic equity	7.9%	9.3%	7.6%	8.1%
Fixed income	7.8%	7.9%	3.9%	4.8%
Foreign equity	22.6%	23.0%	21.9%	20.2%
Leveraged buyouts	7.0%	7.1%	8.4%	8.8%
Venture capital	13.0%	9.9%	12.5%	10.2%
Real estate	6.4%	6.7%	10.4%	11.1%
Natural resources	6.0%	6.6%	5.5%	6.1%
Cash	1.1%	2.4%	2.3%	5.9%

The pension and retiree health long-term rate of return assumption is determined by adding expected inflation to expected long-term real returns of various asset classes, considering expected volatility and correlation between the returns of various asset classes.

Contributions

Annual contributions for the pension and retiree health plans are determined by the university considering calculations prepared by the plans' actuary as well as other factors. Expected contributions on an accrual basis to the pension plan and retiree health plan in fiscal 2019 are $60.0 million and $44.2 million, respectively.

Benefit Payments

The following estimated benefit payments, which reflect expected future service, are expected to be paid out of the plans, in thousands of dollars:

Fiscal year	Pension	Postretirement	Total
2019	$ 57,787	$ 32,815	$ 90,602
2020	61,596	34,134	95,730
2021	65,583	38,580	104,163
2022	69,862	42,281	112,143
2023	74,047	47,017	121,064
2024-2028	435,609	283,960	719,569
	$ 764,484	$ 478,787	$ 1,243,271

12. Net Assets

The university's net assets as of June 30, in thousands of dollars, includes:

	2018	2017
With Donor Restrictions:		
Donor-restricted endowments, perpetual in nature	$ 3,981,513	$ 3,858,255
Student loans, perpetual in nature	45,622	42,996
Donor-restricted endowments, subject to spending policy and appropriation	20,392,002	18,917,850
Board designated endowment, subject to spending policy and appropriation	255,412	295,130
Unexpended gift balances	1,055,642	1,038,592
Total net assets with donor restrictions	25,730,191	24,152,823
Without Donor Restrictions:		
Board designated endowment, subject to spending policy and appropriation	4,722,139	4,104,806
Undesignated	1,091,442	468,327
Non-controlling interest	713,343	260,202
Total net assets without donor restrictions	6,526,924	4,833,335
Total net assets	$ 32,257,115	$ 28,986,158

Yale's endowment consists of approximately 7,700 funds established for a variety of purposes.

The endowment includes both donor-restricted endowment funds and funds designated by the Corporation to function as endowments. The university endowment fund composition by fund type as of June 30, in thousands of dollars, includes:

2018	Without Donor Restrictions	With Donor Restrictions	Total
Donor-restricted endowment	$ -	$ 24,373,515	$ 24,373,515
Board-designated endowment	4,722,139	255,412	4,977,551
	$ 4,722,139	$ 24,628,927	$ 29,351,066

2017	Without Donor Restrictions	With Donor Restrictions	Total
Donor-restricted endowment	$ -	$ 22,776,105	$ 22,776,105
Board-designated endowment	4,104,806	295,130	4,399,936
	$ 4,104,806	$ 23,071,235	$ 27,176,041

Changes in endowment net assets for the fiscal year ended June 30, in thousands of dollars, were:

2018	Without Donor Restrictions	With Donor Restrictions	Total
Endowment net assets, beginning of year	$ 4,104,806	$ 23,071,235	$ 27,176,041
Investment return:			
Investment income	53,608	334,046	387,654
Net appreciation	585,332	2,304,924	2,890,256
Total investment return	638,940	2,638,970	3,277,910
Contributions	7,588	130,452	138,040
Allocation of endowment spending	(163,542)	(1,118,282)	(1,281,824)
Other increases (decreases)	134,347	(93,448)	40,899
Endowment net assets, end of year	$ 4,722,139	$ 24,628,927	$ 29,351,066

2017	Without Donor Restrictions	With Donor Restrictions	Total
Endowment net assets, beginning of year	$ 3,821,817	$ 21,588,429	$ 25,410,246
Investment return:			
Investment income	54,848	278,597	333,445
Net appreciation	401,352	2,012,932	2,414,284
Total investment return	456,200	2,291,529	2,747,729
Contributions	16	204,233	204,249
Allocation of endowment spending	(203,358)	(1,023,472)	(1,226,830)
Other increases	30,131	10,516	40,647
Endowment net assets, end of year	$ 4,104,806	$ 23,071,235	$ 27,176,041

13. Functional and Natural Classification of Expenses

The financial statements report certain categories of expenses that are attributable to one or more program or supporting functions of the university. Expenses reported by functional categories include allocations of costs for operation and maintenance of plant, interest on indebtedness and depreciation and amortization expense. The university applies various methods to allocate costs among the program and support functions, the most significant of which is by the amount of building space utilized.

