PPG INDUSTRIES INC
Form 10-K/A
June 28, 2018

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549
FORM 10-K/A
Amendment No. 1
Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934
For the fiscal year ended December 31, 2017
Commission File Number 1-1687

PPG INDUSTRIES, INC.
(Exact name of registrant as specified in its charter)

Pennsylvania	25-0730780
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
One PPG Place, Pittsburgh, Pennsylvania	15272
(Address of principal executive offices)	(Zip code)
Registrant’s telephone number, including area code:	412-434-3131

Securities Registered Pursuant to Section 12(b) of the Act:

Title of each class	Name of each exchange on which registered
Common Stock – Par Value $1.66 $^{2}/_{3}$	New York Stock Exchange
0.000% Notes due 2019	New York Stock Exchange
0.875% Notes due 2022	New York Stock Exchange
0.875% Notes due 2025	New York Stock Exchange
1.400% Notes due 2027	New York Stock Exchange

Securities Registered Pursuant to Section 12(g) of the Act: None

Indicate by check mark if the Registrant is a well-known seasoned issuer as defined in Rule 405 of the Securities Act. YES x NO ¨

Indicate by check mark if the Registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. YES ¨ NO x

Indicate by check mark whether the Registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months, and (2) has been subject to such filing requirements for the past 90 days. YES x NO ¨

Indicate by checkmark whether the registrant has submitted electronically and posted on its corporate web site, if any, every Interactive Date File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). YES x NO ¨

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of Registrant’s knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K/A or any amendment to this Form 10-K/A. x

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of “large accelerated filer,” “accelerated filer,” “smaller reporting company,” and “emerging growth company” in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer x Accelerated filer ¨

Non-accelerated filer ¨	Smaller reporting company ¨
(Do not check if a smaller reporting company)	Emerging growth company ¨

If an emerging growth company, indicate by check mark if the Registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ¨

Indicate by check mark whether the Registrant is a shell company (as defined by Rule 12b-2 of the Act). YES o NO x

The aggregate market value of common stock held by non-affiliates as of June 30, 2017, was $28,173 million.

As of January 31, 2018, 249,880,613 shares of the Registrant's common stock, with a par value of $1.66 $^{2}/_{3}$ per share, were outstanding. As of that date, the aggregate market value of common stock held by non-affiliates was $29,638 million.

DOCUMENTS INCORPORATED BY REFERENCE

Document	Incorporated By Reference In Part No.
Portions of PPG Industries, Inc. Proxy Statement for its 2018 Annual Meeting of Shareholders	III

PPG INDUSTRIES, INC.
AND CONSOLIDATED SUBSIDIARIES

As used in this report, the terms “PPG,” “Company,” “Registrant,” “we,” “us” and “our” refer to PPG Industries, Inc., and its subsidiaries, taken as a whole, unless the context indicates otherwise.

EXPLANATORY NOTE

PPG is filing this Amendment No. 1 (this “Form 10-K/A”) to amend our Annual Report on Form 10-K for the year ended December 31, 2017 filed with the Securities and Exchange Commission (the “SEC”) on February 15, 2018 (the “Original Filing”) to restate our audited consolidated financial statements for the years ended December 31, 2017 and 2016 and to amend related disclosures, including those regarding our disclosure controls and procedures. We have also restated certain unaudited quarterly results related to the quarters ended December 31, 2016, March 31, 2017, June 30, 2017, September 30, 2017 and December 31, 2017. This Form 10-K/A also amends certain other items in the Original Filing, as listed in “Items Amended in this Filing” below.

Background of the Restatement

On April 16, 2018, we received a report through our internal reporting system alleging violations of our accounting policies and procedures regarding the failure to accrue certain specified expenses in the first quarter of 2018. Based on our initial review at that time, we identified approximately $1.4 million of expenses (including legal fees, property taxes and performance-based compensation) that should have been accrued in the first quarter of 2018 and that were then reflected in our earnings for the quarter ended March 31, 2018, released on April 19, 2018. In addition, the report alleged that there may have been other unspecified expenses, potentially up to $5 million in the aggregate, that were improperly not accrued in the first quarter.

The Audit Committee of the Board of Directors (the “Audit Committee”) oversaw an investigation of the matters set forth in the internal report with the assistance of outside counsel and forensic accountants. The investigation identified the following items with respect to the quarter ended March 31, 2018, in addition to the approximately $1.4 million of expenses described above: (1) failure to record amortization expense in the amount of $1.4 million to correct for amortization of an intangible asset that was inadvertently not recorded over a three-year period and discovered in March 2018; (2) understatement of a health insurance accrued liability in the amount of $0.5 million; and (3) failure to record an adjustment increasing the value of inventory in our Europe, Middle East and Africa region in the amount of $2.2 million due to inflation of raw materials costs which, when corrected, had a positive effect on income in the first quarter of 2018. These three items resulted in a net increase to income from continuing operations before income taxes of approximately $0.3 million.

The investigation also identified certain inadvertent errors with respect to the quarter ended March 31, 2018. Correction of such inadvertent errors, together with the matters discussed in the immediately preceding paragraph, resulted in a net decrease in income from continuing operations before income taxes of $5.7 million for the quarter ended March 31, 2018. The correction of these inadvertent errors also resulted in a net decrease in income from continuing operations before income taxes of $2.3 million for the year ended December 31, 2017.

The investigation identified the following items with respect to the year ended December 31, 2017: (1) improper reclassifications of gains from income from discontinued operations to income from continuing operations in total pre-tax amounts of $2.5 million in the quarter ended June 30, 2017 and $4.7 million in the quarter ended December 31, 2017; (2) improper shifting of pre-tax expenses between quarterly periods in 2017, including a total of $3.5 million in compensation expense recorded in the third and fourth quarters of 2017 that should have been recorded in the quarter ended June 30, 2017; an additional expense accrual for health care claims in the amount of $3.5 million recorded in the third quarter of 2017 that should have been recorded in the quarter ended June 30, 2017; additional expense for paid vacation in the amount of $2.2 million recorded in the quarter ended December 31, 2017 that should have been recorded in the second and third quarters of 2017; and additional pension expense in the amount of $1.0 million recorded in the fourth quarter of 2017 that should have been recorded in the quarter ended September 30, 2017.

On May 10, 2018, management, in consultation with the Audit Committee and our independent registered public accounting firm, PricewaterhouseCoopers LLP (“PwC”), concluded that our consolidated financial statements for the year ended December 31, 2017 included in the Original Filing and the related report of PwC, and for the quarterly and year-to-date periods in 2017, should no longer be relied upon because of certain misstatements contained in those financial statements.

The investigation identified the following items with respect to the year ended December 31, 2016: (1) improper classification in the consolidated statement of income of the release of a reserve related to the Company’s 2015 business restructuring program in the amount of $3.4 million and (2) an improper reduction in the payout assumption for certain performance-based restricted stock units that had the impact of recognizing a $6.8 million reduction in stock based compensation expense in the fourth quarter of 2016. In the first quarter of 2017, the payout assumption for these same performance-based restricted stock units was increased, resulting in $6.8 million of stock-based compensation expense in the first quarter of 2017 that would not have been recorded if the payout assumption had not been reduced in the fourth quarter of 2016.

On June 27, 2018, management, in consultation with the Audit Committee and PwC, concluded that our consolidated financial statements for the year ended December 31, 2016 included in the Original Filing and the related report of PwC, and for the final quarterly and year-to-date period in 2016, should no longer be relied upon because of certain misstatements contained in those financial statements.

On June 27, 2018, the Audit Committee determined that its investigation was complete, and authorized the filing of our restated audited consolidated financial statements for the years ended December 31, 2017 and 2016 and certain quarterly periods within those fiscal years in order to correct our previously issued financial statements.

Impact of the Restatement

Annual

As a result of the restatement, reported net income from continuing operations was decreased by $2 million, or $0.01 per diluted share, and income from discontinued operations, net of tax, was increased by $5 million, or $0.02 per diluted share, for the year ended December 31, 2017. Reported net income from continuing operations decreased by $4 million, or $0.01 per diluted share, and there was no impact to income from discontinued operations, net of tax, for the year ended December 31, 2016.

Quarterly

As a result of the restatement, reported net income from continuing operations and earnings per diluted share from continuing operations and income from discontinued operations, net of tax, and earnings per diluted share from discontinued operations were adjusted for the appropriate quarterly periods within 2016 and 2017 as follows:

- For the quarter ended December 31, 2016, net income from continuing operations decreased $4 million, or $0.01 per diluted share, and there was no impact to income from discontinued operations, net of tax.
- For the quarter ended March 31, 2017, net income from continuing operations increased $3 million, or $0.01 per diluted share, and there was no impact to income from discontinued operations, net of tax.
- For the quarter ended June 30, 2017, net income from continuing operations decreased $7 million, or $0.03 per diluted share, and income from discontinued operations, net of tax, increased by $2 million, or $0.01 per diluted share; and for the six months ended June 30, 2017, net income from continuing operations decreased $4 million, or $0.02 per diluted share and income from discontinued operations, net of tax, increased by $2 million, or $0.01 per diluted share.
- For the quarter ended September 30, 2017, net income from continuing operations increased $1 million, or zero cents per diluted share, and there was no impact to income from discontinued operations, net of tax; and for the nine months ended September 30, 2017, net income from continuing operations decreased $3 million, or $0.01 per diluted share, and income from discontinued operations, net of tax, increased by $2 million, or $0.01 per diluted share.
- For the quarter ended December 31, 2017, net income from continuing operations increased $1 million, or zero cents per diluted share, and income from discontinued operations, net of tax, increased by $3 million, or $0.01 per diluted share.

Internal Control Over Financial Reporting and Disclosure Controls and Procedures

Management has concluded that a material weakness existed in the Company’s internal control over financial reporting as of December 31, 2017 because the Company did not maintain effective controls within its financial close process. Specifically, the Company’s former Vice President and Controller directed his subordinates to improperly override the Company’s internal controls during the Company’s financial close process, which directions were followed and not disclosed to others in senior management, the Audit Committee or the Company’s independent registered public accounting firm and not otherwise detected by the Company’s internal controls. These actions often occurred after the end of a quarter and close to the end of the financial close process for the quarter and had the effect of positively impacting income from continuing operations reported for such quarter. This material weakness resulted in misstatements in the Company’s annual financial statements that were not prevented or detected on a timely basis and led to the restatement described above. Based on this evaluation, management has concluded that, as of December 31, 2017, the Company’s internal control over financial reporting was ineffective. Accordingly, management has restated its report on internal control over financial reporting. For more information, refer to Item 8. “Financial Statements and Supplementary Data—Management Report.”

In connection with the restatement described above, the Company's principal executive officer and principal financial officer re-evaluated the effectiveness of our disclosure controls and procedures and have concluded that PPG's disclosure controls

and procedures were not effective. For more information, refer to Item 9A. "Controls and Procedures—Evaluation of disclosure controls and procedures" and "Prior period disclosure controls and procedures and internal control over financial reporting" of this Form 10-K/A. In connection with the investigation described in this Explanatory Note, the Company has identified and implemented, and continues to identify and implement, actions to improve the effectiveness of its internal control over financial reporting and disclosure controls and procedures, including plans to enhance the Company's resources and training with respect to financial reporting and disclosure responsibilities. For more information, refer to Item 9A. "Controls and Procedures—Remediation of material weakness" of this Form 10-K/A. Additionally, in connection with the restatement described above, the Company's principal executive and principal financial officers have reassessed the effectiveness of the Company's internal control over financial reporting as of December 31, 2016 and, due to the existence of the material weakness in internal control over financial reporting discussed under Item 8. "Financial Statements and Supplementary Data—Management Report" have determined that the Company's internal control over financial reporting was not effective as of such date. For more information, refer to Item 9A. "Controls and Procedures." Prior period disclosure controls and procedures and internal control over financial reporting" of this Form 10-K/A. Also, in connection with the restatement described above, the Company's principal executive officer and principal financial officer reevaluated the effectiveness of our disclosure controls and procedures and have concluded that PPG's disclosure controls and procedures were not effective as of December 31, 2016. For more information, refer to Item 9A. "Controls and Procedures—Prior period disclosure controls and procedures and internal control over financial reporting"
of this Form 10-K/A.

More Information

Note 2 titled "Restatement of Previously Reported Consolidated Annual Financial Statements" to the Company's consolidated financial statements discloses the nature of the restatement matters and adjustments and shows the effect of the restatement matters on the Company's consolidated financial statements for 2017 and 2016. Note 19 titled "Summary Quarterly Information (Unaudited)" to the Company's consolidated financial statements discloses the nature of the restatement matters and adjustments and shows the effect of the restatement matters on the Company's restated condensed consolidated financial statements and notes (unaudited) for the interim periods ended December 31, 2016, March 31, 2017, June 30, 2017, September 30, 2017 and December 31, 2017.

Items Amended in this Filing

For the convenience of the reader, this Form 10-K/A sets forth the Original Filing, in its entirety, as amended to reflect the restatement. No attempt has been made in this Form 10-K/A to update other disclosures presented in the Original Filing, except as required to reflect the effects of the restatement. The following items have been amended as a result of the restatement:

Financial Highlights
Part I, Item 1 - Business
Part I, Item 1 - Forward-Looking Statements
Part I, Item 1A - Risk Factors
Part I, Item 3 - Legal Proceedings
Part II, Item 6 - Selected Financial Data
Part II, Item 7 - Management's Discussion and Analysis of Financial Condition and Results of Operations
Part II, Item 8 - Financial Statements and Supplementary Data
Part II, Item 9A - Controls and Procedures
Part IV, Item 15 - Exhibits, Financial Statement Schedules

The Company's Principal Executive Officer and Principal Financial Officer are providing currently dated certifications in connection with this Form 10-K/A. These certifications are filed as Exhibits 31.1, 31.2, 32.1 and 32.2.

PPG INDUSTRIES, INC.
AND CONSOLIDATED SUBSIDIARIES

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Note on Incorporation by Reference
Throughout this report, various information and data are incorporated by reference from the Company’s 2017 Annual Report (hereinafter referred to as “the Annual Report”). Any reference in this report to disclosures in the Annual Report shall constitute incorporation by reference only of that specific information and data into this Form 10-K/A.

FINANCIAL HIGHLIGHTS (As Restated)

Below are our key financial results from continuing operations for the fiscal year ended December 31, 2017:

- Net sales were $14.7 billion, up 3% from the prior year, driven primarily by higher sales volumes and acquisition-related sales.
- Cost of sales, exclusive of depreciation and amortization increased 7% to $8.2 billion, driven primarily by raw material cost inflation, higher sales volumes and higher cost of sales from acquired businesses.
- Selling, general and administrative expenses of $3.6 billion were slightly lower compared to the prior year.
- Income before income taxes was $2,005 million, up $1.2 billion year-over-year, due to the absence of pension settlement charges related to the purchase of group annuity contracts and a business restructuring charge.
- Net income from continuing operations was $1,369 million and earnings per diluted share was $5.31.
- Adjusted net income from continuing operations was $1,511 million and adjusted earnings per diluted share was $5.86.
- Cash and short-term investments were approximately $1.5 billion at year-end.
- Cash from operating activities - continuing operations was $1,551 million.
- Capital expenditures for modernization, productivity and regulatory improvements was $360 million.
- Cash used for business acquisitions (net of cash acquired), was $325 million.
- The Company raised the per-share dividend by 13%, paid approximately $434 million in dividends and also repurchased $813 million of its outstanding common stock.
- The Company expects to deploy at least $3.5 billion for acquisitions and share repurchases during 2017 and 2018 combined, with $1.1 billion deployed in 2017.
- The 2017 effective tax rate was 30.7%, which includes a $134 million net charge related to the enactment of the U.S. Tax Cuts and Jobs Act. This net charge is $37 million higher than the net charge included in PPG’s fourth quarter earnings release and Form 8-K furnished on January 18, 2018, primarily due to new IRS regulations issued and refinements of the Company’s estimates. While the Company has made a preliminary assessment of the new legislation’s impact on PPG, U.S. regulatory agencies will be issuing further regulations and clarifying interpretations over 2018 which could alter the Company’s conclusions regarding the impact of the new law. Further, PPG may continue to refine its estimates to incorporate new or better information as it comes available. The Company’s adjusted effective tax rate was 24.3%.

For further information and a full discussion and analysis of business performance for the years ended December 31, 2017, 2016, and 2015 and a reconciliation of non-GAAP financial measures, see Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations” of this Form 10-K/A.

Part I

Item 1. Business

PPG Industries, Inc., manufactures and distributes a broad range of paints, coatings and specialty materials. PPG was incorporated in Pennsylvania in 1883. PPG’s vision is to be the world’s leading coatings company by consistently delivering high-quality, innovative and sustainable solutions that customers trust to protect and beautify their products and surroundings. PPG’s business is comprised of two reportable business segments: Performance Coatings and Industrial Coatings.

In September 2017, PPG completed the sale of its North American fiber glass business, which represents the culmination of a multi-year strategic shift in the Company's business portfolio, resulting in the exit of all glass operations. Accordingly, all historical information has been recast to present the Glass segment as discontinued operations and assets held for sale. Refer to Note 3, “Acquisitions and Divestitures” under Item 8 of this Form 10-K/A for further information relating to this transaction.

Performance Coatings and Industrial Coatings

PPG is a major global supplier of coatings. The Performance Coatings and Industrial Coatings reportable business segments supply coatings and specialty materials to customers in a wide array of end-use markets, including industrial equipment and components, packaging material; aircraft and marine equipment; automotive original equipment (“automotive OEM”); automotive refinish; as well as for other industrial and consumer products. PPG also serves commercial and residential new build and maintenance markets by supplying coatings to painting and maintenance contractors and directly to consumers for decoration and maintenance. The coatings industry is highly competitive and consists of several large firms with global presence and many smaller firms serving local or regional markets. PPG competes in its primary markets with the world's largest coatings companies, most of which have global operations, and many smaller regional coatings companies.

PERFORMANCE COATINGS

Strategic Business Unit	Products	Primary End-use Markets	Main Distribution Methods	Brands
Refinish Coatings	Coatings, solvents, adhesives, sundries, software	Automotive and commercial transport/fleet repair and refurbishing, light industrial coatings and specialty coatings for signs.	Independent distributors and direct to customers	PPG®
Aerospace Coatings	Coatings, sealants, transparencies, transparent armor, packaging and chemical management services for the aerospace industry	Commercial, military, regional jet and general aviation aircraft	Direct to customers and company-owned distribution network	PPG®
Protective and Marine Coatings	Coatings and finishes for the protection of metals and structures	Metal fabricators, heavy duty maintenance contractors and manufacturers of ships, bridges and rail cars	Company-owned architectural coatings stores, independent distributors, concessionaires and direct to customers	PPG®
Architectural Coatings Americas and Asia Pacific	Coatings and purchased sundries	Painting and maintenance contractors and consumers for decoration and maintenance of residential and commercial building structures	Company-owned stores, home centers and other regional or national consumer retail outlets, paint dealers, concessionaires, independent distributors and direct to customers	PPG®, GLIDDEN®, COMEX®, OLYMPIC®, DULUX® (in Canada), SIKKENS®, PPG PITTSBURGH PAINTS®, MULCO®, FLOOD®, LIQUID NAILS®, SICO®, CIL®, RENNER®, TAUBMANS®, WHITE KNIGHT®, BRISTOL®, HOMAX® among others.
Architectural Coatings Europe, Middle East and Africa (EMEA)				SIGMA®, HISTOR®, SEIGNEURIE®, GUITTET®, PEINTURES GAUTHIER®, RIPOLIN®, JOHNSTONE'S®, LEYLAND®, PRIMALEX®, DEKORAL®, TRILAK®, PROMINENT PAINTS®, GORI®, BONDEX®, and DANKE!® among others.

Major Competitive Factors	Product performance, technology, quality, technical and customer service, price, customer productivity, distribution, and brand recognition
Global Competitors	Akzo Nobel N.V., Axalta Coating Systems Ltd., BASF Corporation, Benjamin Moore, Hempel A/S, the Jotun Group, Masco Corporation, Materis Paints, Nippon Paint; RPM International

	Inc, the Sherwin-Williams Company and Tikkurila Oyj
Average Number of Employees in 2017	28,200
Principal Manufacturing and Distribution Facilities	Amsterdam, Netherlands; Birstall, United Kingdom; Budapest, Hungary; Clayton, Australia; Delaware, Ohio; Dover, Del.; Gonfreville, France; Huntsville, Ala.; Huron, Ohio; Kunshan, China; Little Rock, Ark.; Mexico City, Mexico; Milan, Italy; Mojave, Calif.; Moreuil, France; Shildon, United Kingdom; Sylmar, Calif.; Soborg, Denmark; Stowmarket, United Kingdom; Tepexpan, Mexico and Wroclaw, Poland.