Operating and non-operating expenses by functional and natural classification for the year ended June 30, in thousands of dollars, were as follows:

	Programmatic support	Patient care and other related services	Administration and other institutional support	2018
Salaries and wages	$ 1,081,891	$ 534,266	$ 129,165	$ 1,745,322
Employee benefits	378,260	154,880	47,810	580,950
Depreciation, amortization and interest	297,047	12,317	23,841	333,205
Other operating expenditures	793,946	146,767	57,678	998,391
Total operating expenses	2,551,144	848,230	258,494	3,657,868
Non-operating expenses	39,573	1,338	1,123	42,034
	$ 2,590,717	$ 849,568	$ 259,617	$ 3,699,902

Operating expenses by functional categories for the year ended June 30, 2017 were: instruction and departmental research ($941.2 million), patient care and other related services ($853.0 million), organized research ($564.8 million), student services ($410.5 million), libraries and other academic support ($318.2 million), administration and other institutional support ($250.0 million), and public services ($142.8 million). In connection with the implementation of a new enterprise reporting system in 2018, functional expenses were presented in new categories. Further, 2018 and 2017 functional expenses are not comparable as a result of a change in reporting methodology. It is not practicable to present 2017 functional expenses using the 2018 categories.

14. Commitments and Contingencies

The university is involved in various legal actions arising in the normal course of activities and is also subject to periodic audits and inquiries by various regulatory agencies. Although the ultimate outcome is not determinable at this time, management, after taking into consideration advice of legal counsel, believes that the resolution of these pending matters should not have a material adverse effect upon the university's financial position.

The Tax Cuts and Jobs Act (the “Act”) was enacted on December 22, 2017. The Act impacts the university in several ways, including new excise taxes on executive compensation and net investment income, as well as new rules for calculating unrelated business taxable income. The overall impact of the Act remains uncertain and the full impact of the Act will not be known until further regulatory guidance is provided to assist the university with calculating tax liabilities.

Minimum lease commitments at June 30, 2018, under agreements to lease space, in thousands of dollars, are as follows:

		Operating Lease Payments		Capital Lease Payments
2019	$	11,794	$	7,696
2020		11,185		7,811
2021		9,262		7,929
2022		8,432		8,048
2023		8,121		8,168
Thereafter		72,186		78,461
		120,980		118,113
Executory costs		-		(58,832)
Interest on capital leases		-		(19,658)
	$	120,980	$	39,623

The university has outstanding commitments on contracts to construct campus facilities in the amount of $404.1 million at June 30, 2018. Funding for these projects is expected to come from capital replacement reserves, gifts, and debt.

15. Subsequent Events

Management has evaluated subsequent events for the period after June 30, 2018, through October 22, 2018, the date the consolidated financial statements were issued.

The President and Fellows of Yale University

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Peter Salovey, A.B., A.M., Ph.D.

Fellows
His Excellency the Governor of Connecticut, *ex officio*

Her Honor the Lieutenant Governor of Connecticut, *ex officio*

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Wayland, Massachusetts

Charles Waterhouse Goodyear IV, B.S., M.B.A.
New Orleans, Louisiana

Catharine Bond Hill, B.A., B.A., M.A., PH.D.
New York, New York

Paul Lewis Joskow, B.A., Ph.D.
New York, New York

William Earl Kennard, B.A., J.D.
Charleston, South Carolina

Gina Marie Raimondo, A.B., D.Phil., J.D.
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Joshua Linder Steiner, B.A., M.St.
New York, New York

David Li Ming Sze, B.A., M.B.A.
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Annette Thomas, S.B., Ph.D.
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Kathleen Elizabeth Walsh, B.A., M.P.H.
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Douglas Alexander Warner III, B.A.
Hobe Sound, Florida

Michael James Warren, B.A., P.P.E.
Washington, D.C.

Lei Zhang, B.A., M.A., M.B.A.
Hong Kong, China

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Senior Vice President for Operations
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Senior Vice President for Institutional Affairs and General Counsel
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Vice President for Human Resources and Administration
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Vice President for Alumni Affairs and Development
Joan Elizabeth O'Neill, B.A.

Vice President for West Campus Planning and Program Development
Scott Allan Strobel, B.A., Ph.D.

The Yale Science Building project is a major construction project, scheduled to be completed in the fall of 2019, that will provide new research and teaching space on Science Hill. The project includes demolition of the J.W. Gibbs Laboratory and replacement of it with a new laboratory building. In addition to the new building, the project will renovate program space beneath the Science Hill Plaza and provide a new Plaza Pavilion which will act as a central social and gathering space on Science Hill.

Construction of the Yale Science Building as of September 2018, photographed by Joseph Wolenski.

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