INDUSTRIAL COATINGS

Strategic Business Unit	Products	Primary End-use Markets	Main Distribution Methods	Brands
Automotive OEM Coatings	Specifically formulated coatings, adhesives and sealants and metal pretreaments	Automotive original equipment manufacturer (OEM)	Direct to manufacturing companies and various coatings applicators	PPG®
Industrial Coatings		Appliances, agricultural and construction equipment, consumer electronics, automotive parts and accessories, building products (including residential and commercial construction), transportation vehicles and numerous other finished products.		PPG®
Packaging Coatings	Specifically formulated coatings	Widely used for the protection, performance and decoration of metal cans, closures, plastic tubes, industrial packaging, and promotional and specialty packaging.		PPG®
Specialty Coatings and Materials	Amorphous precipitated silicas, TESLIN® substrate, Organic Light Emitting Diode (OLED) materials, optical lens materials and photochromic dyes	SILICA - Tire, battery separator and other end-use markets; TESLIN - used in applications such as radio frequency identification (RFID) tags and labels, e-passports, drivers' licenses and identification cards; OLED - for use in displays and lighting; Lens materials - for optical lenses and color-change products.		PPG®
Coatings Services[(a)]	Services and coatings application	On-site coatings services within several customer manufacturing locations as well as at regional service centers. Customers ship parts to service centers where they are treated to enhance paint adhesion and painted with electrocoat, powder or liquid coatings. Coated parts are then shipped to the customer's next stage of assembly.	On site at customer locations or at our company-owned service centers	PPG®

(a) Effective January 1, 2018, the coating services business unit has been merged into the industrial coatings business unit to achieve operational efficiencies and to realign management teams and operations to better deliver our total value proposition and provide optimal solutions to our customers.

Technology / Alliances	PPG's automotive OEM coatings business was the first to introduce breakthrough automotive coating technologies such as cathodic electrocoat, powder clearcoat, compact paint systems and factory-applied spray-in bedliners, and the Company has a continued focus on innovation leadership. PPG has established alliances with Kansai Paints to serve Japanese-based automotive OEM customers in North America and Europe and Asian Paints Ltd. to serve certain aftermarket customers and automotive OEM customers in India.
Major Competitive Factors	Product performance, technology, quality, technical and customer service, price, customer productivity and distribution.
Global Competitors	Akzo Nobel N.V., Axalta Coating Systems Ltd., BASF Corporation, Kansai Paints, Nippon Paint and the Sherwin-Williams Company
2017 Strategic Acquisitions	The Crown Group (Crown) - Refer to Note 3, "Acquisitions and Divestitures" under Item 8 of this Form 10-K/A for more information.
Average Number of Employees in 2017	14,800

Principal Manufacturing and Distribution Facilities	Barberton, Ohio; Busan, South Korea; Cieszyn, Poland; Cleveland, Ohio; Lake Charles, La.; Oak Creek, Wis.; Quattordio, Italy; San Juan del Rio, Mexico; Sumaré, Brazil; Tianjin, China, and Zhangjiagang, China

Research and Development

($ in millions)	2017	2016	2015
Research and development costs, including depreciation of research facilities	$474	$479	$484
% of annual net sales	3.2 %	3.4 %	3.4 %

Technology innovation has been a hallmark of PPG's success throughout its history. The Company seeks to optimize its investment in research and development to create new products to drive profitable growth. We align our product development with the macro trends in the end-use markets we serve and leverage core technology platforms to develop products for unmet market needs. Our history of successful technology introductions is based on a commitment to an efficient and effective innovation process and disciplined portfolio management. We have obtained government funding for a small portion of the Company's research efforts, and we will continue to pursue government funding where appropriate.

PPG owns and operates several facilities to conduct research and development for new and improved products and processes. In addition to the Company's centralized principal research and development centers (See Item 2. "Properties" of this Form 10-K/A), operating segments manage their development through centers of excellence. As part of our ongoing efforts to manage our formulations and raw material costs effectively, we operate a global competitive sourcing laboratory in China. Because of the Company's broad array of products and customers, PPG is not materially dependent upon any single technology platform.

Raw Materials and Energy

The effective management of raw materials and energy is important to PPG's continued success. The Company's most significant raw materials are epoxy and other resins, titanium dioxide and other pigments, and solvents in the coatings businesses and sand and soda ash for the specialty coatings and materials business. Coatings raw materials, which include both organic, primarily petroleum based, materials and inorganic materials, including titanium dioxide, comprise between 70% and 80% of the Company's cost of sales, excluding depreciation and amortization, in most coatings formulations and represent PPG's single largest production cost component.

Most of the raw materials and energy used in production are purchased from outside sources, and the Company has made, and plans to continue to make, supply arrangements to meet the planned operating requirements for the future. Supply of critical raw materials and energy is managed by establishing contracts, multiple sources, and identifying alternative materials or technology whenever possible. Our products use both petroleum-derived and bio-based materials as part of a product renewal strategy. While prices for these raw materials typically fluctuate with energy prices, such fluctuations are impacted by the fact that the manufacture of our raw materials is several steps downstream from crude oil and natural gas.

The Company is continuing its aggressive sourcing initiatives to broaden our supply of high quality raw materials. These initiatives include qualifying multiple and local sources of supply, including suppliers from Asia and other lower cost regions of the world, adding on-site resin production at certain manufacturing locations and a reduction in the amount of titanium dioxide used in our product formulations.

Our global efforts to reduce titanium dioxide consumption have been successful to date and are expected to continue. Titanium dioxide is a raw material widely used in the paint and coatings industry as a pigment to provide hiding, durability and whiteness characteristics. PPG purchases both sulfate-grade and chloride-grade titanium dioxide from suppliers for use in coatings formulations. The Company has undertaken a strategic initiative to secure and enhance PPG's supply of titanium dioxide, as well as to minimize PPG's use of this raw material. PPG possesses intellectual property and expertise in the production and finishing of titanium dioxide pigment. PPG intends to continue to leverage this technology and intends to develop innovative supply solutions through technical collaborations, joint ventures and licensing arrangements with other interested parties.

We are subject to existing and evolving standards relating to the registration of chemicals which could potentially impact the availability and viability of some of the raw materials we use in our production processes. Our ongoing global product stewardship efforts are directed at maintaining our compliance with these standards.

Changes to chemical registration regulations have been proposed or implemented in the EU and many other countries, including China, Canada, the United States (U.S.), and Korea. Because implementation of many of these programs has not been finalized, the financial impact cannot be estimated at this time. We anticipate that the number of chemical registration regulations will continue to increase globally, and we have implemented programs to track and comply

with these regulations.
Given the recent volatility in certain energy-based input costs and foreign currencies, the Company is not able to predict with certainty the 2018 full year impact of related changes in raw material pricing; however, PPG currently expects overall coatings raw material costs to increase a mid-single-digit percentage in the first half of 2018, with impacts varied by region and commodity. Further, given the distribution nature of many of our businesses, logistics and distribution costs are sizable, as are wages and benefits but to a lesser degree. PPG typically experiences fluctuating prices for energy and raw materials

driven by various factors, including changes in supplier feedstock costs and inventories, global industry activity levels, foreign currency exchange rates, government regulation, and global supply and demand factors. In aggregate, average raw material cost inflation rose by a mid-single-digit percentage in 2017 versus 2016, driven mostly by supply related factors including an unusually high number of supplier force majeure events in Europe, Chinese environmental regulation enforcement and severe hurricanes in the U.S. In addition, oil prices moved much higher in the second half of 2017 also contributing to raw material inflation.

Patents

($ in millions)	2017	2016	2015
Revenue earned from royalties and the sale of technical know-how	$11	$12	$15

PPG considers patent protection to be important; however, the Company's operating segments are not materially dependent upon any single patent or group of related patents.

Backlog

In general, PPG does not manufacture its products against a backlog of orders. Production and inventory levels are geared primarily to projections of future demand and the level of incoming orders.

Global Operations

PPG has a significant investment in non-U.S. operations. This broad geographic footprint serves to lessen the significance of economic impacts occurring in any one region on PPG's total net sales and income from continuing operations. As a result of our expansion outside the U.S., we are subject to certain inherent risks, including economic and political conditions in international markets and fluctuations in foreign currency exchange rates. During 2017, favorable foreign currency translation increased net sales by approximately $55 million and decreased income from continuing operations by $7 million.

Our net sales in the developed and emerging regions of the world for the years ended December 31st are summarized below:

($ in millions)	2017	2016	2015
Net Sales	As Restated		
United States, Canada, Western Europe	$9,911	$9,773	$9,692
Latin America, Central and Eastern Europe, Middle East, Africa, Asia Pacific	4,837	4,497	4,549
Total	$14,748	$14,270	$14,241

Refer to Note 20, "Reportable Business Segment Information" under Item 8 of this Form 10-K/A for geographic information related to PPG's property, plant and equipment, and for additional geographic information pertaining to sales.

Seasonality

PPG's income from continuing operations has typically been greater in the second and third quarters and cash from operating activities has been greatest in the fourth quarter due to end-use market seasonality, primarily in PPG's architectural coatings businesses. Demand for PPG's architectural coatings products is typically the strongest in the second and third quarters due to higher home improvement, maintenance and construction activity during the spring and summer months in the U.S., Canada and Europe. The Latin America paint season is the strongest in the fourth quarter. These cyclical activity levels result in the collection of outstanding receivables and lower inventory on hand in the fourth quarter generating higher cash from operating activities.

Employee Relations

The average number of people employed worldwide by PPG during 2017 was about 47,200. The Company has numerous collective bargaining agreements throughout the world. We observe local customs, laws and practices in labor relations when negotiating collective bargaining agreements. There were no significant work stoppages in 2017. While we have experienced occasional work stoppages as a result of the collective bargaining process and may experience some work stoppages in the future, we believe that we will be able to negotiate all labor agreements on satisfactory terms. To date, these work stoppages have not had a significant impact on PPG's results of operations. Overall, the Company believes it has good relationships with its employees.

Environmental Matters

PPG is committed to operating in a sustainable manner and to helping our customers meet their sustainability goals. Our sustainability efforts are led by the Technology and Environment Committee of our Board of Directors and our Sustainability Committee, which is comprised of members of PPG's senior management team. The Sustainability Committee establishes policies, programs, procedures and goals to address sustainability in our business practices, including resource management, climate change, innovation, communications, purchasing, manufacturing and employee wellness.

Our dedication to innovation is intertwined with sustainability. Once again in 2017, we increased the percent of our sales from sustainable products. We are marketing an ever-growing variety of products and services that provide environmental, safety and other benefits to our customers. Our products contribute to lighter, more fuel-efficient vehicles, airplanes and ships, and they help our customers reduce their energy consumption, conserve water and reduce waste. These products include a compact automotive paint process that saves energy and reduces water usage; sustainable, waterborne coatings formulations; lightweight sealants and coatings for aircraft; coatings that cool surfaces; and solutions for autonomous and battery-powered vehicles.

Public and governmental concerns related to climate change continue to grow, leading to efforts to limit the greenhouse gas (“GHG”) emissions believed to be responsible. While PPG has operations in many countries, a substantial portion of PPG’s GHG emissions are generated by locations in the U.S. where considerable legislative and regulatory activity has been taking place. PPG has, and will continue to, annually report our global GHG emissions to the voluntary Carbon Disclosure project.

PPG participates in both the U.S. Department of Energy, BETTER BUILDINGS®, BETTER PLANTS® program, formerly the SAVE ENERGY NOW® Leadership program, and the Environmental Protection Agency ENERGY STAR® Industrial Partnership program, both reinforcing the company’s voluntary efforts to significantly reduce its industrial energy intensity. These programs include developing and implementing energy management processes and setting energy savings targets while providing a suite of educational, training, and technical resources to help meet those targets. Recognizing the continuing importance of this matter, PPG has a senior management group with a mandate to guide the Company’s progress in this area.

Our commitment to sustainability continues to yield tangible results. In 2017, we again made significant progress reducing our energy intensity, greenhouse gas emissions intensity, water usage intensity and waste intensity. More information about PPG’s sustainability values, efforts, goals and data and our community and employee engagement programs can be found in our Sustainability Report and on our sustainability website at http://sustainability.ppg.com and on the Carbon Disclosure Project’s website at www.cdp.net.

PPG is subject to existing and evolving standards relating to protection of the environment. In management’s opinion, the Company operates in an environmentally sound manner and is well positioned, relative to environmental matters, within the industries in which it operates. PPG is negotiating with various government agencies concerning 126 current and former manufacturing sites and offsite waste disposal locations, including 24 sites on the National Priority List. While PPG is not generally a major contributor of wastes to these offsite waste disposal locations, each potentially responsible party may face governmental agency assertions of joint and several liability. Generally, however, a final allocation of costs is made based on relative contributions of wastes to the site. There is a wide range of cost estimates for cleanup of these sites, due largely to uncertainties as to the nature and extent of their condition and the methods that may have to be employed for their remediation. The Company has established reserves for onsite and offsite remediation of those sites where it is probable that a liability has been incurred and the amount of loss can be reasonably estimated.

The Company’s experience to date regarding environmental matters leads it to believe that it will have continuing expenditures for compliance with provisions regulating the protection of the environment and for present and future remediation efforts at waste and plant sites. Management anticipates that such expenditures will occur over an extended period of time.

In addition to the $258 million currently reserved for environmental remediation efforts, we may be subject to loss contingencies related to environmental matters estimated to be approximately $100 million to $200 million. These reasonably possible unreserved losses relate to environmental matters at a number of sites, none of which are individually significant. The loss contingencies related to these sites include significant unresolved issues such as the nature and extent of contamination at these sites and the methods that may have to be employed to remediate them.

($ in millions)	2017	2016	2015
Capital expenditures for environmental control projects	$7	$18	$15

It is expected that expenditures for such projects in 2018 will be in the range of $10 million to $20 million. Although future capital expenditures are difficult to estimate accurately because of constantly changing regulatory standards and policies, it can be anticipated that environmental control standards will become increasingly stringent and the cost of compliance will increase.

Management believes that the outcome of these environmental contingencies will not have a material adverse effect on PPG's financial position or liquidity; however, any such outcome may be material to the results of operations of any particular period in which costs, if any, are recognized. See Note 14, "Commitments and Contingent Liabilities," under Item 8 of this Form 10-K/A for additional information related to environmental matters and our accrued liability for estimated environmental remediation costs.

Available Information

The Company's website address is www.ppg.com. The Company posts, and shareholders may access without charge, the Company's recent filings and any amendments thereto of its annual reports on Form 10-K/A, quarterly reports on Form 10-Q and its proxy statements as soon as reasonably practicable after such reports are filed with the Securities and Exchange Commission ("SEC"). The Company also posts all financial press releases, including earnings releases, to its website. All other reports filed or furnished to the SEC, including reports on Form 8-K, are available via direct link on PPG's website to the SEC's website, www.sec.gov. Reference to the Company's and the SEC's websites herein does not incorporate by reference any information contained on those websites and such information should not be considered part of this Form 10-K/A.

Item 1A. Risk Factors

As a global manufacturer of paints, coatings and specialty materials, we operate in a business environment that includes risks. These risks are not unlike the risks we have faced in the recent past nor are they unlike risks faced by our competitors. Each of the risks described in this section could adversely affect our results of operations, financial position and liquidity. While the factors listed here are considered to be the more significant factors, no such list should be considered to be a complete statement of all potential risks and uncertainties. Unlisted factors may present significant additional obstacles which may adversely affect our businesses and our results of operations.

Increases in prices and declines in the availability of raw materials could negatively impact our financial results.

Our financial results are significantly affected by the cost of raw materials. Coatings raw materials, which include both organic, primarily petroleum based, materials and inorganic materials, including titanium dioxide, comprise between 70% and 80% of the Company's cost of sales, exclusive of depreciation and amortization, sold in most coatings formulations and represent PPG's single largest production cost component.

While not our customary practice, we also import raw materials and intermediates, particularly for use at our manufacturing facilities in the emerging regions of the world. In most cases, those imports are priced in the currency of the supplier and, therefore, if that currency strengthens against the currency of our manufacturing facility, our margins may be lower.

Most of our raw materials are purchased from outside sources, and the Company has made, and plans to continue to make, supply arrangements to meet the planned operating requirements for the future. Adequate supply of critical raw materials is managed by establishing contracts, procuring from multiple sources, and identifying alternative materials or technology whenever possible. The Company is continuing its aggressive sourcing initiatives to effectively broaden our supply of high quality raw materials. These initiatives include qualifying multiple and local sources of supply, including suppliers from Asia and other lower cost regions of the world, adding on-site resin production at certain manufacturing locations, and a reduction in the amount of titanium dioxide and other raw materials used in our product formulations. Our products use both petroleum-derived and bio-based materials as part of a product renewal strategy.

An inability to obtain critical raw materials would adversely impact our ability to produce products. Increases in the cost of raw materials may have an adverse effect on our income from continuing operations or cash from operating activities in the event we are unable to offset these higher costs in a timely manner.

Refer to Item 1. "Raw Materials and Energy" of this Form 10-K/A for a discussion of the current year trends and outlook in raw material and energy costs.

The pace of economic growth and level of uncertainty could have a negative impact on our results of operations and cash flows.

During 2017, economic conditions improved in all of our major geographical regions while remaining mixed by end-use market. PPG provides products and services to a variety of end-use markets in many geographies. This broad end-use market exposure and expanded geographic presence lessens the significance of any individual decrease in activity levels; nonetheless, lower demand levels may result in lower sales, which would result in reduced income

from continuing operations and cash from operating activities.
Refer to Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations” of this Form 10-K/A for discussion of the economic conditions in 2017 and our outlook on certain economic conditions in 2018.

We are subject to existing and evolving standards relating to the protection of the environment.
Environmental laws and regulations control, among other things, the discharge of pollutants into the air and water, the handling, use, treatment, storage and clean-up of hazardous and non-hazardous waste, the investigation and remediation of soil and groundwater affected by hazardous substances, and regulate various health and safety matters. The environmental laws and regulations we are subject to impose liability for the costs of, and damages resulting from, cleaning up current sites, past spills, disposals and other releases of hazardous substances. Violations of these laws and regulations can also result in fines and penalties. Future environmental laws and regulations may require substantial capital expenditures or may require or cause us to modify or curtail our operations, which may have a material adverse impact on our business, financial condition and results of operations.
As described in Note 14, “Commitments and Contingent Liabilities,” under Item 8 of this Form 10-K/A, we are currently undertaking environmental remediation activities at a number of our current and former facilities and properties, the cost of which is substantial. In addition to the amounts currently reserved, we may be subject to loss contingencies related to environmental matters estimated to be as much as $100 million to $200 million. Such unreserved losses are reasonably possible but are not currently considered to be probable of occurrence.
We are involved in a number of lawsuits and claims, and we may be involved in future lawsuits and claims, in which substantial monetary damages are sought.
PPG is involved in a number of lawsuits and claims, both actual and potential, in which substantial monetary damages are sought. Those lawsuits and claims relate to contract, patent, environmental, product liability, asbestos exposure, antitrust, employment, securities and other matters arising out of the conduct of PPG’s current and past business activities. Any such claims, whether with or without merit, could be time consuming, expensive to defend and could divert management’s attention and resources. We maintain insurance against some, but not all, of these potential claims, and the levels of insurance we do maintain may not be adequate to fully cover any and all losses. We believe that, in the aggregate, the outcome of all current lawsuits and claims involving PPG, including those described in Note 14, “Commitments and Contingent Liabilities” under Item 8 of this Form 10-K/A, will not have a material effect on PPG’s consolidated financial position or liquidity; however, such outcome may be material to the results of operations of any particular period in which costs, if any, are recognized. Nonetheless, the results of any future litigation or claims are inherently unpredictable, and such outcomes could have a material adverse effect on our results of operations, cash from operating activities or financial condition.
Fluctuations in foreign currency exchange rates could affect our financial results.
We earn revenues, pay expenses, own assets and incur liabilities in countries using currencies other than the U.S. dollar. Because our consolidated financial statements are presented in U.S. dollars, we must translate revenues and expenses into U.S. dollars at the average exchange rate during each reporting period, as well as assets and liabilities into U.S. dollars at exchange rates in effect at the end of each reporting period. Therefore, increases or decreases in the value of the U.S. dollar against other currencies will affect our net sales, net income and the value of balance sheet items denominated in foreign currencies. We may use derivative financial instruments to reduce our net exposure to currency exchange rate fluctuations related to foreign currency transactions. However, fluctuations in foreign currency exchange rates, particularly the strengthening or weakening of the U.S. dollar against major currencies, could adversely or positively affect our financial condition and results of operations expressed in U.S. dollars. In 2017, changes in the U.S. dollar versus our mix of currencies had a favorable impact on full year net sales and an unfavorable impact on income before income taxes from the translation of foreign earnings into U.S. dollars of approximately $55 million and $7 million, respectively.
We are subject to a variety of complex U.S. and non-U.S. laws and regulations which could increase our compliance costs.
We are subject to a wide variety of complex U.S. and non-U.S. laws and regulations, and legal compliance risks, including securities laws, tax laws, environmental laws, employment and pension-related laws, competition laws, U.S. and foreign export and trading laws, and laws governing improper business practices, including bribery. We are affected by new laws and regulations and changes to existing laws and regulations, as well as interpretations by courts and regulators. These laws and regulations effectively expand our compliance obligations and potential enforcement actions by governmental authorities or litigation related to them.

New laws and regulations or changes in existing laws or regulations or their interpretation could increase our compliance costs. For example, regulations concerning the composition, use and transport of chemical products continue to evolve. Developments concerning these regulations could potentially impact the availability or viability of some of the raw materials we use in our product formulations and/or our ability to supply certain products to some customers or markets. Import/export regulations also continue to evolve and could result in increased compliance costs, slower product movements or additional complexity in our supply chains.

Our international operations expose us to additional risks and uncertainties that could affect our financial results.
PPG has a significant investment in global operations. This broad geographic footprint serves to lessen the significance of economic impacts occurring in any one region. Notwithstanding the benefits of geographic diversification, our ability to achieve and maintain profitable growth in international markets is subject to risks related to the differing legal, political, social and regulatory requirements and economic conditions of many countries. As a result of our operations outside the U.S., we are subject to certain inherent risks, including political and economic uncertainty, inflation rates, exchange rates, trade protection measures, local labor conditions and laws, restrictions on foreign investments and repatriation of earnings, and weak intellectual property protection. Our percentage of sales generated in 2017 by products sold outside the U.S. was approximately 62%.
Changes in the tax regimes and related government policies and regulations in the countries in which we operate could adversely affect our results and our effective tax rate.
As a multinational corporation, we are subject to various taxes in both the U.S. and non-U.S. jurisdictions. Due to economic and political conditions, tax rates in these various jurisdictions may be subject to significant change. Our future effective income tax rate could be affected by changes in the mix of earnings in countries with differing statutory tax rates, changes in the valuation of deferred tax assets or changes in tax laws or their interpretation. In December 2017, the U.S. enacted the U.S. Tax Cuts and Job Act. While the Company has made a preliminary assessment of the new legislation's impact on PPG, U.S. regulatory agencies will be issuing further regulations and clarifying interpretations over the next year which could alter the Company's conclusions regarding the impact of the new law. Further, PPG may continue to refine its estimates to incorporate new or better information as it comes available. Recent developments, including the European Commission's investigations on illegal state aid as well as the Organisation for Economic Co-operation and Development project on Base Erosion and Profit Shifting may result in changes to long-standing tax principles, which could adversely affect our effective tax rate or result in higher cash tax liabilities. If our effective income tax rate was to increase, our cash from operating activities, financial condition and results of operations would be adversely affected.
Although we believe that our tax filing positions are appropriate, the final determination of tax audits or tax disputes may be different from what is reflected in our historical income tax provisions and accruals. If future audits find that additional taxes are due, we may be subject to incremental tax liabilities, possibly including interest and penalties, which could have a material adverse effect on our cash from operating activities, financial condition and results of operations.
Business disruptions could have a negative impact on our results of operations and financial condition.
Unexpected events, including supply disruptions, temporary plant and/or power outages, work stoppages, natural disasters and severe weather events, computer system disruptions, fires, war or terrorist activities, could increase the cost of doing business or otherwise harm the operations of PPG, our customers and our suppliers. It is not possible for us to predict the occurrence or consequence of any such events. However, such events could reduce our ability to supply products, reduce demand for our products or make it difficult or impossible for us to receive raw materials from suppliers or to deliver products to customers.
Integrating acquired businesses into our existing operations.
Part of the Company's strategy is growth through acquisitions. Over the last decade, we have successfully completed more than 50 acquisitions and we will likely acquire additional businesses and enter into additional joint ventures in the future. Growth through acquisitions and the formation of joint ventures involve risks, including:
- difficulties in assimilating acquired companies and products into our existing business;
- delays in realizing the benefits from the acquired companies or products;
- diversion of our management's time and attention from other business concerns;
- difficulties due to lack of or limited prior experience in any new markets we may enter;
- unforeseen claims and liabilities, including unexpected environmental exposures or product liability;
- unexpected losses of customers or suppliers of the acquired or existing business;
- difficulty in conforming the acquired business' standards, processes, procedures and controls to those of our operations; and
- difficulties in retaining key employees of the acquired businesses.

These risks or other problems encountered in connection with our past or future acquisitions and joint ventures could cause delays in realizing the anticipated benefits of such acquisitions or joint ventures and could adversely affect our results of operations, cash from operating activities or financial condition.

Our ability to understand our customers' specific preferences and requirements, and to innovate, develop, produce and market products that meet customer demand is critical to our business results.

Our business relies on continued global demand for our brands and products. To achieve business goals, we must develop and sell products that appeal to customers. This is dependent on a number of factors, including our ability to produce products that meet the quality, performance and price expectations of our customers and our ability to develop effective sales, advertising and marketing programs.

We believe the automotive industry will experience significant and continued change in the coming years. Vehicle manufacturers continue to develop new safety features such as collision avoidance technology and self-driving vehicles that may reduce vehicle collisions in the future, potentially lowering demand for our refinish coatings. In addition, through the introduction of new technologies, new business models or new methods of travel, such as ridesharing, the number of automotive OEM new-builds may decline, potentially reducing demand for our automotive OEM coatings.

Our future growth will depend on our ability to continue to innovate our existing products and to develop and introduce new products. If we fail to keep pace with product innovation on a competitive basis or to predict market demands for our products, our businesses, financial condition and results of operations could be adversely affected.

The industries in which we operate are highly competitive.

With each of our businesses, an increase in competition may cause us to lose market share, lose a large regional or global customer, or compel us to reduce prices to remain competitive, which could result in reduced margins for our products. Competitive pressures may not only reduce our margins but may also impact our revenues and our growth which could adversely affect our results of operations.

The security of our information technology systems could be compromised, which could adversely affect our ability to operate.

Increased global information technology security requirements, threats and sophisticated and targeted computer crime pose a risk to the security of our systems, networks and the confidentiality, availability and integrity of our data. Despite our efforts to protect sensitive information and confidential and personal data, our facilities and systems may be vulnerable to security breaches. This could lead to negative publicity, theft, modification or destruction of proprietary information or key information, manufacture of defective products, production downtimes and operational disruptions, which could adversely affect our reputation, competitiveness and results of operations.

We have concluded that certain of our previously issued financial statements should not be relied upon and have restated certain of our previously issued financial statements, which may lead to, among other things, shareholder litigation, loss of investor confidence, negative impact on our stock price and certain other risks.

As discussed in the Explanatory Note, Note 2, "Restatement of Previously Reported Consolidated Annual Financial Statements" and in Note 19, "Quarterly Financial Information (unaudited)" under Item 8 of this Form 10-K/A, we have concluded that our previously issued financial statements as of December 31, 2017 and 2016, and for each of the quarterly and year-to-date periods in 2017, and the final quarterly and year-to-date period in 2016, should no longer be relied upon. The determination that the applicable financial statements should no longer be relied upon and that certain financial statements would be restated was made following the identification of misstatements. As a result of these misstatements, we have become subject to a number of additional risks and uncertainties, including unanticipated costs for accounting and legal fees in connection with or related to the restatement, shareholder litigation and government investigations. Any such proceeding could result in substantial defense costs regardless of the outcome of the litigation or investigation. If we do not prevail in any such litigation, we could be required to pay substantial damages or settlement costs.

We are remediating certain internal controls and procedures, which, if not successful, could result in additional misstatements in our financial statements negatively affecting our results of operations.

We are in the process of implementing certain remediation actions. See Item 9A. "Controls and Procedures" of this Form 10-K/A for a description of these remediation measures. To the extent these steps are not successful, not sufficient to correct our material weakness in internal control over financial reporting or are not completed in a timely manner, future financial statements may contain material misstatements and we could be required to restate our financial results. Any of these matters could adversely affect our business, reputation, revenues, results of operations, financial condition and stock price and limit our ability to access the capital markets through equity or debt issuances.

We are involved in governmental investigations, which are costly to conduct and may result in substantial financial and other penalties, as well as adverse effects on our business and financial condition.

Prior to filing the Current Report on Form 8-K disclosing our receipt of the internal report on April 19, 2018, we self-reported these issues to the SEC. We are cooperating with the SEC in its investigation of this matter. The SEC investigation is continuing, and we are currently unable to predict its duration, scope or results or whether the SEC will commence any legal action. If we are found to have violated securities laws or other federal statutes, we may be subject to criminal and civil penalties and other remedial measures, including, but not limited to, injunctive relief, disgorgement, civil and criminal fines and penalties, modifications of compliance programs and the retention of a monitor to oversee compliance. The imposition of any of these sanctions or remedial measures could have a material adverse impact on our business, reputation, revenues, results of operations and financial condition.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

The Company's corporate headquarters is located in Pittsburgh, Pa. The Company's manufacturing facilities, sales offices, research and development centers and distribution centers are located throughout the world. As of February 15, 2018, the Company operated 133 manufacturing facilities in 39 countries. See Item 1. "Business" of this Form 10-K/A for the principal manufacturing and distribution facilities by reportable segment.

The Company has manufacturing facilities in the following geographic areas:

United States and Canada:	39 facilities.	EMEA:	54 facilities in 23 countries.
Latin America:	14 facilities in 5 countries.	Asia Pacific:	26 facilities in 9 countries.

The Company's principal research and development centers are located in Allison Park, Pa.; Monroeville, Pa.; Burbank, Calif.; Tianjin, China; Amsterdam, Netherlands and Tepexpan, Mexico.

The Company's headquarters, certain distribution centers and substantially all company-owned paint stores are located in facilities that are leased while the Company's other facilities are generally owned. Our facilities are considered to be suitable and adequate for the purposes for which they are intended and overall have sufficient capacity to conduct business in the upcoming year.

Item 3. Legal Proceedings

PPG is involved in a number of lawsuits and claims, both actual and potential, including some that it has asserted against others, in which substantial monetary damages are sought. These lawsuits and claims may relate to contract, patent, environmental, product liability, asbestos exposure, antitrust, employment, securities and other matters arising out of the conduct of PPG’s current and past business activities. To the extent that these lawsuits and claims involve personal injury and property damage, PPG believes it has adequate insurance; however, certain of PPG’s insurers are contesting coverage with respect to some of these claims, and other insurers may contest coverage. PPG’s lawsuits and claims against others include claims against insurers and other third parties with respect to actual and contingent losses related to environmental, asbestos and other matters.

The Company has self-reported to the SEC information concerning the internal investigation of accounting matters described in the Explanatory Note and in Note 2, “Restatement of Previously Reported Consolidated Annual Financial Statements” under Item 8 of this Form 10-K/A. The Company’s cooperation with the SEC’s investigation is continuing.

On May 20, 2018, a putative securities class action lawsuit was filed in the U.S. District Court for the District for the Central District of California against the Company and certain of its current or former officers. This action, captioned Trevor Mild v. PPG Industries, Inc., Michael H. McGarry, Vincent J. Morales, and Mark C. Kelly, asserts securities fraud claims under Sections 10(b) and 20(a) of the Securities Exchange Act of 1934 on behalf of putative classes of persons who purchased or otherwise acquired stock of the Company during various time periods between April 24, 2017 and May 10, 2018. The allegations relate to, among other things, allegedly false and misleading statements and/or failures to disclose information about the Company’s business, operations and prospects. This action remains pending. The Company believes this action is without merit and intends to defend itself vigorously.

For many years, PPG has been a defendant in lawsuits involving claims alleging personal injury from exposure to asbestos. For a description of asbestos litigation affecting the Company, see Note 14, “Commitments and Contingent Liabilities” under Item 8 of this Form 10-K/A.

In the past, the Company and others have been named as defendants in several cases in various jurisdictions claiming damages related to exposure to lead and remediation of lead-based coatings applications. PPG has been dismissed as a defendant from most of these lawsuits and has never been found liable in any of these cases.

In March 2016, the Natural Resource Trustees for the Calcasieu River Estuary (the United States Department of the Interior, acting through the United States Fish and Wildlife Service, the National Oceanic and Atmospheric Administration of the United States Department of Commerce, the Louisiana Department of Environmental Quality and the Louisiana Department of Wildlife and Fisheries) reached an agreement in principle with PPG and two other potentially responsible parties to resolve the Trustees’ claims for natural resource damages alleged to have been caused by the release of hazardous substances into the Estuary. In the fourth quarter of 2017, PPG signed a consent decree prepared by the US Department of Justice for settlement of potential natural resource damage claims at the Calcasieu River Estuary. PPG’s share of this settlement is $3.6 million. Payment of PPG’s share of the settlement is required to be made into an escrow account within 30 days of filing the agreement with the court and is expected to occur in the first quarter of 2018.

Executive Officers of the Company

Set forth below is information related to the Company's executive officers as of June 28, 2018.

Name	Age	Title
Michael H. McGarry [(a)]	59	Chairman and Chief Executive Officer since September 2016
Glenn E. Bost II [(b)]	65	Senior Vice President and General Counsel since July 2010
Jean-Marie Greindl [(c)]	55	Senior Vice President, Architectural Coatings and President PPG EMEA since March 2016
Timothy M. Knavish [(d)]	52	Senior Vice President, Industrial Coatings since October 2017
Ramaparasad Vadlamannati [(e)]	55	Senior Vice President, Protective and Marine Coatings since March 2016
Vincent J. Morales [(f)]	52	Senior Vice President and Chief Financial Officer since March 2017

(a) Mr. McGarry served as President and Chief Executive Officer from September 2015 through August 2016, President and Chief Operating Officer from March 2015 through August 2015; Chief Operating Officer from August 2014 through February 2015; Executive Vice President from September 2012 through July 2014; and Senior Vice President, Commodity Chemicals from July 2008 through August 2012.

(b) Mr. Bost served as Vice President and Associate General Counsel from July 2006 through June 2010.

(c) Mr. Greindl served as Vice President, Automotive Coatings, EMEA and President, PPG EMEA from February 2013 through February 2016, Vice President, Automotive Coatings, EMEA from January 2011 through January 2013 and Vice President, Automotive Coatings, Europe from October 2010 through December 2010.

(d) Mr. Knavish served as Senior Vice President, Automotive Coatings from March 2016 through September 2017, Vice President, Protective and Marine Coatings from August 2012 through February 2016 and Vice President, Automotive Coatings, Americas from March 2010 through July 2012.

(e) Mr. Vadlamannati served as Vice President, Architectural Coatings, EMEA and Asia/Pacific from August 2014 through February 2016, Vice President, Architectural Coatings, EMEA from February 2012 through July 2014, Vice President, Architectural Coatings, EMEA for Region Western Europe from March 2011 through January 2012 and Vice President, Automotive Refinish, EMEA from September 2010 through February 2011.

(f) Mr. Morales served as Vice President, Finance from June 2016 through February 2017. From June 2015 through June 2016, he served as Vice President Investor Relations and Treasurer and from October 2007 through May 2015 he served as Vice President, Investor Relations.

Item 4. Mine Safety Disclosures

Not Applicable.

Part II
Item 5. Market for the Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities
The information required by Item 5 regarding market information, including stock exchange listings and quarterly stock market prices, dividends and holders of common stock is included in Exhibit 13.1 filed with this Form 10-K/A and is incorporated herein by reference. This information is also included in the PPG Shareholder Information on page 4 of the Annual Report to shareholders.
Directors who are not also officers of the Company may receive common stock equivalents pursuant to the PPG Industries, Inc. Deferred Compensation Plan for Directors ("PPG Deferred Compensation Plan for Directors"). Common stock equivalents are hypothetical shares of common stock having a value on any given date equal to the value of a share of common stock. Common stock equivalents earn dividend equivalents that are converted into additional common stock equivalents but carry no voting rights or other rights afforded to a holder of common stock. The common stock equivalents credited to directors under this plan are exempt from registration under Section 4(a)(2) of the Securities Act of 1933 as private offerings made only to directors of the Company in accordance with the provisions of the plan.
Under the PPG Deferred Compensation Plan for Directors, each director may elect to defer the receipt of all or any portion of the compensation paid to such director for serving as a PPG director. All deferred payments are held in the form of common stock equivalents. Payments out of the deferred accounts are made in the form of common stock of the Company (and cash as to any fractional common stock equivalent). The directors, as a group, were credited with 14,007; 17,807; and 15,445 common stock equivalents in 2017, 2016 and 2015, respectively, under this plan. The values of the common stock equivalents, when credited, ranged from $95.25 to $115.89 in 2017; $95.63 to $116.07 in 2016, and $90.13 to $98.73 in 2015.
Issuer Purchases of Equity Securities - Fourth Quarter, 2017

Month	Total Number of Shares Purchased	Avg. Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Programs	Max. Number of Shares That May Yet Be Purchased Under the Programs[1]
October 2017				
Repurchase program	1,221,668	$114.35	1,221,668	11,327,456
November 2017				
Repurchase program	1,152,976	$115.64	1,152,976	10,127,329
December 2017				
Repurchase program	1,091,300	$116.36	1,091,300	30,443,353
Total quarter ended December 31, 2017				
Repurchase program	3,465,944	$115.41	3,465,944	30,443,353

(1) In December 2017, PPG's board of directors approved a $2.5 billion share repurchase program. This program is in addition to the company's existing share repurchase authorization, which was approved in October 2016. The remaining shares yet to be purchased under the programs have been calculated using PPG's closing stock price on the last business day of the respective month. These repurchase programs have no expiration date.

No shares were withheld in satisfaction of the exercise price and/or tax withholding obligation by holders of employee stock options who exercised options granted under the Company's equity compensation plans in the fourth quarter of 2017.
Item 6. Selected Financial Data (As Restated)
The information required by Item 6 regarding the selected financial data for the five years ended December 31, 2017 is included in Exhibit 13.2 filed with this Form 10-K/A and is incorporated herein by reference.
Management and the Audit Committee have concluded that our financial statements as of December 31, 2017 and 2016, and for each of the quarterly and year-to-date periods in 2017 and the final quarterly and year-to-date period in 2016 should not be relied upon. In this Form 10-K/A, we have restated our audited consolidated financial statements as of December 31, 2017 and 2016, and certain unaudited consolidated financial information for each of the quarterly

and year-to-date periods in 2017 and the final quarterly and year-to-date period in 2016. The selected statement of operations data presented in Exhibit 13.2 and incorporated by reference herein for each of the three years in the period ended December 31, 2017 and the balance sheet data as of December 31, 2017 and 2016 have been derived from the audited consolidated financial statements included in this Form 10-K/A. The selected statement of operations data for the years ended December 31, 2014 and 2013 and the balance sheet data as of December 31, 2015, 2014 and 2013 have been derived from consolidated financial information not included in this Form 10-K/A.

For more information on this restatement, see the Explanatory Note immediately preceding the Table of Contents, Note 2, “Restatement of Previously Reported Consolidated Annual Financial Statements” and Note 19, “Quarterly Financial Information (unaudited)” under Item 8 of this Form 10-K/A. The selected financial data reflect the restatement described in the Explanatory Note.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations (As Restated)
As described in Note 2, "Restatement of Previously Reported Consolidated Annual Financial Statements" under Item 8 of this Form 10-K/A, we restated our audited financial statements as of December 31, 2017 and 2016 and for the years ended December 31, 2017 and 2016. The impact of the restatement is reflected in Management's Discussion and Analysis ("MD&A") of Financial Condition and Results of Operations below. We have also restated certain unaudited quarterly results related to the three months ended December 31, 2016, March 31, 2017, June 30, 2017 (and six months ended), September 30, 2017 (and nine months ended) and December 31, 2017. The impact of the restatement to the quarterly 2017 financial statements does not result in material changes to the MD&A included in the previously filed Forms 10-Q. As such, these disclosures have not been included in this Form 10-K/A.
Performance Overview
Net Sales

				% Change	
($ in millions, except percentages)	2017 As Restated	2016	2015	2017 vs. 2016	2016 vs. 2015
United States and Canada	$6,307	$6,254	$6,232	0.8%	0.4%
Europe, Middle East and Africa (EMEA)	4,389	4,164	4,103	5.4%	1.5%
Asia Pacific	2,523	2,431	2,433	3.8%	(0.1)%
Latin America	1,529	1,421	1,473	7.6%	(3.5)%
Total	$14,748	$14,270	$14,241	3.3%	0.2%

2017 vs. 2016
Net sales increased $478 million due to the following:
- Acquisition-related sales (+1%)
- Higher sales volumes (+1%)
- Slightly favorable foreign currency translation
- Slightly higher selling prices

Net sales from acquired businesses, net of divestitures, added over $200 million of sales in 2017, primarily MetoKote, DEUTEK, Univer and The Crown Group.
U.S. and Canada sales volumes declined slightly year-over-year, with mixed demand by business and end-use market segment. Sales volumes in architectural coatings U.S. company-owned stores grew by a mid-single-digit percentage, but were more than offset by sales volumes declines in the independent dealer networks and national retail (DIY) customer accounts in aggregate. Automotive OEM coatings sales volumes declined year-over-year and lagged industry demand levels due to a customer-driven market-share shift away from PPG that was offset in other regions of the world. These decreases in sales volumes were partially offset by higher sales volumes in specialty coatings and materials, automotive refinish coatings, general industrial coatings, aerospace coatings and packaging coatings.
EMEA sales volumes increased a low-single-digit percentage versus the prior year. Sales volumes in our automotive OEM coatings and aerospace coatings businesses each grew by a mid-single-digit percentage. Specialty coatings and materials sales volumes grew by a double-digit percentage, driven by strong silica demand. Protective coatings volumes also grew year-over-year. These increases in sales volumes were partially offset by lower demand in architectural coatings.
Asia Pacific sales volumes expanded by a mid-single-digit percentage year-over-year led by growth in each business within the Industrial Coatings segment along with sales volume growth in the architectural coatings business. These increases in sales volumes were partially offset by lower demand in marine coatings year-over-year. From a country and sub-region perspective, sales volumes grew in India, China, and Southeast Asia versus the prior year. Korea sales volumes continued to decline year-over-year primarily due to continued weakness in new shipbuilding.
Latin America sales volumes expanded by a mid-single-digit percentage versus the prior year primarily due to above market growth in our automotive OEM coatings and general industrial coatings businesses. The automotive OEM coatings growth was driven by industry production expansion with the opening of new assembly facilities in Mexico. Regional sales volumes were lower in architectural coatings versus the prior year primarily due to lower sales volumes in Brazil and in Mexico due to the impact of the natural disasters during the third quarter.

2016 vs. 2015

Net sales increased $29 million due to the following:

- Acquisition-related sales (+2%)
- Higher sales volumes (+1%)

Partially offset by:

- Unfavorable foreign currency translation (-3%)

Acquired businesses added approximately $310 million of sales in 2016, primarily due to the partial year sales from businesses acquired in 2015, including Revocoat, IVC Industrial Coatings, Le Joint Francais and Cuming Microwave, as well as the 2016 acquisitions of MetoKote and Univer.

Sales volume growth, excluding acquisition related sales, grew 1% led by growth in Asia Pacific and EMEA, while U.S. and Canada sales volumes as a percentage of sales, declined modestly.

U.S. and Canada sales volumes declined a low-single-digit percentage year-over-year, with mixed demand by business and end-use market segment. Sales volumes in architectural coatings company-owned stores grew by a mid-single-digit percentage, but were more than offset by sales volumes declines in the independent dealer networks and several national retail (DIY) customer accounts. Automotive OEM coatings sales volumes declined year-over-year, in large-part due to lower industry production. These decreases in sales volumes were partially offset by higher sales volumes in automotive refinish coatings and packaging coatings.

EMEA sales volumes increased a low-single-digit percentage versus the prior year. Sales volumes in our automotive OEM coatings and general industrial coatings businesses each grew by a mid-single-digit percentage, above market. Specialty coatings and materials sales volumes grew by a mid-single-digit percentage, driven by silica demand. These increases in sales volumes were partially offset by modestly lower demand in architectural coatings.

Asia Pacific sales volumes expanded by a mid-single-digit percentage year-over-year led by growth in each business within the Industrial Coatings segment. These increases in sales volumes were partially offset by lower demand in marine coatings year-over-year. From a country and sub-region perspective, sales volumes grew in India, China, and Southeast Asia versus the prior year. Korea sales volumes declined year-over-year primarily due to continued weakness in new shipbuilding.

Latin America sales volumes expanded by a low-to-mid-single-digit percentage versus the prior year primarily due to above market growth in our architectural coatings, automotive OEM coatings and general industrial coatings businesses.

Unfavorable foreign currency translation reduced net sales by approximately $385 million as the U.S. dollar strengthened against most foreign currencies year-over-year, notably the British pound, the Mexican peso, and the Chinese yuan.

Cost of sales, exclusive of depreciation and amortization

				% Change	
($ in millions, except percentages)	2017 As Restated	2016	2015	2017 vs. 2016	2016 vs. 2015
Cost of sales, exclusive of depreciation and amortization	$8,207	$7,693	$7,786	6.7%	(1.2)%
Cost of sales as a % of net sales	55.6 %	53.9 %	54.7 %	1.7%	(0.8)%

2017 vs. 2016

Cost of sales, exclusive of depreciation and amortization, increased $514 million (+7%) due to the following:

- Raw material cost inflation
- Higher sales volumes
- Cost of sales attributable to acquired businesses
- Foreign currency translation

Partially offset by:

- Lower manufacturing costs

2016 vs. 2015

Cost of sales, exclusive of depreciation and amortization, decreased $93 million (-1%) due to the following:

- Foreign currency translation

Lower manufacturing costs
Partially offset by:
Cost of sales from acquired businesses
Higher sales volumes

Selling, general and administrative expenses

($ in millions, except percentages)	2017	2016	2015	% Change 2017 vs. 2016	2016 vs. 2015
	As Restated	As Restated			
Selling, general and administrative expenses	$3,564	$3,588	$3,584	(0.7)%	0.1%
Selling, general and administrative expenses as a % of net sales	24.2 %	25.1 %	25.2 %	(0.9)%	(0.1)%

2017 vs. 2016

Selling, general and administrative expenses decreased $24 million (-1%) primarily due to:

- Lower net periodic pension and other postretirement benefit costs
- Lower selling and advertising costs
- Restructuring cost savings

Partially offset by:

- Wage and other cost inflation
- Selling, general and administrative expenses from acquired businesses
- Foreign currency translation

2016 vs. 2015

Selling, general and administrative expenses increased $4 million (0%) due to the following:

- Foreign currency translation
- Restructuring cost savings

Partially offset by:

- Selling, general and administrative expenses from acquired businesses
- Overhead cost inflation

Other charges and other income

($ in millions, except percentages)	2017	2016	2015	% Change 2017 vs. 2016	2016 vs. 2015
	As Restated	As Restated			
Interest expense, net of Interest income	$85	$99	$86	(14.1)%	15.1%
Business restructuring (As Restated)	$—	$191	$136	(100.0)%	40.4%
Pension settlements	$60	$968	$—	(93.8)%	N/A
Other charges	$64	$175	$90	(63.4)%	94.4%
Other income	($150)	($127)	($110)	18.1%	15.5%

Interest expense, net of Interest income

Interest expense, net of interest income decreased $14 million in 2017 versus 2016 primarily due to lower interest rate debt outstanding during 2017. Interest expense, net of Interest income increased $13 million in 2016 versus 2015 as interest income decreased year-over-year due to lower interest rates and lower average cash deposits on hand.

Business restructuring

In 2016, PPG recorded a pre-tax business restructuring charge of $191 million (as restated). During 2017, PPG realized approximately $50 million of cost savings related to restructuring actions. Once fully implemented, the total annual savings run rate is expected to be approximately $125 million. Refer to Note 8, "Business Restructuring" in Item 8 of this Form 10-K/A for additional information.

In 2015, PPG recorded a pre-tax restructuring charge of $136 million, of which about 85% represented employee severance and other cash charges. As of December 31, 2016, substantially all actions have been completed.

Pension settlements

During 2017, PPG made lump-sum payments to certain retirees who had participated in PPG's U.S. qualified and non-qualified pension plans totaling approximately $127 million. As the lump-sum payments were in excess of the expected 2017 service and interest costs for the affected plans, PPG remeasured the periodic benefit obligation of these plans in the period payments were made and recorded settlement charges totaling $60 million ($38 million after-tax) during 2017.

During 2016, PPG permanently transferred approximately $1.8 billion of its U.S. and Canadian pension obligations and assets to several highly rated insurance companies. These actions triggered remeasurement and partial settlement of certain of the Company's defined benefit pension plans. PPG recognized a $968 million pre-tax settlement charge in connection with these transactions. Refer to Note 13, "Employee Benefit Plans" in Item 8 of this Form 10-K/A for additional information.

Other charges

Other charges in 2017 were lower than 2016 due to the absence of environmental charges and certain asset write-downs. In 2016, Other charges were higher than in 2015 due to environmental charges of $82 million. These charges were principally for environmental remediation at a former chromium manufacturing plant and associated sites in New Jersey.

Other income

Other income was higher in 2017 than in 2016 primarily due to the gain from the sale of the Mexican Plaka business of $25 million. Other income in 2016 was higher than in 2015 due to gains totaling $46 million resulting from the sale of a PPG legacy U.S. automotive glass and services business and a U.S. business affiliate, higher equity earnings from a 2017 acquisition of a 40% interest in a joint venture and was partially offset by the absence of certain business transaction-related gains.

Effective tax rate and earnings per diluted share, continuing operations

($ in millions, except percentages)	2017 As Restated	2016 As Restated	2015	% Change 2017 vs. 2016	% Change 2016 vs. 2015
Income tax expense	$615	$214	$413	187.4%	(48.2)%
Effective tax rate	30.7 %	27.5 %	23.7 %	3.2%	3.8%
Adjusted effective tax rate*	24.3 %	24.5 %	23.9 %	(0.2)%	0.6%
Earnings per diluted share	$5.31	$2.04	$4.79	160.3%	(57.4)%
Adjusted earnings per diluted share*	$5.86	$5.64	$5.33	3.9%	5.8%

*See the Regulation G reconciliations - results of operations

The effective tax rate for the year-ended December 31, 2017 was 30.7% and increased 3.2% from the prior year primarily due to recording the net charge triggered by the enactment of the U.S. Tax Cuts and Jobs Act. This charge is approximately $37 million higher than the net charge included in PPG's fourth quarter earnings release and Form 8-K furnished on January 18, 2018, primarily due to new IRS regulations issued and refinements of management estimates.

As reported, earnings per diluted share from continuing operations for the year ended December 31, 2017 increased year-over-year, primarily due to the absence of the pension settlement charge of $616 million after-tax recorded in 2016. Refer to the Regulation G Reconciliations - Results of Operations for additional information. The Company's earnings per diluted share and adjusted earnings per diluted share both benefited from the 7.4 million, 10.7 million and 7.0 million shares of stock repurchased in 2017, 2016 and 2015, respectively.

Regulation G Reconciliations - Results of Operations

PPG Industries believes investors' understanding of the company's operating performance is enhanced by the disclosure of net income, earnings per diluted share and the effective tax rate adjusted for certain charges. PPG's management considers this information useful in providing insight into the company's ongoing operating performance because it excludes the impact of items that cannot reasonably be expected to recur on a quarterly basis or that are not attributable to our primary operations. Net income and earnings per diluted share adjusted for these items are not recognized financial measures determined in accordance with U.S. generally accepted accounting principles (GAAP) and should not be considered a substitute for net income or earnings per diluted share or other financial measures as computed in accordance with U.S. GAAP. In addition, adjusted net income, earnings per diluted share and the effective tax rate may not be comparable to similarly titled measures as reported by other companies.

Income before income taxes from continuing operations is reconciled to adjusted income before income taxes, the effective tax rate from continuing operations is reconciled to the adjusted effective tax rate from continuing operations and net income (attributable to PPG) and earnings per share – assuming dilution (attributable to PPG) are reconciled to adjusted net income (attributable to PPG) and adjusted earnings per share – assuming dilution below:

Year-ended December 31, 2017 (As Restated)

($ in millions, except percentages and per share amounts)	Income Before Income Taxes	Tax Expense	Effective Tax Rate	Net income from continuing operations (attributable to PPG)	Earnings per diluted share
As reported, continuing operations	$2,005	$615	30.7 %	$1,369	$5.31
Includes:					
Net tax charge related to U.S. Tax Cuts and Jobs Act	—	(134)	N/A	134	0.52
Charges related to transaction-related costs[1]	9	3	37.9 %	6	0.02
Charges related to pension settlements	60	22	37.9 %	38	0.14
Gain from sale of business	(25)	(1)	3.2 %	(24)	(0.09)
Gain from a legal settlement	(18)	(7)	37.9 %	(11)	(0.04)
Gain from sale of a non-operating asset	(13)	(5)	37.9 %	(8)	(0.03)
Charges related to asset write-downs	7	—	— %	7	0.03
Adjusted, continuing operations, excluding certain charges	$2,025	$493	24.3 %	$1,511	$5.86

Year-ended December 31, 2016 (As Restated)

($ in millions, except percentages and per share amounts)	Income Before Income Taxes	Tax Expense	Effective Tax Rate	Net income from continuing operations (attributable to PPG)	Earnings per diluted share
As reported, continuing operations	$779	$214	27.5 %	$543	$2.04
Includes:					
Charges related to transaction-related costs[1]	8	3	37.6 %	5	0.03
Charges related to pension settlements	968	352	36.4 %	616	2.31
Charge related to business restructuring	191	50	26.2 %	141	0.53
Charge related to environmental remediation	82	31	37.6 %	51	0.20
Net gain from disposals of ownership interests in business affiliates	(46)	(16)	34.8 %	(30)	(0.12)
Net tax effect of asbestos settlement funding	—	(151)	N/A	151	0.57
Charge related to early retirement of debt	8	3	37.6 %	5	0.02
Charges related to asset write-downs	23	7	30.4 %	17	0.06
Adjusted, continuing operations, excluding certain charges	$2,013	$493	24.5 %	$1,499	$5.64

Year-ended December 31, 2015

($ in millions, except percentages and per share amounts)	Income Before Income Taxes	Tax Expense	Effective Tax Rate	Net income from continuing operations (attributable	Earnings per diluted share

					to PPG)	
As reported, continuing operations	$1,745	$413	23.7	%	$1,311	$4.79
Includes:						
Charges related to transaction-related costs[1]	44	14	33.3	%	30	0.10
Charge related to business restructuring	136	31	22.8	%	105	0.39
Charge related to pension settlement	7	2	28.6	%	5	0.02
Charge related to equity affiliate debt refinancing	11	4	37.6	%	7	0.03
Adjusted, continuing operations, excluding certain charges	$1,943	$464	23.9	%	$1,458	$5.33

(1) Transaction-related costs include advisory, legal, accounting, valuation, and other professional or consulting fees incurred to effect significant acquisitions, as well as similar fees and other costs to effect divestitures not classified as discontinued operations. These costs also include the flow-through cost of sales impact for the step up to fair value of inventory acquired in acquisitions. These costs also include certain nonrecurring severance costs and charges associated with the Company's business portfolio transformation.

Regulation G Reconciliations - Quarterly Results of Operations (unaudited) (As Restated)

	Three months ended December 31, 2016				
($ in millions, except percentages and per share amounts)	Income Before Income Taxes	Tax Expense	Effective Tax Rate	Net income from continuing operations (attributable to PPG)	Earnings per diluted share
As reported, continuing operations	$131	$ 40	30.5 %	$ 91	$ 0.33
Adjusted for:					
Business restructuring charge	191	50	26.2 %	141	0.53
Environmental remediation charge	82	31	37.6 %	51	0.20
Net gain on disposals of ownership interests in business affiliates	(13)	(5)	38.5 %	(8)	(0.04)
Net tax effect of asbestos settlement funding	—	(23)	N/A	23	0.09
Premium on early retirement of debt	8	3	37.6 %	5	0.02
Adjusted, continuing operations, excluding certain charges	$399	$ 96	24.1 %	$ 303	$ 1.13

	Three months ended March 31, 2017				
($ in millions, except percentages and per share amounts)	Income Before Income Taxes	Tax Expense	Effective Tax Rate	Net income from continuing operations (attributable to PPG)	Earnings per diluted share
As reported, continuing operations	$446	$ 110	24.7 %	$ 331	$ 1.28
Adjusted for:					
Transaction-related costs[(1)]	4	1	37.9 %	3	0.01
Pension settlement charge	22	8	37.9 %	14	0.05
Adjusted, continuing operations, excluding certain charges	$472	$ 119	25.2 %	$ 348	$ 1.34

	Three months ended June 30, 2017				
($ in millions, except percentages and per share amounts)	Income Before Income Taxes	Tax Expense	Effective Tax Rate	Net income from continuing operations (attributable to PPG)	Earnings per diluted share
As reported, continuing operations	$659	$ 157	23.8 %	$ 497	$ 1.92
Adjusted for:					
Transaction-related costs[(1)]	5	2	37.9 %	3	0.01
Gain from sale of the Plaka business	(25)	(1)	3.2 %	(24)	(0.09)
Income from a legal settlement	(18)	(7)	37.9 %	(11)	(0.04)
Adjusted, continuing operations, excluding certain charges	$621	$ 151	24.3 %	$ 465	$ 1.80

	Three months ended September 30, 2017				
($ in millions, except percentages and per share amounts)	Income Before Income	Tax Expense	Effective Tax Rate	Net income from continuing	Earnings per diluted

	Taxes				operations (attributable to PPG)	share
As reported, continuing operations	$523	$ 124	23.7	%	$ 393	$ 1.52

($ in millions, except percentages and per share amounts)	Three months ended December 31, 2017 Income Before Income Taxes	Tax Expense	Effective Tax Rate	Net income from continuing operations (attributable to PPG)	Earnings per diluted share
As reported, continuing operations	$377	$ 224	59.4 %	$ 148	$ 0.58
Adjusted for:					
Net tax charge for Tax Cuts and Jobs Act	—	(134)	N/A	134	0.52
Pension settlement charge	38	14	37.9 %	24	0.09
Gain on sale of a non-operating asset	(13)	(5)	37.9 %	(8)	(0.03)
Asset write-downs	(7)	—	— %	7	0.03
Adjusted, continuing operations, excluding certain charges	$395	$ 99	25.1 %	$ 305	$ 1.19

(1) Transaction-related costs include advisory, legal, accounting, valuation, and other professional or consulting fees incurred to effect significant acquisitions, as well as similar fees and other costs to effect divestitures not classified as discontinued operations. These costs also include the flow-through cost of sales impact for the step up to fair value of inventory acquired in acquisitions. These costs also include certain nonrecurring severance costs and charges associated with the Company’s business portfolio transformation.

Performance of Reportable Business Segments

Performance Coatings

($ in millions, except percentages)	2017	2016 As Restated	2015	$ Change 2017 vs. 2016	$ Change 2016 vs. 2015	% Change 2017 vs. 2016	% Change 2016 vs. 2015
Net sales	$8,730	$8,580	$8,765	$150	$(185)	1.7%	(2.1)%
Segment income	$1,321	$1,314	$1,302	$7	$12	0.5%	0.9%

2017 vs. 2016

Performance Coatings net sales increased (2%) due to the following:

- Higher selling prices (+1%)
- Net sales from acquisitions (+1%)
- Modest foreign currency translation

Partially offset by:

- Slightly lower sales volumes

Selling prices increased year-over-year primarily due to selling price initiatives across all businesses to combat accelerating raw material cost inflation.

Architectural coatings - Americas and Asia Pacific sales volumes declined a low-single-digit-percentage versus the prior year. Sales volumes increased by a mid-single-digit percentage in company-owned stores in the U.S. and Canada, including the unfavorable impact from natural disasters in the third quarter 2017. This increase was more than offset by sales volume declines in the U.S. and Canada independent dealer networks and national retail (DIY) customer accounts, as both distribution channels continued to experience soft demand. Organic sales improved in both the Latin America and Asia Pacific regions.

Architectural coatings - EMEA net sales increased by a high-single-digit percentage year-over-year, primarily due to acquisition-related sales, principally DEUTEK and Univer, which contributed approximately $85 million to net sales. Sales volumes were down year-over-year primarily driven by continued weak demand in France and eastern Europe, as well as our turning away certain business due to low profitability or lack of customer acceptance of selling price increases. Demand growth continued in Northern Europe, where we continued to outperform the market.

Automotive refinish coatings organic sales grew by a low-single-digit percentage year-over-year, led by above-market performance in U.S. and Canada as customers continued to adopt PPG’s industry leading technologies. Organic sales also increased in the Latin American region versus the prior year, reflecting high end-use market demand. In Asia Pacific, net sales increased, largely due to the recent Futian Xinshi acquisition in China.

Aerospace coatings sales volumes grew by a low-single-digit percentage versus the prior year, led by above market performance in Europe and consistent with the overall industry demand.

Protective and marine coatings sales volumes declined by a mid-single-digit percentage year-over-year. Protective coatings sales volumes expanded in most regions, led by Europe, but were more than offset by significant weakness in new shipbuilding activity, primarily in the Asia Pacific region.

Segment income increased $9 million (1%) year-over-year primarily due to selling price increases, lower overhead and manufacturing costs, including the initial benefits from business restructuring actions, partially offset by increasing raw material costs, wage and other cost inflation, and lower sales volumes.

2016 vs. 2015

Performance Coatings net sales decreased (2%) due to the following:

Unfavorable foreign currency translation of approximately $260 million (3%), most notably the Mexican peso, the British pound, the Chinese yuan and the euro.

Partially offset by:

Net sales from acquisitions (+1%)

Architectural coatings - Americas and Asia Pacific organic sales were flat versus the prior year. In the U.S. and Canada, sales volumes advanced in the company-owned store channel versus the prior year, mainly due to recent growth-related investments and initiatives. The increase in the company-owned stores channel was more than offset by sales volume declines in national retail (DIY) accounts and U.S. independent dealer channel year-over-year, despite DIY channel strengthening in the second half of 2016. Latin America organic sales were up year-over-year, led by Mexico which grew at more than double the Mexican GDP growth rate.

Architectural coatings - EMEA sales volumes were flat year-over-year. Growth in western Europe was offset by reduced demand levels in central Europe and in Africa, where economies are closely linked to depressed commodity prices. Acquisition-related sales from Univer in Italy added about $10 million in the fourth quarter 2016.

Automotive refinish coatings organic sales grew at a low-single-digit percentage rate year-over-year, outperforming end-use market demand levels in the U.S. and Canada and Asia Pacific, as customers continued to adopt PPG’s industry leading technologies.

Aerospace coatings sales volumes increased modestly year-over-year, in line with industry growth rates. Sales growth occurred in all major regions.

Protective and marine coatings net sales volumes declined a low-to-mid-single-digit-percentage year-over-year as growth in protective coatings was offset by declines in marine coatings, primarily due to lower shipbuilding activity in the Asia Pacific region and the ongoing impact of decreased capital investment and maintenance in the oil and gas sector. Protective coatings sales volumes grew versus the prior year, led by the U.S. and Canada and Latin America regions, including benefits from expanded distribution through the PPG-Comex concessionaire network.

Segment income increased $12 million (+1%) primarily due to the benefits from prior year business restructuring initiatives, modestly higher selling prices, lower manufacturing costs, acquisition-related income (Cumings Microwave, Le Joint Francais, Univer), partially offset by unfavorable foreign currency translation and higher growth-related spending in the U.S. architectural coatings business. Segment income margins expanded, increasing 40 basis points year-over-year.

Looking Ahead

In the first quarter 2018, we expect sales volumes in the architectural coatings - Americas and Asia Pacific business to be seasonally lower than the fourth quarter 2017. In addition, overall volume trends by customer channel are anticipated to be consistent with the fourth quarter 2017. The PPG TIMELESS® product, launched in certain HOME DEPOT® stores in 2017, is projected to continue to meet our sales targets and is being expanded to more locations during 2018. We also anticipate additional growth-related spending of up to $5 million in the first quarter to support the continued momentum in the region. The volume growth trend for architectural coatings - EMEA is expected to improve modestly in the first quarter 2018, with results remaining uneven by country. We expect continued, high end-use demand in our automotive refinish coatings business as customers continue to adopt PPG’s industry leading technologies. In aerospace coatings, we anticipate continued improvement in industry demand growth. The protective and marine coatings business is expected to perform in-line with the market in the first quarter 2018.

We expect raw material costs to remain elevated in the first-quarter 2018 at similar levels experienced in the fourth quarter. Further selling price increases in 2018 will be needed to offset more recent raw material inflation. There will be no material benefit from acquisition-related sales in the segment, and, based on mid-January exchange rates, foreign currency translation is expected to have a similar sequential favorable impact on segment sales and income in the first quarter 2018.

Due to the timing of the Easter holiday, there is one fewer ship day in the first-quarter 2018 compared to first-quarter 2017, which is expected to unfavorably impact global architectural coatings sales volumes by about $20 million to $25 million in net sales. This unfavorable impact will reverse in the second quarter.

Industrial Coatings

				$ Change		% Change	
($ in millions, except percentages)	2017	2016	2015	2017 vs. 2016	2016 vs. 2015	2017 vs. 2016	2016 vs. 2015
Net sales	$6,018	$5,690	$5,476	$328	$214	5.8%	3.9%
Segment income	$972	$1,042	$985	$(70)	$57	(6.7)%	5.8%

2017 vs. 2016

Industrial Coatings segment net sales increased (6%) due to the following:

Higher sales volumes (+4%)

Acquisition-related sales (+3%)

Partially offset by:

Lower selling prices (1%)

PPG’s automotive OEM coatings sales volumes increased by a low-single-digit percentage versus the prior year, consistent with the global automotive industry production growth rate, led by China, Mexico, Europe and Brazil. Sales volumes declined in the U.S. and Canada, partially reflecting fewer automotive new builds.

General industrial coatings and specialty coatings and materials sales volumes, in aggregate, grew by a mid-single-digit percentage year-over-year. Sales volumes grew year-over-year in every major region with mixed demand by end-use market and geography. This growth was led by Asia Pacific and the U.S., which outpaced regional industrial production demand growth. Sales volumes grew across most sub-segments, including year-over-year increases in electronics materials, heavy duty equipment and organic light emitting diode (OLED) materials. Acquisition-related sales, primarily MetoKote, added approximately $155 million.

Packaging coatings sales volumes grew by a mid-single-digit percentage year-over-year, primarily driven by ongoing industry conversions to PPG’s new can coatings technologies, led by the U.S.

Segment income decreased $70 million (-7%) year-over-year primarily due to increasing raw material costs, lower selling prices and wage and other cost inflation. These cost increases were partially offset by income from higher sales volumes, lower manufacturing and overhead costs, including the initial benefits from business restructuring actions, and acquisition-related income.

2016 vs. 2015

Industrial Coatings segment net sales increased (4%) due to the following:

Net sales from acquired businesses (+4%)

Higher sales volumes (+3%)

Partially offset by:

Unfavorable foreign currency translation of approximately $125 million (2%), most notably the Mexican peso, the British pound, the Chinese yuan and the euro.

Lower selling prices (1%)

PPG’s automotive OEM coatings business sales volumes increased a low-single-digit-percentage over the prior year, consistent with global automotive industry production growth. PPG's sales volumes differed by region, led by year-over-year growth in Europe and Asia Pacific, while U.S. and Canada sales volumes lagged industry demand levels due to a customer-driven market-share shift away from PPG that was offset in other regions of the world.

General industrial coatings and specialty coatings and materials sales volumes, in aggregate, increased a mid-single-digit percentage year-over-year. Sales volume growth was led by Asia Pacific and EMEA, and was driven by strong end-market demand for automotive components, electronic materials, and coil and extrusion products. Latin America sales volumes advanced moderately, while volumes in the U.S. and Canada declined modestly.

Packaging coatings sales volumes were up a mid-to-high single-digit percentage year-over-year, primarily driven by continued strong sales growth momentum related to the adoption of PPG's new can coatings technologies. This above market sales volume growth was led by U.S. and Canada and Asia Pacific regions.

Segment income increased $57 million (+6%) primarily due to lower manufacturing costs, higher sales volumes, acquisition-related income (MetoKote, IVC Industrial Coatings, Revocoat) and the benefits from prior year restructuring initiatives, partially offset by unfavorable foreign currency translation and modestly lower selling prices. PPG experienced higher transportation and logistics costs required to meet increasing customer demand in Asia.

Segment income margins continued to improve, increasing 30 basis points year-over-year.

Looking ahead

In the first quarter of 2018, we expect global automotive industry production growth to be about 1% led by Europe and Mexico. In China, automotive production is expected to modestly decrease in the first quarter of 2018, reflecting the expiration of a small engine subsidy that had been in effect the past several years. We anticipate solid general industrial demand growth trends to continue in aggregate, but remain mixed by geography and end-use market. PPG's market outperformance is expected to continue. In our packaging coatings business, we anticipate volume growth will continue due to the ongoing industry conversion to BPA non-intent interior can coatings, with PPG's year-over-year growth rates continuing at an above market level in 2018. We expect acquisition-related sales to add approximately $30 million to first quarter 2018 segment sales and, based on mid-January exchange rates, foreign currency translation is expected to have a similar sequential favorable impact on segment sales and income in the first quarter 2018. Segment margin recovery continues to be a priority for 2018. Based on recent raw material inflation, segment margin recovery is expected to continue through the first half of 2018. All businesses in the segment have made progress with selling price initiatives and additional price increases have been announced for early 2018. Also, efforts to reduce costs remain a key focus in 2018.

Review and Outlook

During 2017, economic conditions improved in all of our major geographical regions while remaining mixed by end-use market. PPG's aggregate organic sales grew 1.5% versus the prior year and were higher in the second half of 2017 compared to the first half of 2017. Acquisition-related sales from two acquisitions completed in 2016 and the four completed in 2017 contributed over 1% to net sales growth year-over-year. Foreign currency translation was modestly favorable to net sales year-over-year. Favorable foreign currency translation experienced in the second half of 2017 slightly offset unfavorable impacts during the first half of the year. Raw material inflation rose by a mid-single-digit percentage driven mostly by supply related factors, including an unusual high number of supplier force majeure events in Europe, government mandated production curtailments in China to help improve pollution, and severe hurricanes in the U.S. In addition, oil prices moved sharply higher in the second half of the year also contributing to raw material inflation.

U.S. and Canada

During 2017, the pace of economic activity improved in the U.S. and Canada region versus the prior year, with higher industrial production despite lower automotive industry builds. Demand in the residential and commercial construction markets were modestly higher in 2017 compared to 2016. New home starts advanced about 2% in 2017 versus approximately 6% in 2016. Residential remodeling declined 1% in 2017 versus 2016, while commercial construction was flat compared to 7% growth in 2016. Market demand for architectural paint shifted more to trade paint as U.S. unemployment continued to decline. Demand in the overall U.S. DIY paint market remained soft throughout the year. PPG's architectural coatings performance in the U.S. followed market trends with solid improvement in company-owned same store sales throughout the year. The automotive refinish coatings business benefited from higher miles driven and more congestion on the roads due to lower unemployment. PPG's packaging coatings business continued to expand well ahead of the industry end-use market growth driven by continued strong sales growth momentum related to customer adoption of PPG's new interior can coatings technologies. Similar to 2016, PPG's automotive OEM coatings business lagged industry demand levels due to a customer-driven market-share shift away from PPG that was offset in other regions of the world. The U.S. and Canada region remained PPG's largest, representing approximately 43% of 2017 sales, although a smaller percentage of total sales than in the prior year.

Europe, Middle East and Africa

European economic activity improved in 2017 despite continued regional uncertainty over the United Kingdom's exit from the European Union. Overall GDP and industrial production improved in the region. Regional demand continued to be mixed by country and end-use market. Demand for PPG's products in several end-use markets drove the regional growth rate, including above market performance in automotive OEM coatings, aerospace coatings and specialty coatings and materials. PPG's architectural coatings - EMEA business sales volumes decreased year-over-year, driven by soft market demand in France and more competitive pressures in Northern and Eastern Europe.

EMEA represented approximately 30% of PPG's 2017 sales, similar to prior year levels. Regional coatings volumes remain approximately 13% below their pre-recession levels in 2008. The modest volume recovery reflects the slow pace of economic growth in the region. PPG expects continued volume growth over time at attractive incremental margins due to significant cost structure improvements and available capacity to satisfy additional demand. In the second half of the year, the euro appreciated approximately 5% against the U.S. dollar. The British pound recovered some of its 2016 declines versus the U.S. dollar gaining about 10% from the start of 2017.

Asia Pacific and Latin America

The emerging regional markets of Asia Pacific and Latin America represented 27% of PPG's 2017 sales in aggregate, 200 basis points higher than the prior year.

Asia remained the largest emerging region, with sales of approximately $2.5 billion, led by China, which continued as PPG's second largest country by revenue. Sales volume growth in Asia was led by the Industrial Coatings segment, in part due to strong sales volume growth in general industrial and automotive OEM. These increases were partially offset by the continued demand decline in the marine shipbuilding industry.

Overall, demand in Latin America improved year-over-year, with continued above market growth in Mexico and Central America. Economic conditions modestly improved in South America, primarily led by Brazil. In Mexico, the PPG-Comex business added over 200 new concessionaire locations, and strong growth continued in the automotive industry due to the opening of new automotive assembly plants within the country in the past 18 months. Foreign currency translation turned favorable in the second half of the year, principally the Mexican peso and Chinese yuan. In Central America, the Company continued to grow organically following a 2015 acquisition to expand its presence in the architectural end-use market.

Regional Outlook

Looking ahead to 2018, we expect to continue to operate in a more balanced global growth environment. We anticipate the positive economic trends in 2017 to mostly continue. We expect economic growth rates to remain consistent with 2017 for the U.S. and Canada, Europe, and Asia Pacific regions, and we expect the Latin America region will increase its economic growth year-over-year, when compared to 2017.

We anticipate PPG's U.S. and Canada regional growth will be led by general industrial coatings and packaging coatings, with flat automotive industry builds. We expect growth in the housing and commercial construction markets to be better than 2017.

We expect growth rates in Europe to stay at similar levels as 2017 but will remain mixed by sub-region and country. Favorable end-use market trends are expected to continue, particularly in automotive OEM coatings as industry build growth rates are anticipated to remain positive. Market demand is expected to improve in the architectural coatings business. There is greater risk to the economic environment in the U.K. as their exit from the European Union progresses.

In Asia Pacific, we expect continued industrial production growth in China as well as gains in Southeast Asia and India. In China, we see continued above global average growth with heightened risk as the Chinese economy continues to shift and rely more on domestic consumption. The regional declines in marine coatings sales volumes were less severe in the second half of 2017, and we expect a moderate recovery in sales volumes starting in the second half of 2018. Automotive build growth is expected to remain modestly positive.

In Latin America, we anticipate economic expansion will be led by Brazil and that Mexico's economic conditions will modestly improve.

Significant other factors

During 2017, PPG finalized the divestiture of its North American fiber glass business. This is a transformational milestone for the Company as it completed the culmination of a multi-year strategic shift in the company's business portfolio. The pre-tax cash proceeds from the sale were approximately $540 million.

In December 2016, PPG initiated a $195 million global restructuring program, with anticipated annual savings of approximately $125 million once fully implemented. The expected cost savings are broadly spread across all regions and all business units. The company achieved approximately $50 million of savings in 2017 and expects to achieve the full annualized target of $125 million by 2019. PPG will continue to aggressively manage the company's cost structure to ensure alignment with the overall demand environment and make adjustments as required to remain competitive in the marketplace.

Raw materials are a significant input cost to the process of manufacturing coatings. PPG experiences fluctuating energy and raw material costs driven by various factors, including changes in supplier feedstock costs and inventories, global industry activity levels, foreign currency exchange rates, and global supply and demand factors. In aggregate, average raw material costs were higher in 2017 versus 2016, due to supplier force majeure, natural disasters and environmental regulation enforcement. PPG currently expects overall coatings raw material prices to increase a mid-single-digit percentage in the first half of 2018, with impacts varied by region and commodity.

In 2017, aggregate selling prices were modestly higher year-over-year, reflecting the company's efforts to offset higher raw material costs. We expect to see further benefits from selling price actions taken in 2017 and other actions planned in 2018 to recover profit contribution margins. The Company will carefully monitor raw material costs during 2018 and assess the need for additional increases to selling prices to compensate for increases in raw material costs.

Pension and postretirement benefit costs, excluding settlements, curtailments and special termination benefits, totaled approximately $50 million in 2017, down approximately $70 million from 2016. In 2018, we expect pension and other postretirement benefit costs to decrease by approximately $15 million to $20 million due to strong 2017 asset performance improving the expected return on assets component of net periodic benefit cost as well as certain U.S. plan changes made in 2017.

PPG contributed $54 million to its U.S. defined benefit pension plans in 2017 and an additional $25 million in January 2018. In 2017, the Company made contributions aggregating $33 million to its non-U.S. defined benefit pension plans. In 2018, mandatory contributions to PPG's non-U.S. defined benefit pension plans are expected to be between $20 million and $30 million.

In 2017, unfavorable foreign currency translation experienced in the first half was completely offset by favorable foreign currency translation experienced in the second half of the year. Based on mid-January 2018 exchange rates, the Company expects year-over-year favorable foreign currency translation to increase 2018 sales by $250 million to $300 million and 2018 income before income taxes by $25 million to $30 million. We expect the foreign currency translation impact to be more prevalent during the first half of 2018, due to prior year foreign exchange rate trends. The foreign currency environment continues to be volatile and the impact on 2018 net sales and income before income taxes could differ from the guidance provided above. The Company generally purchases raw materials, incurs manufacturing costs and sells finished goods in the same currency, so we typically incur only modest foreign currency transaction costs.

With the enactment of the U.S. Tax Cuts and Jobs Act, the Company's 2018 effective tax rate from continuing operations is expected to be in the range of 23.0% and 24.0%. This range represents the Company's best estimate, including the new legislation, however, our estimate is subject to revision as the Company completes its assessment of the new law and as additional regulations and interpretations are issued. Other factors may affect the expected 2018 effective tax rate positively or negatively throughout the year, including changes to various statutory tax rates and regulations around the world.

Over the past four years, the Company used $3.4 billion of cash to repurchase about 33 million shares of PPG stock, including over $800 million in 2017. The Company ended the year with approximately $3.6 billion remaining under its current share repurchase authorizations. During 2017, the Company deployed approximately $325 million for acquisitions and $434 million for dividends. PPG increased its per-share dividend in July 2017, marking the 46th annual increase and the 118th consecutive year of dividend payments. The Company is committed to deploying a minimum of $2.4 billion of cash during 2018 on acquisitions and share repurchases as part of our previously communicated commitment to deploy $3.5 billion in 2017 and 2018 combined. In 2017, PPG deployed $1.1 million for acquisitions and share repurchases.

PPG ended 2017 with approximately $1.5 billion in cash and short-term investments. The Company expects continued strong cash generation in 2018.

Accounting Standards Adopted in 2017

Note 1, "Summary of Significant Accounting Policies," under Item 8 of this Form 10-K/A describes the Company's recently adopted accounting pronouncements.

Accounting Standards to be Adopted in Future Years

Note 1, "Summary of Significant Accounting Policies," under Item 8 of this Form 10-K/A describes accounting pronouncements that have been promulgated prior to December 31, 2017 but are not effective until a future date.

Commitments and Contingent Liabilities, including Environmental Matters

PPG is involved in a number of lawsuits and claims, both actual and potential, including some that it has asserted against others, in which substantial monetary damages are sought. See Item 3. "Legal Proceedings" and Note 14, "Commitments and Contingent Liabilities," under Item 8 of this Form 10-K/A for a description of certain of these lawsuits.

As discussed in Item 3 and Note 14, although the result of any future litigation of such lawsuits and claims is inherently unpredictable, management believes that, in the aggregate, the outcome of all lawsuits and claims involving PPG, including asbestos-related claims, will not have a material effect on PPG's consolidated financial position or liquidity; however, any such outcome may be material to the results of operations of any particular period in which costs, if any, are recognized.

It is PPG's policy to accrue expenses for contingencies when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. Reserves for environmental contingencies are exclusive of claims against third parties and are generally not discounted. In management's opinion, the Company operates in an environmentally sound manner and the outcome of the Company's environmental contingencies will not have a material effect on PPG's financial position or liquidity; however, any such outcome may be material to the results of operations of any particular period in which costs, if any, are recognized. Management anticipates that the resolution of the Company's environmental contingencies will occur over an extended period of time.

The Company continues to analyze, assess and remediate the environmental issues associated with PPG's former chromium manufacturing plant in Jersey City, N.J. and associated sites ("New Jersey Chrome"). Information will continue to be generated from the ongoing groundwater remedial investigation activities related to New Jersey Chrome and will be incorporated into a final draft remedial action work plan for groundwater expected to be submitted to the New Jersey Department of Environmental Protection in 2021.

There are multiple, future events yet to occur, including further remedy selection and design, remedy implementation and execution and applicable governmental agency or community organization approvals. Considerable uncertainty exists regarding the timing of these future events for the New Jersey Chrome sites. Final resolution of these events is expected to occur over the next several years. As these events occur and to the extent that the cost estimates of the environmental remediation remedies change, the existing reserve for this environmental remediation matter will be adjusted.

Liquidity and Capital Resources (As Restated)

During the past three years, PPG has had sufficient financial resources to meet its operating requirements, to fund our capital spending, including acquisitions, share repurchases and pension plans and to pay increasing dividends to shareholders.

Cash and cash equivalents and short-term investments

($ in millions)	2017	2016
Cash and cash equivalents	$1,436	$1,820
Short-term investments	55	43
Total	$1,491	$1,863

Cash from operating activities - continuing operations

($ in millions, except percentages)				% Change	
	2017	2016	2015	2017 vs. 2016	2016 vs. 2015
	As Restated				
Cash from operating activities	$1,551	$1,218	$1,759	27.3%	(30.8)%

2017 vs. 2016

The $333 million increase in cash from operating activities - continuing operations, was primarily due to the absence of the prior year funding of the Pittsburgh Corning asbestos trust (the "Trust"), lower defined benefit pension contributions, lower restructuring payments and lower interest payments, partially offset by higher cash taxes paid in 2017 and higher working capital.

2016 vs. 2015

The $541 million decrease in cash from operating activities - continuing operations, was primarily due to the after-tax funding of the Trust, partially offset by lower working capital and lower defined benefit pension contributions.

Operating working capital

Operating Working Capital is a subset of total working capital and represents (1) receivables from customers, net of allowance for doubtful accounts, (2) inventories, and (3) trade liabilities. See Note 4, "Working Capital Detail" under Item 8 of this Form 10-K/A for further information related to the components of the Company's Operating Working Capital. We believe Operating Working Capital represents the key components of working capital under the operating control of our businesses.

A key metric we use to measure our working capital management is Operating Working Capital as a percentage of sales (fourth quarter sales annualized).

($ in millions, except percentages)	2017	2016
Trade Receivables, net	$2,559	$2,288
Inventories, FIFO	1,833	1,620
Trade Creditor's Liabilities	2,321	1,907
Operating Working Capital	$2,071	$2,001
Operating Working Capital as a % of fourth quarter sales, annualized	14.1 %	14.6 %
Trade Receivables, net as a % of fourth quarter sales, annualized	17.4 %	16.7 %
Days sales outstanding	57	54
Inventories, FIFO as a % of fourth quarter sales, annualized	12.4 %	11.9 %
Inventory turnover	4.8	4.6

Environmental expenditures

($ in millions)	2017	2016	2015
Cash outlays related to environmental remediation activities	$44	$47	$109

We expect cash outlays for environmental remediation activities in 2018 to be between $25 million and $75 million.

Defined benefit pension plan contributions

($ in millions)	2017	2016	2015
U.S. defined benefit pension plans	$54	$134	$224
Non-U.S. defined benefit pension plans	$33	$54	$39

PPG contributed $54 million and $25 million to its U.S. defined benefit pension plans during 2017 and in January 2018, respectively. Some contributions to PPG's non-U.S. defined benefit pension plans in 2017 were required by local funding requirements. PPG expects to make mandatory contributions to its non-U.S. defined benefit pension plans in the range of $20 million to $30 million in 2018. PPG may make voluntary contributions to its defined benefit pension plans in 2018 and beyond.

Asbestos settlement trust funding

In June 2016, PPG fully funded its portion of the trust that was established by the U.S. Bankruptcy Court for the Western District of Pennsylvania in May 2016. PPG's total cash obligations to fund the Trust totaled $813 million (pre-tax). All payments were applied against a previously established PPG reserve for the total asbestos trust obligation. The company utilized cash on hand for the payments, and this funding had no impact on PPG's previously stated cash-deployment targets. Refer to Note 14, "Commitments and Contingent Liabilities" under Item 8 of this Form 10-K/A for additional information.

Cash used for investing activities - continuing operations

($ in millions, except percentages)				% Change	
	2017	2016	2015	2017 vs. 2016	2016 vs. 2015
Cash (used for)from investing activities	($63)	$472	($349)	(113.3)%	235.2%

2017 vs. 2016

The $535 million decrease in cash used for investing activities - continuing operations, was primarily due to the absence of the prior year proceeds from the sale of the flat glass business, European fiber glass business and two Asian joint ventures, as well as lower capital expenditures, including business acquisitions, partially offset by the current year proceeds from the sale of the North American fiber glass business.

2016 vs. 2015
The $821 million increase in cash from investing activities - continuing operations, was primarily due to the proceeds received from the divestiture of the flat glass business, European fiber glass business and two Asian joint ventures, partially offset by lower cash received from the maturity of short-term investments.
Capital expenditures, including business acquisitions

($ in millions, except percentages)				% Change	
	2017	2016	2015	2017 vs. 2016	2016 vs. 2015
Capital expenditures [1]	$360	$380	$430	(5.3)%	(11.6)%
Business acquisitions, net of cash acquired [2]	$325	$349	$320	(6.9)%	9.1%
Total capital expenditures, including acquisitions	$685	$729	$750	(6.0)%	(2.8)%
Capital expenditures, excluding acquisitions as a % of sales	2.4 %	2.7 %	3.0 %	(11.1)%	(10.0)%

(1) Includes modernization and productivity improvements, expansion of existing businesses and environmental control projects.
(2) Excluding cash acquired, business acquisitions totaled $332 million, $362 million, and $440 million in 2017, 2016 and 2015, respectively.
Capital expenditures related to modernization and productivity improvements, expansion of existing businesses and environmental control projects is expected to be in the range of 2.5% to 3.0% of sales during 2018.
A primary focus for the Company in 2018 will continue to be cash deployment focused on profitable income growth, including pursuing opportunities for additional strategic acquisitions.
Cash proceeds from divestitures
In September 2017, PPG completed the sale of its North American fiber glass business to Nippon Electric Glass Co. and received approximately $540 million in pre-tax cash proceeds.
During 2016, PPG finalized the sale of its flat glass business and several other businesses and business affiliates. The Company received total pre-tax cash proceeds of approximately $1.1 billion from these business divestitures. Refer to Note 3, “Acquisitions and Divestitures” under Item 8 of this Form 10-K/A for additional information.
Cash used for financing activities - continuing operations

				% Change	
($ in millions, except percentages)	2017	2016	2015	2017 vs. 2016	2016 vs. 2015
Cash used for financing activities	($1,954)	($1,210)	($812)	61.5%	49.0%

2017 vs. 2016
The $744 million increase in cash used for financing activities - continuing operations, was primarily due to repayment of long term debt and higher dividends in 2017, partially offset by issuance of long term debt in 2016 and lower net purchases of treasury stock year-over-year.
2016 vs. 2015
The $398 million increase in cash used for financing activities - continuing operations, was primarily due to higher dividends in 2016, higher net purchases of treasury stock year-over-year, lower net issuance of long term debt in 2016, partially offset by lower taxes withheld for share-based payments.
Share repurchase activity

($ in millions, except number of shares)	2017	2016	2015
Number of shares repurchased (millions)	7.4	10.7	7.0
Cost of shares repurchased	$813	$1,050	$751

We anticipate completing additional share repurchases during 2018. The Company has approximately $3.6 billion remaining under the current authorizations from the Board of Directors, the latest of which was approved in December 2017. The current authorized repurchase programs have no expiration date.

Dividends paid to shareholders

($ in millions)	2017	2016	2015
Dividends paid to shareholders	$434	$414	$383

PPG has paid uninterrupted annual dividends since 1899, and 2017 marked the 46th consecutive year of increased annual per-share dividend payments to shareholders. The Company raised its per-share dividend by 13% to $0.45 per share in July 2017.

Debt issued and repaid

Debt Issued	Year	$ in millions
€300 million 0.000% Notes due 2019 and €600 million 0.875% Notes due 2025	2016	$987
€600 million 0.875% Notes due 2022 and €600 million 1.400% Notes due 2027	2015	1,240

Debt Repaid	Year	$ in millions
3-year variable rate bank loan due 2017	2017	$587
$125 million 6.65% notes due 2018	2016	133
Two $250 million Term Loan Credit Agreements	2016	500
$250 million 1.9% notes	2016	250
€300 million 3.875% notes	2015	336

The ratio of total debt, including capital leases, to total debt and equity was 43% at December 31, 2017 down from 47% in 2016.

Credit agreements and lines of credit

In December 2015, PPG entered into a five-year credit agreement (the "Credit Agreement") with several banks and financial institutions as further discussed in Note 9, "Borrowings and Lines of Credit" under Item 8 of this Form 10-K/A. The Credit Agreement provides for a $1.8 billion unsecured revolving credit facility. The Credit Agreement will terminate on December 18, 2020. During the years ended December 31, 2017 and 2016, there were no borrowings outstanding under the existing or the prior Credit Agreement.

In addition to the amounts available under the lines of credit, the Company has an automatic shelf registration statement on file with the SEC pursuant to which it may issue, offer and sell from time to time on a continuous or delayed basis any combination of securities in one or more offerings.

See Note 9, "Borrowings and Lines of Credit," under Item 8 of this Form 10-K/A for information regarding notes entered into and repaid as well as details regarding the use and availability of committed and uncommitted lines of credit, letters of credit, guarantees and debt covenants.

Contractual obligations

We continue to believe that our cash on hand and short term investments, cash from operations and the Company's access to capital markets will continue to be sufficient to fund our operating activities, capital spending, acquisitions, dividend payments, debt service, share repurchases, contributions to pension plans, and PPG's significant contractual obligations. These significant contractual obligations are presented in the following table.

($ in millions)		Obligations Due In:			
	Total	2018	2019-2020	2021-2022	Thereafter
Contractual Obligations					
Long-term debt	$4,123	$—	$1,151	$849	$2,123
Short-term debt	8	8	—	—	—
Capital lease obligations	15	4	5	2	4
Operating leases	840	212	305	149	174
Interest payments(1)	1,004	94	179	115	616
Pension contributions(2)	55	55	—	—	—
Unconditional purchase commitments(3)	124	55	39	11	19
Other commitments	136	6	56	13	61
Total	$6,305	$434	$1,735	$1,139	$2,997

(1) Includes interest on all outstanding debt.

(2) Includes the high end of the range of the expected mandatory pension contributions for 2018 only and U.S. contributions made in January 2018, as PPG is unable to estimate the pension contributions beyond 2018.

(3) The unconditional purchase commitments are principally take-or-pay obligations related to the purchase of certain materials, including industrial gases and electricity, consistent with customary industry practice.

Other liquidity matters

On December 22, 2017, the U.S. enacted the Tax Cuts and Jobs Act (the "Act") which, among other things lowered the U.S. corporate statutory income tax rate from 35% to 21%, eliminated certain deductible items and added other deductible items for corporations, imposed a tax on unrepatriated foreign earnings and eliminated U.S. taxes on most future foreign earnings. In December 2017, the Company recorded a net tax charge of $134 million related to the Act. The net charge consists of the tax on unrepatriated foreign earnings of approximately $250 million and a charge of approximately $125 million related to the remeasurement of PPG's U.S. deferred tax assets and liabilities at the new enacted statutory rate. These charges were partially offset by a benefit from the reversal of an existing deferred tax liability on repatriated foreign earnings of approximately $150 million and a benefit resulting from PPG's decision to accelerate recognition of certain U.S. tax attributes during the fourth quarter.

This net charge is $37 million higher than the net charge included in PPG's fourth quarter earnings release and Form 8-K furnished on January 18, 2018, primarily due to new IRS regulations issued and refinements of management estimates. The net charge recorded as a provisional amount as of December 31, 2017 represents the Company's best estimate using information available as of February 1, 2018. The Company anticipates U.S. regulatory agencies will issue further regulations during 2018, which may alter this estimate. The Company is still evaluating among other things, its position with respect to permanent reinvestment of foreign earnings overseas and other related outside basis difference considerations and the amount of tax owed on unrepatriated earnings by subsidiaries. The Company believes its remeasurement of the U.S deferred tax assets and liabilities is complete, except for changes in estimates that can result from finalizing the filing of our 2017 U.S. income tax return, which are not anticipated to be material, and changes that may be a direct impact of other provisional amounts recorded due to the enactment of the Act. The Company will refine its estimates to incorporate new or better information as it comes available through the filing date of its 2017 U.S. income tax returns in the fourth quarter of 2018.

The tax owed by PPG on its unrepatriated foreign earnings is payable over eight years and is subject to a prescriptive calculation to determine the portion payable in 2018 and beyond. PPG's current estimate, using this prescriptive method, indicates its tax payable will be increased by approximately $1 million to $3 million per year through 2025. As such, the portion of the tax on unrepatriated foreign earnings not payable within the next 12 months is presented within "Other liabilities" on the consolidated balance sheet.

The Company currently expects its 2018 on-going effective tax rate from continuing operations to be in the range of 23% to 24%.

At December 31, 2017, the total amount of unrecognized tax benefits for uncertain tax positions, including an accrual of related interest and penalties along with positions only impacting the timing of tax benefits, was $163 million. The timing of payments will depend on the progress of examinations with tax authorities. PPG does not expect a significant tax payment related to these obligations within the next year. The Company is unable to make a reasonably reliable estimate as to when any significant cash settlements with taxing authorities may occur.

Off-Balance Sheet Arrangements

The Company's off-balance sheet arrangements include the operating leases and unconditional purchase commitments disclosed in the "Liquidity and Capital Resources" section in the contractual obligations table as well as letters of credit and guarantees as discussed in Note 9, "Borrowings and Lines of Credit," under Item 8 of this Form 10-K/A.

Critical Accounting Estimates

Management has evaluated the accounting policies used in the preparation of the financial statements and related notes presented under Item 8 of this Form 10-K/A and believes those policies to be reasonable and appropriate. We believe that the most critical accounting estimates made in the preparation of our financial statements are those related to accounting for contingencies, under which we accrue a loss when it is probable that a liability has been incurred and the amount can be reasonably estimated, and to accounting for pensions, other postretirement benefits, business combinations, goodwill and other identifiable intangible assets with indefinite lives because of the importance of management judgment in making the estimates necessary to apply these policies.

Contingencies

Contingencies, by their nature, relate to uncertainties that require management to exercise judgment both in assessing the likelihood that a liability has been incurred as well as in estimating the amount of potential loss. The most important contingencies impacting our financial statements are those related to the collectability of accounts receivable, to environmental remediation, to pending, impending or overtly threatened litigation against the Company and to the resolution of matters related to open tax years. For more information on these matters, see Note 4, "Working Capital Detail," Note 13, "Income Taxes" and Note 14, "Commitments and Contingent Liabilities" under Item 8 of this Form 10-K/A.

Defined Benefit Pension and Other Postretirement Benefit Plans

Accounting for pensions and other postretirement benefits involves estimating the cost of benefits to be provided well into the future and attributing that cost over the time period each employee works. To accomplish this, we make extensive use of assumptions about inflation, investment returns, mortality, turnover, medical costs and discount rates. The Company has established a process by which management reviews and selects these assumptions annually. See Note 13, "Employee Benefit Plans," under Item 8 of this Form 10-K/A for information on these plans and the assumptions used.

Business Combinations

In accordance with the accounting guidance for business combinations, the Company uses the acquisition method of accounting to allocate costs of acquired businesses to the assets acquired and liabilities assumed based on their estimated fair values at the dates of acquisition. The excess costs of acquired businesses over the fair values of the assets acquired and liabilities assumed were recognized as goodwill. The valuations of the acquired assets and liabilities will impact the determination of future operating results. In addition to using management estimates and negotiated amounts, the Company uses a variety of information sources to determine the estimated fair values of acquired assets and liabilities including: third-party appraisals for the estimated value and lives of identifiable intangible assets and property, plant and equipment; third-party actuaries for the estimated obligations of defined benefit pension plans and similar benefit obligations; and legal counsel or other experts to assess the obligations associated with legal, environmental and other contingent liabilities.

The business and technical judgment of management was used in determining which intangible assets have indefinite lives and in determining the useful lives of finite-lived intangible assets in accordance with the accounting guidance for goodwill and other intangible assets.

Goodwill and Intangible Assets

The Company tests indefinite-lived intangible assets and goodwill for impairment annually by either performing a qualitative evaluation or a quantitative test. The qualitative evaluation is an assessment of factors to determine whether it is more likely than not that the fair values of a reporting unit or asset is less than its carrying amount. Fair values under the quantitative test are estimated using discounted cash flow methodologies that are based on projections of the amounts and timing of future revenues and cash flows. For more information on these matters, see Note 1, "Summary of Significant Accounting Policies," under Item 8 of this Form 10-K/A.

We believe that the amounts recorded in the financial statements under Item 8 of this Form 10-K/A related to these contingencies, pensions, other postretirement benefits, business combinations, goodwill and other identifiable intangible assets with indefinite lives are based on the best estimates and judgments of the appropriate PPG management, although actual outcomes could differ from our estimates.

Currency

Comparing exchange rates from December 31, 2016 to December 31, 2017, the U.S. dollar weakened against the currencies in most countries in which PPG operates, most notably the Mexican peso, British pound, Chinese yuan and euro. As a result, consolidated net assets at December 31, 2017 increased by approximately $231 million from December 31, 2016.

Comparing exchange rates from December 31, 2015 to December 31, 2016, the U.S. dollar strengthened against the currencies in most countries in which PPG operates, most notably the Mexican peso, British pound, Chinese yuan and euro. As a result, consolidated net assets at December 31, 2016 decreased by approximately $465 million from December 31, 2015.

Comparing exchange rates during 2017 to those of 2016, in the countries in which PPG operates, the U.S. dollar was stronger overall, which had an unfavorable impact of approximately $7 million on full year 2017 income before income taxes from the translation of this foreign income into U.S. dollars.

Comparing exchange rates during 2016 to those of 2015, in the countries in which PPG operates, the U.S. dollar was stronger overall, which had an unfavorable impact of approximately $70 million on full year 2016 income before income taxes from the translation of this foreign income into U.S. dollars.

Forward-Looking Statements

The Private Securities Litigation Reform Act of 1995 provides a safe harbor for forward-looking statements made by or on behalf of the Company. Management’s Discussion and Analysis and other sections of this Annual Report contain forward-looking statements that reflect the Company’s current views with respect to future events and financial performance.

You can identify forward-looking statements by the fact that they do not relate strictly to current or historic facts. Forward-looking statements are identified by the use of the words “aim,” “believe,” “expect,” “anticipate,” “intend,” “estimate, “project,” “outlook,” “forecast” and other expressions that indicate future events and trends. Any forward-looking statement speaks only as of the date on which such statement is made, and the Company undertakes no obligation to update any forward looking statement, whether as a result of new information, future events or otherwise. You are advised, however, to consult any further disclosures we make on related subjects in our reports to the Securities and Exchange Commission. Also, note the following cautionary statements.

Many factors could cause actual results to differ materially from the Company’s forward-looking statements. Such factors include the impacts of the natural disasters in Mexico, Puerto Rico and the U.S., and their length and severity, any currently unanticipated future impacts from the natural disasters, global economic conditions, increasing price and product competition by foreign and domestic competitors, fluctuations in cost and availability of raw materials, the ability to increase selling price, the ability to recover margins, our ability to maintain favorable supplier relationships and arrangements, the timing of and the realization of anticipated cost savings from restructuring initiatives, difficulties in integrating acquired businesses and achieving expected synergies therefrom, economic and political conditions in the markets we serve, the ability to penetrate existing, developing and emerging foreign and domestic markets, foreign exchange rates and fluctuations in such rates, fluctuations in tax rates, the impact of future legislation, the impact of environmental regulations, unexpected business disruptions, our ability to successfully remediate the material weakness in our internal control over financial reporting disclosed in this report within the time periods and in the manner currently anticipated, the effectiveness of our internal control over financial reporting, including the identification of additional control deficiencies, further expenditures related to our restatement, the results of governmental actions relating to pending investigations, the results of shareholder actions relating to the restatement of our financial statements and the unpredictability of existing and possible future litigation. However, it is not possible to predict or identify all such factors.

Consequently, while the list of factors presented here and under Item 1A is considered representative, no such list should be considered to be a complete statement of all potential risks and uncertainties. Unlisted factors may present significant additional obstacles to the realization of forward-looking statements.

Consequences of material differences in the results compared with those anticipated in the forward-looking statements could include, among other things, lower sales or income, business disruption, operational problems, financial loss, legal liability to third parties, other factors set forth in Item 1A of this Form 10-K/A and similar risks, any of which could have a material adverse effect on the Company's consolidated financial condition, results of operations or liquidity.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

PPG is exposed to market risks related to changes in foreign currency exchange rates, interest rates, and was exposed to changes in PPG's stock price. The Company may enter into derivative financial instrument transactions in order to manage or reduce these market risks. A detailed description of these exposures and the Company's risk management policies are provided in Note 10, "Financial Instruments, Hedging Activities and Fair Value Measurements," under Item 8 of this Form 10-K/A.

The following disclosures summarize PPG's exposure to market risks and information regarding the use of and fair value of derivatives employed to manage its exposure to such risks. Quantitative sensitivity analyses have been provided to reflect how reasonably possible, unfavorable changes in market rates can impact PPG's consolidated results of operations, cash flows and financial position.

Foreign Currency Risk

We conduct operations in many countries around the world. Our results of operations are subject to both currency transaction and currency translation risk. Foreign currency forward contracts outstanding during 2017 and 2016 were generally designated as a hedge of PPG's exposure to foreign currency transaction risk. As of December 31, 2017 and 2016, the fair value of these contracts was a net liability of $19 million and a net asset of $16 million, respectively. The potential reduction in PPG's income from continuing operations resulting from the impact of adverse changes in exchange rates on the fair value of its outstanding foreign currency hedge contracts of 10% for European and Canadian currencies and 20% for Asian and Latin American currencies for the years ended December 31, 2017 and 2016 would have been $255 million and $105 million, respectively.

As of December 31, 2017 and 2016, PPG had U.S. dollar to Euro cross currency swap contracts with a total notional amount of $560 million outstanding. As of December 31, 2017 and 2016, the fair value of these contracts was a net asset of $2 million and $65 million, respectively. A 10% increase in the value of the Euro to the U.S. dollar would have had an unfavorable effect on the fair value of these swap contracts by reducing the value of these instruments by $58 million and by $54 million at December 31, 2017 and 2016, respectively.

As of December 31, 2017 and 2016, PPG had non-U.S. dollar denominated debt outstanding of $2.8 billion and $3.1 billion, respectively. A weakening of the U.S. dollar by 10% against European currencies and by 20% against Asian and South American currencies would have resulted in unrealized translation losses of $314 million and $344 million as of December 31, 2017 and 2016, respectively.

Interest Rate Risk

The Company manages its interest rate risk by balancing its exposure to fixed and variable rates while attempting to minimize its interest costs. A 10% increase in interest rates in the U.S., Canada, Mexico and Europe and a 20% increase in interest rates in Asia and South America would have an insignificant effect on PPG's variable rate debt obligations and interest expense for the years ended December 31, 2017 and 2016, respectively. Further, a 10% reduction in interest rates would have increased the present value of the Company's fixed rate debt by approximately $61 million and $65 million as of December 31, 2017 and 2016, respectively; however, such changes would not have had an effect on PPG's annual income from continuing operations or cash flows.

Equity Price Risk

In prior years, PPG entered into equity forward arrangements to hedge the Company's exposure to changes in the fair value of its future obligation to contribute PPG stock to the Trust (see Note 10, "Financial Instruments, Hedging Activities and Fair Value Measurements" and Note 14, "Commitments and Contingent Liabilities," under Item 8 of this Form 10-K/A). In June 2016, PPG satisfied its funding obligation to the Trust and the equity forward arrangements were settled. At settlement, the aggregated fair value of the equity forward arrangements was an asset of $258 million.

Item 8. Financial Statements and Supplementary Data
Report of Independent Registered Public Accounting Firm
To the Board of Directors and Shareholders of PPG Industries, Inc.
Opinions on the Financial Statements and Internal Control over Financial Reporting
We have audited the accompanying consolidated balance sheets of PPG Industries, Inc. and its subsidiaries as of December 31, 2017 and 2016, and the related consolidated statements of income, comprehensive income, shareholders' equity, and cash flows for each of the three years in the period ended December 31, 2017, including the related notes and schedule of valuation and qualifying accounts for each of the three years in the period ended December 31, 2017 appearing under item 15(a)(2) (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2017, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).
In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2017 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company did not maintain, in all material respects, effective internal control over financial reporting as of December 31, 2017, based on criteria established in Internal Control - Integrated Framework (2013) issued by the COSO because a material weakness in internal control over financial reporting related to ineffective controls within the Company's financial close process existed as of that date.
A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of the annual or interim financial statements will not be prevented or detected on a timely basis. The material weakness referred to above is described in the accompanying Management Report on Responsibility for Preparation of the Financial Statements and Establishing and Maintaining Adequate Internal Control Over Financial Reporting. We considered this material weakness in determining the nature, timing, and extent of audit tests applied in our audit of the December 31, 2017 consolidated financial statements, and our opinion regarding the effectiveness of the Company's internal control over financial reporting does not affect our opinion on those consolidated financial statements.
Restatement of Previously Issued Financial Statements and Management's Conclusion Regarding Internal Control over Financial Reporting
As discussed in Note 2 to the consolidated financial statements, the Company has restated its 2017 and 2016 financial statements to correct misstatements.
Management and we previously concluded that the Company maintained effective internal control over financial reporting as of December 31, 2017. However, management has subsequently determined that a material weakness in internal control over financial reporting related to ineffective controls within the Company's financial close process existed as of that date. Accordingly, management's report has been restated and our present opinion on internal control over financial reporting, as presented herein, is different from that expressed in our previous report.
Basis for Opinions
The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting included in management's report referred to above. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) ("PCAOB") and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.
We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ PricewaterhouseCoopers LLP
Pittsburgh, Pennsylvania
February 15, 2018, except for the effects of the restatement discussed in Note 2 to the consolidated financial statements and the matter described in the fourth paragraph of Management Report on Responsibility for Preparation of the Financial Statements and Establishing and Maintaining Adequate Internal Control Over Financial Reporting, as to which the date is June 28, 2018.

We have served as the Company’s auditor since 2013.

Management Report

Responsibility for Preparation of the Financial Statements and Establishing and Maintaining Adequate Internal Control Over Financial Reporting (As Restated)

We are responsible for the preparation of the consolidated financial statements included in this Annual Report. The consolidated financial statements were prepared in accordance with accounting principles generally accepted in the United States of America and include amounts that are based on the best estimates and judgments of management.

We are also responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Securities Exchange Act of 1934, as amended (the “Exchange Act”). Internal control over financial reporting, no matter how well designed, has inherent limitations. Therefore, internal control over financial reporting can provide only reasonable assurance and may not prevent or detect misstatements on a timely basis. In addition, because of changing conditions, there is risk in projecting any evaluation of internal controls to future periods.

We conducted an evaluation of the effectiveness of the Company’s internal control over financial reporting as of December 31, 2017. In making this evaluation, we used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in Internal Control - Integrated Framework (2013).

At the time that the Original Filing was made, we concluded that the Company’s internal control over financial reporting was effective as of December 31, 2017. As a result of the investigation described in the Explanatory Note immediately preceding the Table of Contents, we have subsequently concluded that the material weakness described below existed as of December 31, 2017. Therefore, we have concluded that, as of December 31, 2017, the Company’s internal control over financial reporting was ineffective. Accordingly, we have restated our report on internal control over financial reporting.

Material Weakness

A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of the Company’s annual or interim financial statements will not be prevented or detected on a timely basis.

We did not maintain effective controls within our financial close process. Specifically, the Company’s former Vice President and Controller directed his subordinates to improperly override the Company’s internal controls during the Company’s financial close process, which directions were followed and not disclosed to others in senior management, the Audit Committee or the Company’s independent registered public accounting firm and not otherwise detected by the Company’s internal controls. These actions often occurred after the end of a quarter and close to the end of the financial close process for the quarter and had the effect of positively impacting income from continuing operations reported for such quarter. This material weakness resulted in misstatements in the Company’s interim and annual financial statements that were not prevented or detected on a timely basis and led to the restatement of the Company’s financial statements for the years ended 2016 and 2017 and each of the quarters in the periods ended December 31, 2016, March 31, 2017, June 30, 2017, September 30, 2017, and December 31, 2017.

Until such time as it is remediated, this material weakness could result in material misstatements of the Company’s financial statements that would not be prevented or detected.

PricewaterhouseCoopers LLP, an independent registered public accounting firm, has issued their report, included on page 42-43 of this Form 10-K/A, regarding the Company’s internal control over financial reporting.

/s/ Michael H. McGarry	/s/ Vincent J. Morales
Michael H. McGarry	Vincent J. Morales
Chairman and Chief Executive Officer	Senior Vice President and Chief Financial Officer
June 28, 2018	June 28, 2018

Consolidated Statement of Income

($ in millions, except per share amounts)	For the Year 2017 As Restated	2016 As Restated	2015
Net sales	$14,748	$14,270	$14,241
Cost of sales, exclusive of depreciation and amortization	8,207	7,693	7,786
Selling, general and administrative	3,564	3,588	3,584
Depreciation	331	319	314
Amortization	129	121	132
Research and development, net	453	459	466
Interest expense	105	125	125
Interest income	(20)	(26)	(39)
Asbestos settlement, net	—	5	12
Business restructuring	—	191	136
Pension settlement charges	60	968	—
Other charges	64	175	90
Other income	(150)	(127)	(110)
Income before income taxes	$2,005	$779	$1,745
Income tax expense	615	214	413
Income from continuing operations	$1,390	$565	$1,332
Income from discontinued operations, net of tax	225	330	95
Net income attributable to the controlling and noncontrolling interests	$1,615	$895	$1,427
Less: net income attributable to noncontrolling interests	21	22	21
Net income (attributable to PPG)	$1,594	$873	$1,406
Amounts Attributable to PPG			
Continuing operations	$1,369	$543	$1,311
Discontinued operations	225	330	95
Net income	$1,594	$873	$1,406
Earnings per common share			
Continuing operations	$5.34	$2.05	$4.83
Discontinued operations	0.88	1.24	0.35
Net income (attributable to PPG)	$6.22	$3.29	$5.18
Earnings per common share - assuming dilution			
Continuing operations	$5.31	$2.04	$4.79
Discontinued operations	0.87	1.23	0.35
Net income (attributable to PPG)	$6.18	$3.27	$5.14

Consolidated Statement of Comprehensive Income

($ in millions)	For the Year 2017 As Restated	2016 As Restated	2015
Net income attributable to the controlling and noncontrolling interests	$1,615	$895	$1,427
Unrealized foreign currency translation gains/(losses)	248	(476)	(717)
Defined benefit pension and other postretirement benefit adjustments	78	808	113
Unrealized (losses)/gains – derivative financial instruments	(10)	4	5
Other comprehensive income/(loss), net of tax	316	336	(599)
Total comprehensive income	$1,931	$1,231	$828
Less: amounts attributable to noncontrolling interests:			
Net income	(21)	(22)	(21)

Unrealized foreign currency translation (losses)/gains	(17)	10	13
Comprehensive income attributable to PPG	$1,893	$1,219	$820

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

Consolidated Balance Sheet

($ in millions)	December 31 2017 As Restated	2016 As Restated
Assets		
Current assets		
Cash and cash equivalents	$1,436	$1,820
Short-term investments	55	43
Receivables	2,903	2,654
Inventories	1,730	1,514
Assets held for sale	—	223
Other	353	320
Total current assets	$6,477	$6,574
Property, plant and equipment, net	2,824	2,608
Goodwill	3,942	3,572
Identifiable intangible assets, net	2,045	1,983
Deferred income taxes	305	186
Investments	268	179
Other assets	677	669
Total	$16,538	$15,771
Liabilities and Shareholders' Equity		
Current liabilities		
Accounts payable and accrued liabilities	$3,781	$3,460
Restructuring reserves	102	100
Short-term debt and current portion of long-term debt	12	629
Liabilities held for sale	—	64
Total current liabilities	$3,895	$4,253
Long-term debt	4,134	3,787
Accrued pensions	729	740
Other postretirement benefits	699	724
Deferred income taxes	442	417
Other liabilities	967	935
Total liabilities	$10,866	$10,856
Commitments and contingent liabilities (See Note 14)		
Shareholders' equity		
Common stock	$969	$969
Additional paid-in capital	756	707
Retained earnings	17,140	15,980
Treasury stock, at cost	(11,251)	(10,472)
Accumulated other comprehensive loss	(2,057)	(2,356)
Total PPG shareholders' equity	$5,557	$4,828
Noncontrolling interests	115	87
Total shareholders' equity	$5,672	$4,915
Total	$16,538	$15,771

The accompanying notes to the consolidated financial statements are an integral part of this consolidated statement.

Consolidated Statement of Shareholders’ Equity

($ in millions)	Common Stock	Additional Paid-In Capital	Retained Earnings	Treasury Stock	Accumulated Other Comprehensive Income/(Loss)	Total PPG	Non-controlling Interests	Total
		As Restated	As Restated			As Restated		As Restated
January 1, 2015	$484	$1,028	$14,498	($8,714)	($2,116)	$5,180	$85	$5,265
Net income attributable to the controlling and noncontrolling interests	—	—	1,406	—	—	1,406	21	1,427
Other comprehensive loss, net of tax	—	—	—	—	(586)	(586)	(13)	(599)
Cash dividends	—	—	(383)	—	—	(383)	—	(383)
2:1 Stock split	485	(485)	—	—	—	—	—	—
Purchase of treasury stock	—	—	—	(751)	—	(751)	—	(751)
Issuance of treasury stock	—	46	—	25	—	71	—	71
Stock-based compensation activity	—	46	—	—	—	46	—	46
Dividends paid on subsidiary common stock to noncontrolling interests	—	—	—	—	—	—	(4)	(4)
Reductions in noncontrolling interests	—	—	—	—	—	—	(3)	(3)
December 31, 2015	$969	$635	$15,521	($9,440)	($2,702)	$4,983	$86	$5,069
Net income attributable to the controlling and noncontrolling interests (As Restated)	—	—	873	—	—	873	22	895
Other comprehensive loss, net of tax	—	—	—	—	346	346	(10)	336
Cash dividends	—	—	(414)	—	—	(414)	—	(414)
Purchase of treasury stock	—	—	—	(1,050)	—	(1,050)	—	(1,050)
Issuance of treasury stock	—	37	—	18	—	55	—	55
Stock-based compensation activity (As Restated)	—	35	—	—	—	35	—	35
Dividends paid on subsidiary common stock to noncontrolling interests	—	—	—	—	—	—	(4)	(4)
Reductions in noncontrolling interests	—	—	—	—	—	—	(7)	(7)
December 31, 2016 (As Restated)	$969	$707	$15,980	($10,472)	($2,356)	$4,828	$87	$4,915
Net income attributable to the controlling and noncontrolling interests (As Restated)	—	—	1,594	—	—	1,594	21	1,615
Other comprehensive income, net of tax	—	—	—	—	299	299	17	316
Cash dividends	—	—	(434)	—	—	(434)	—	(434)
Purchase of treasury stock	—	—	—	(813)	—	(813)	—	(813)
Issuance of treasury stock	—	49	—	34	—	83	—	83
Stock-based compensation activity (As Restated)	—	—	—	—	—	—	—	—
Dividends paid on subsidiary common stock to noncontrolling	—	—	—	—	—	—	(5)	(5)

interests								
Reductions in noncontrolling interests	—	—	—	—	—	—	(5)	(5)
December 31, 2017 (As Restated)	$969	$756	$17,140	($11,251)	($2,057)	$5,557	$115	$5,672

The accompanying notes to the consolidated financial statements are an integral part of this consolidated statement.

Consolidated Statement of Cash Flows

($ in millions)	For the Year 2017 As Restated	2016 As Restated	2015
Operating activities			
Net income attributable to the controlling and noncontrolling interests	$1,615	$895	$1,427
Less: Income from discontinued operations	225	330	95
Income from continuing operations	$1,390	$565	$1,332
Adjustments to reconcile to cash from operations:			
Depreciation and amortization	460	440	446
Defined benefit pension expense	65	85	88
Pension settlement charge	60	968	—
Business restructuring charge	—	191	136
Environmental remediation charge	—	82	—
Stock-based compensation expense	35	45	54
Net gain, from sale of businesses	(25)	(39)	—
Equity affiliate (income)/loss, net of dividends	(4)	(6)	66
Deferred income taxes	38	171	—
Contributions to pension plans	(87)	(188)	(263)
Restructuring payments	(49)	(76)	(47)
Funding of asbestos settlement trust	—	(813)	—
Change in certain asset and liability accounts (net of acquisitions):			
Receivables	(76)	(68)	(125)
Inventories	(116)	56	37
Other current assets	(43)	21	(81)
Accounts payable and accrued liabilities	188	169	152
Noncurrent assets and liabilities, net	(170)	(53)	79
Taxes and interest payable	(129)	(268)	(96)
Other	14	(64)	(19)
Cash from operating activities - continuing operations	$1,551	$1,218	$1,759
Cash from operating activities - discontinued operations	17	133	136
Cash from operating activities	$1,568	$1,351	$1,895
Investing activities			
Capital expenditures	($360)	($380)	($430)
Business acquisitions, net of cash balances acquired	(225)	(349)	(320)
Payments for acquisition of equity investment	(100)	—	—
Net proceeds from the sale of businesses	593	1,094	47
Proceeds from maturity of short-term investments	—	92	402
Purchase of short-term investments	(1)	—	(97)
Payments for the settlement of cross currency swap contracts	(34)	(36)	(34)
Proceeds from the settlement of cross currency swap contracts	37	37	37
(Payments on) / Proceeds from net investment hedges	—	(13)	19
Other	27	27	27
Cash (used for)/from investing activities - continuing operations	($63)	$472	($349)
Cash used for investing activities - discontinued operations	(4)	(36)	(46)
Cash (used for)/from investing activities	($67)	$436	($395)
Financing activities			
Net change in borrowings with maturities of three months or less	($7)	($15)	($32)
Net payments on commercial paper and short-term debt	(93)	(361)	(528)

Net proceeds from the issuance of long-term debt (net of discount and issuance costs)	—	988	1,242
Repayment of long-term debt	(588)	(379)	(340)
Payments related to tax withholding on stock-based compensation awards	(28)	(26)	(58)
Purchase of treasury stock	(813)	(1,050)	(751)
Issuance of treasury stock	52	31	53
Dividends paid on PPG common stock	(434)	(414)	(383)
Other	(43)	16	(15)
Cash used for financing activities	($1,954)	($1,210)	($812)
Effect of currency exchange rate changes on cash and cash equivalents	69	(68)	(63)
Net (decrease) increase in cash and cash equivalents	($384)	$509	$625
Cash and cash equivalents, beginning of year	$1,820	$1,311	$686
Cash and cash equivalents, end of year	$1,436	$1,820	$1,311
Supplemental disclosures of cash flow information:			
Interest paid, net of amount capitalized	$100	$118	$115
Taxes paid, net of refunds	$648	$349	$383

The accompanying notes to the consolidated financial statements are an integral part of this consolidated statement.

Notes to the Consolidated Financial Statements

1. Summary of Significant Accounting Policies

Principles of Consolidation

The accompanying consolidated financial statements include the accounts of PPG Industries, Inc. (“PPG” or the “Company”) and all subsidiaries, both U.S. and non-U.S., that it controls. PPG owns more than 50% of the voting stock of most of the subsidiaries that it controls. For those consolidated subsidiaries in which the Company’s ownership is less than 100%, the outside shareholders’ interests are shown as noncontrolling interests. Investments in companies in which PPG owns 20% to 50% of the voting stock and has the ability to exercise significant influence over operating and financial policies of the investee are accounted for using the equity method of accounting. As a result, PPG’s share of income or losses from such equity affiliates is included in the accompanying consolidated statement of income and PPG’s share of these companies’ shareholders’ equity is included in “Investments” in the accompanying consolidated balance sheet. Transactions between PPG and its subsidiaries are eliminated in consolidation.

Use of Estimates in the Preparation of Financial Statements

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the reported amounts of income and expenses during the reporting period. Such estimates also include the fair value of assets acquired and liabilities assumed resulting from the allocation of the purchase price related to business combinations consummated. Actual outcomes could differ from those estimates.

Revenue Recognition

The Company recognizes revenue when the earnings process is complete. Revenue is recognized by all operating segments when goods are shipped and title to inventory and risk of loss passes to the customer or when services have been rendered.

Shipping and Handling Costs

Amounts billed to customers for shipping and handling are reported in “Net sales” in the accompanying consolidated statement of income. Shipping and handling costs incurred by the Company for the delivery of goods to customers are included in “Cost of sales, exclusive of depreciation and amortization” in the accompanying consolidated statement of income.

Selling, General and Administrative Costs

Amounts presented as “Selling, general and administrative” in the accompanying consolidated statement of income are comprised of selling, customer service, distribution and advertising costs, as well as the costs of providing corporate-wide functional support in such areas as finance, law, human resources and planning. Distribution costs pertain to the movement and storage of finished goods inventory at company-owned and leased warehouses and other distribution facilities.

Advertising Costs

Advertising costs are expensed as incurred and totaled $313 million, $322 million and $324 million in 2017, 2016 and 2015, respectively.

Research and Development

Research and development costs, which consist primarily of employee related costs, are charged to expense as incurred.

($ in millions)	2017	2016	2015
Research and development – total	$474	$479	$484
Less depreciation on research facilities	21	20	18
Research and development, net	$453	$459	$466

Legal Costs

Legal costs, primarily include costs associated with acquisition and divestiture transactions, general litigation, environmental regulation compliance, patent and trademark protection and other general corporate purposes, are charged to expense as incurred.

Foreign Currency Translation

The functional currency of most significant non-U.S. operations is their local currency. Assets and liabilities of those operations are translated into U.S. dollars using year-end exchange rates; income and expenses are translated using the average exchange rates for the reporting period. Unrealized foreign currency translation gains and losses are deferred in accumulated other comprehensive loss, a separate component of shareholders' equity.

Notes to the Consolidated Financial Statements

Cash Equivalents

Cash equivalents are highly liquid investments (valued at cost, which approximates fair value) acquired with an original maturity of three months or less.

Short-term Investments

Short-term investments are highly liquid, high credit quality investments (valued at cost plus accrued interest) that have stated maturities of greater than three months to one year. The purchases and sales of these investments are classified as investing activities in the consolidated statement of cash flows.

Marketable Equity Securities

The Company's investment in marketable equity securities is recorded at fair market value and reported in "Other current assets" and "Investments" in the accompanying consolidated balance sheet with changes in fair market value recorded in income for those securities designated as trading securities and in other comprehensive income, net of tax, for those securities designated as available for sale.

Inventories

Inventories are stated at the lower of cost or net realizable value. Most U.S. inventories are stated at cost, using the last-in, first-out ("LIFO") method of accounting, which does not exceed net realizable value. All other inventories are stated at cost, using the first-in, first-out ("FIFO") method of accounting, which does not exceed net realizable value. PPG determines cost using either average or standard factory costs, which approximate actual costs, excluding certain fixed costs such as depreciation and property taxes. See Note 4, "Working Capital Detail" for further information concerning the Company's inventory.

Derivative Financial Instruments

The Company recognizes all derivative financial instruments (a "derivative") as either assets or liabilities at fair value on the consolidated balance sheet. The accounting for changes in the fair value of a derivative depends on the use of the instrument.

For a derivative that is considered "effective" as a hedge of an exposure to variability in expected future cash flows (cash flow hedge), the effective portion of the gain or loss on the derivative is recorded in other comprehensive income ("OCI") and the ineffective portion, if any, is reported in income from continuing operations. Amounts accumulated in OCI are reclassified into income from continuing operations in the same period or periods during which the hedged transactions are recorded in income from continuing operations.

For a derivative that is considered "effective" as a hedge of an exposure to changes in the fair value (fair value hedge) of an asset, a liability or a firm commitment, the change in the derivative's fair value is reported in income from continuing operations, offsetting the gain or loss recognized for the change in fair value of the asset, liability, or firm commitment that is being hedged.

For a derivative, debt or other financial instrument that is considered "effective" as a hedge of a net investment in a foreign operation, the gain or loss associated with the financial instrument is reported as a translation gain or loss in accumulated other comprehensive income ("AOCI"). Gains and losses in AOCI related to hedges of the Company's net investments in foreign operations are reclassified out of AOCI and recognized in income from continuing operations upon a substantial liquidation, sale or partial sale of such investments or upon impairment of all or a portion of such investments. The cash flow impact of these instruments have been and will be classified as investing activities in the consolidated statement of cash flows.

Changes in the fair value of derivative instruments not designated as hedges for hedge accounting purposes are recognized in income from continuing operations in the period of change.

Property, Plant and Equipment

Property, plant and equipment is recorded at cost. Depreciation is computed on a straight-line method based on the estimated useful lives of related assets. Additional depreciation expense is recorded when facilities or equipment are subject to abnormal economic conditions or obsolescence.

The cost of significant improvements that add to productive capacity or extend the lives of properties are capitalized. Costs for repairs and maintenance are charged to expense as incurred. When a capitalized asset is retired or otherwise disposed of, the original cost and related accumulated depreciation balance are removed from the accounts and any related gain or loss is recorded in income from continuing operations. The amortization cost of capitalized leased assets is recorded in depreciation expense. Property and other long-lived assets are reviewed for impairment whenever events or circumstances indicate that their carrying amounts may not be recoverable. See Note 5, “Property, Plant and Equipment” for further details.

Notes to the Consolidated Financial Statements

Goodwill and Identifiable Intangible Assets

Goodwill represents the excess of the cost over the fair value of acquired identifiable tangible and intangible assets less liabilities assumed from acquired businesses. Identifiable intangible assets acquired in business combinations are recorded based upon their fair value at the date of acquisition.

The Company tests goodwill of each reporting unit for impairment at least annually in connection with PPG's strategic planning process. The Company tests goodwill for impairment by either performing a qualitative evaluation or a quantitative test. The qualitative evaluation is an assessment of factors, including reporting unit specific operating results as well as industry, market and general economic conditions, to determine whether it is more likely than not that the fair values of a reporting unit is less than its carrying amount, including goodwill. The Company may elect to bypass this qualitative assessment for some or all of its reporting units and perform a quantitative test. The quantitative goodwill impairment test is performed during the fourth quarter by comparing the estimated fair value of the associated reporting unit as of September 30 to its carrying value. The Company's reporting units are its operating segments. (See Note 20, "Reportable Business Segment Information," for further information concerning the Company's operating segments.) Fair value is estimated using discounted cash flow methodologies.

The Company has determined that certain acquired trademarks have indefinite useful lives. The Company tests the carrying value of these trademarks for impairment at least annually, or as needed whenever events and circumstances indicate that their carrying amount may not be recoverable. The annual assessment takes place in the fourth quarter of each year either by completing a qualitative assessment or quantitatively by comparing the estimated fair value of each trademark as of September 30 to its carrying value. Fair value is estimated by using the relief from royalty method (a discounted cash flow methodology). The qualitative assessment includes consideration of factors, including revenue relative to the asset being assessed, the operating results of the related business as well as industry, market and general economic conditions, to determine whether it is more likely than not that the fair value of the asset is less than its carrying amount.

Identifiable intangible assets with finite lives are amortized on a straight-line basis over their estimated useful lives (1 to 30 years) and are reviewed for impairment whenever events or circumstances indicate that their carrying amount may not be recoverable.

Receivables and Allowances

All trade receivables are reported on the balance sheet at the outstanding principal adjusted for any allowance for credit losses and any charge offs. The Company provides an allowance for doubtful accounts to reduce receivables to their estimated net realizable value when it is probable that a loss will be incurred. Those estimates are based on historical collection experience, current economic and market conditions, a review of the aging of accounts receivable and the assessments of current creditworthiness of customers.

Product Warranties

The Company accrues for product warranties at the time the associated products are sold based on historical claims experience. The reserve, pre-tax charges against income and cash outlays for product warranties were not significant to the consolidated financial statements of the Company for any year presented.

Asset Retirement Obligations

An asset retirement obligation represents a legal obligation associated with the retirement of a tangible long-lived asset that is incurred upon the acquisition, construction, development or normal operation of that long-lived asset. PPG recognizes asset retirement obligations in the period in which they are incurred, if a reasonable estimate of fair value can be made. The asset retirement obligation is subsequently adjusted for changes in fair value. The associated estimated asset retirement costs are capitalized as part of the carrying amount of the long-lived asset and depreciated over its useful life. PPG's asset retirement obligations are primarily associated with the retirement or closure of certain assets used in PPG's manufacturing process. The accrued asset retirement obligation recorded on PPG's balance sheet was $19 million and $18 million as of December 31, 2017 and 2016, respectively.

PPG's only conditional asset retirement obligation relates to the possible future abatement of asbestos contained in certain PPG production facilities. The asbestos in PPG's production facilities arises from the application of normal and customary building practices in the past when the facilities were constructed. This asbestos is encapsulated in place and, as a result, there is no current legal requirement to abate it. Inasmuch as there is no requirement to abate, the

Company does not have any current plans or an intention to abate and therefore the timing, method and cost of future abatement, if any, are not known. The Company has not recorded an asset retirement obligation associated with asbestos abatement, given the uncertainty concerning the timing of future abatement, if any.

Notes to the Consolidated Financial Statements

Reclassifications

Certain reclassifications of prior years' data have been made to conform to the current year presentation. These reclassifications had no impact on our previously reported net income, cash flows or shareholders' equity.

Accounting Standards Adopted in 2017

PPG's adoption of the following accounting standard updates ("ASU") in 2017 did not have a material impact on PPG's consolidated financial position, results of operations or cash flows:

Accounting Standard Update	
2017-04	Simplifying the Test for Goodwill Impairment
2016-18	Restricted Cash
2016-09	Improvements to Employee Share-Based Payment Accounting

Accounting Standards to be Adopted in Future Years

In February 2018, the Financial Accounting Standards Board ("FASB") issued ASU No. 2018-2, "Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income." This ASU allows a reclassification from Accumulated other comprehensive income to Retained earnings for stranded tax effects resulting from the Tax Cuts and Jobs Act. The amendments in this ASU are effective for fiscal years beginning after December 15, 2018 and for interim periods therein. Early adoption of this ASU is permitted. PPG does not believe this ASU will have a material impact on its consolidated financial position, results of operations or cash flows.

In August 2017, the FASB issued ASU No. 2017-12, "Derivatives and Hedging - Targeted Improvements to Accounting for Hedging Activities." This ASU modifies the presentation and disclosure of hedging results. Further, it provides partial relief on the timing of certain aspects of hedge documentation and eliminates the requirement to recognize hedge ineffectiveness separately in income. The amendments in this ASU are effective for fiscal years beginning after December 15, 2018 and for interim periods therein. Early adoption of this ASU is permitted. PPG does not believe this ASU will have a material impact on its consolidated financial position, results of operations or cash flows.

In May 2017, the FASB issued ASU No. 2017-09, "Stock Compensation - Scope of Modification Accounting." This ASU requires all equity award modifications to be accounted for as a modification unless the fair value, vesting conditions and classification of the award as equity or liability are the same as the classification of the original award immediately before the original award is modified. The amendments in this ASU are effective for fiscal years beginning after December 15, 2017 and for interim periods therein. PPG does not believe this ASU will have a material impact on its consolidated financial position, results of operations or cash flows.

In March 2017, the FASB issued ASU No. 2017-07, "Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost." This ASU requires the service cost component of net benefit costs to be disaggregated from all other components and be reported in the same line item or items as other compensation costs. The other components of net benefit cost are required to be presented in the income statement separately from the service cost. The amendments in this ASU are effective for fiscal years beginning after December 15, 2017 and for interim periods therein. PPG does not believe this ASU will have a material impact on its consolidated financial position, results of operation or cash flows. Beginning January 1, 2018, in connection with the adoption of this new ASU, PPG will change the method by which pension costs are allocated to its strategic business units. Namely, only service costs will be attributed to the strategic business units and all other components will remain in unallocated corporate overhead. PPG will recast its statement of operations and segment income for this change in allocation.

In August 2016, the FASB issued ASU No. 2016-15, "Classification of Certain Cash Receipts and Cash Payments." This ASU addresses eight specific cash flow issues with the objective of eliminating the existing diversity in practice. The amendments in this ASU are effective for public business entities for fiscal years beginning after December 15, 2017 and for interim periods therein. PPG does not believe this ASU will have a material impact on its consolidated financial position, results of operations or cash flows.

In June 2016, the FASB issued ASU No. 2016-13, "Financial Instruments - Credit Losses." This ASU requires an organization to measure all expected credit losses for financial assets held at the reporting date based on historical experience, current conditions, and reasonable and supportable forecasts. Financial institutions and other organizations will now use forward-looking information to better inform their credit loss estimates. The amendments in this ASU are effective for fiscal years beginning after December 15, 2019 and for interim periods therein. Entities may chose to adopt the new ASU as of its fiscal year beginning after December 15, 2018. PPG does not believe this ASU will have a material impact on its consolidated financial position, results of operations or cash flows.

Notes to the Consolidated Financial Statements

In February 2016, the FASB issued ASU No. 2016-02, “Leases.” This ASU requires all lessees to recognize on the balance sheet right to use assets and lease liabilities for the rights and obligations created by lease arrangements with terms greater than 12 months. The amendments in this ASU are effective for fiscal years beginning after December 15, 2018 and for interim periods therein. PPG is in the process of assessing the impact the adoption of this ASU will have on its consolidated financial position, results of operations and cash flows. At a minimum, total assets and total liabilities will increase in the period the ASU is adopted. Early adoption of this ASU is permitted. At December 31, 2017, PPG’s undiscounted future minimum payments outstanding for lease obligations were approximately $840 million.

In January 2016, the FASB issued ASU No. 2016-01, “Recognition and Measurement of Financial Assets and Liabilities.” This ASU simplifies the accounting and disclosures related to equity investments. The amendments in this ASU are effective for fiscal years beginning after December 15, 2017 and for interim periods therein. Adoption of this ASU will not have a material impact on PPG’s consolidated financial position, results of operations or cash flows.

In May 2014, the FASB issued ASU No. 2014-09, “Revenue from Contracts with Customers: Topic 606.” This ASU replaces nearly all existing U.S. GAAP guidance on revenue recognition. The standard prescribes a five-step model for recognizing revenue, the application of which will require significant judgment. The amendments in this ASU are effective for fiscal years beginning after December 15, 2017, and for interim periods therein. The provisions of this ASU may be applied retroactively or on a modified retrospective (cumulative effect) basis. PPG will adopt the standard using the modified retrospective approach in January 2018. PPG believes the preponderance of the Company’s contracts with customers are standard ship and bill arrangements where revenue is recognized at the time of shipment. Under the provisions of this ASU, PPG believes certain costs currently reported in Selling, general and administrative costs will be reclassified to Cost of sales, exclusive of depreciation and amortization on the Consolidated Statement of Income, as they represent costs incurred in satisfaction of performance obligations. In addition, PPG expects the cost of certain customer incentives to be recorded as a reduction of Net sales rather than Cost of sales, exclusive of depreciation and amortization or Selling, general and administrative costs. Adoption of this ASU will not have a significant impact on PPG’s consolidated financial position, results of operations and cash flows.

2. Restatement of Previously Reported Consolidated Annual Financial Statements

Background

On April 16, 2018, PPG received a report through the Company’s internal reporting system alleging violations of the Company’s accounting policies and procedures regarding the failure to accrue certain specified expenses in the first quarter of 2018. Based on the Company’s initial review at that time, the Company identified approximately $1.4 million of expenses (including legal fees, property taxes and performance-based compensation) that should have been accrued in the first quarter of 2018 and that were then reflected in PPG’s earnings for the quarter ended March 31, 2018, released on April 19, 2018. In addition, the report alleged that there may have been other unspecified expenses, potentially up to $5 million in the aggregate, that were improperly not accrued in the first quarter.

The Audit Committee oversaw an investigation of the matters set forth in the internal report, with the assistance of outside counsel and forensic accountants. The investigation identified the following items with respect to the quarter ended March 31, 2018, in addition to the approximately $1.4 million of expenses described above: (1) failure to record amortization expense in the amount of $1.4 million to correct for amortization of an intangible asset that was inadvertently not recorded over a three-year period and discovered in March 2018; (2) understatement of a health insurance accrued liability in the amount of $0.5 million; and (3) failure to record an adjustment increasing the value of inventory in PPG’s Europe, Middle East and Africa region in the amount of $2.2 million due to inflation of raw materials costs which, when corrected, had a positive effect on income in the first quarter of 2018. These three items resulted in a net increase to income from continuing operations before income taxes of approximately $0.3 million.

The investigation also identified certain inadvertent errors with respect to the quarter ended March 31, 2018. Correction of such inadvertent errors, together with the matters discussed in the immediately preceding paragraph, resulted in a net decrease in income from continuing operations before income taxes of $5.7 million for the quarter ended March 31, 2018. The correction of these inadvertent errors also resulted in a net decrease in income from continuing operations before income taxes of $2.3 million for the year ended December 31, 2017.

The investigation identified the following items with respect to the year ended December 31, 2017: (1) improper reclassifications of gains from income from discontinued operations to income from continuing operations, in total pre-tax amounts of $2.5 million in the quarter ended June 30, 2017 and $4.7 million in the quarter ended December 31, 2017; (2) improper shifting of pre-tax expenses between quarterly periods in 2017, including a total of $3.5 million in compensation expense recorded in the third and fourth quarters of 2017 that should have been recorded in the quarter ended June 30, 2017; an additional expense accrual for health care claims in the amount of $3.5 million recorded in the third quarter of 2017 that should have been recorded in the quarter ended June 30, 2017; additional expense for paid vacation in the amount of $2.2 million recorded in the quarter ended December 31, 2017 that should have been recorded in the second and third quarters of 2017; and additional pension expense in the amount of $1.0 million recorded in the fourth quarter of 2017 that should have been recorded in the quarter ended September 30. 2017.

On May 10, 2018, management, in consultation with the Audit Committee and the Company's independent registered public accounting firm, PwC, concluded that the Company's consolidated financial statements for the year ended December 31, 2017 included in the Original Filing and the related report of PwC, and for the quarterly and year-to-date periods in 2017, should no longer be relied upon because of certain misstatements contained in those financial statements.

The investigation identified the following items with respect to the year ended December 31, 2016: (1) improper classification in the consolidated statement of income of the release of a reserve related to the Company's 2015 business restructuring program in the amount of $3.4 million and (2) an improper reduction in the payout assumption for certain performance-based restricted stock units that had the impact of recognizing a $6.8 million reduction in stock-based compensation expense in the fourth quarter of 2016. In the first quarter of 2017, the payout assumption for these same performance-based restricted stock units was increased, resulting in $6.8 million of stock-based compensation expense in the first quarter of 2017 that would not have been recorded if the payout assumption had not been reduced in the fourth quarter of 2016.

On June 27, 2018, management, in consultation with the Audit Committee and PwC, concluded that the Company's consolidated financial statements for the year ended December 31, 2016 included in the Original Filing and the related report of PwC, and for the final quarterly and year-to-date period in 2016, should no longer be relied upon because of certain misstatements contained in those financial statements.

On June 27, 2018, the Audit Committee determined that its investigation was complete, and authorized the filing of our restated audited consolidated financial statements for the years ended December 31, 2017 and 2016 and certain quarterly periods within those fiscal years in order to correct our previously issued financial statements.

Impact of the Restatement

Annual

As a result of the restatement, reported net income from continuing operations was decreased by $2 million, or $0.01 per diluted share, and income from discontinued operations, net of tax, was increased by $5 million, or $0.02 per diluted share, for the year ended December 31, 2017. Reported net income from continuing operations decreased by $4 million, or $0.01 per diluted share, and there was no impact to income from discontinued operations, net of tax, for the year ended December 31, 2016.

The categories of misstatements and their impact on previously reported consolidated financial statements for the 2017 and 2016 annual periods are described below:

(a) Customer Rebates

The Company did not properly recognize expense associated with certain customer rebates, resulting in a misstatement of Net sales in 2017. The misstatement overstated previously reported Income before taxes by $1.8 million for the year ended December 31, 2017.

(b) Classification of Continuing Operations and Discontinued Operations

Certain items of income related to PPG's former Glass segment were inappropriately recorded in continuing operations rather than in discontinued operations. The misstatements overstated previously reported Income before income taxes from continuing operations by $7.2 million for the year ended December 31, 2017. The misstatement understated previously recorded Income from discontinued operations, net of tax, by $4.5 million for the year ended December 31, 2017.

(c) Stock-Based Compensation

In the fourth quarter of 2016, the Company improperly reduced the payout assumption for the 2015 grant of performance-based restricted stock units from 150% to 100%, which had the effect of reducing stock-based compensation expense in that period by $6.8 million. In the first quarter of 2017, the Company increased the payout assumption for these same restricted stock units from 100% back to 150%. These improper changes to the payout assumption for these restricted stock units resulted in a misstatement of stock-based compensation expense in both 2016 and 2017. (See Note 18, "Stock-Based Compensation (As Restated)," for further information concerning the Company's accounting for Restricted Stock Units.) The misstatements overstated previously reported Income before income taxes by $6.8 million for the year ended December 31, 2016 and understated previously reported Income before income taxes by $6.8 million for the year ended December 31, 2017.

Notes to the Consolidated Financial Statements

(d) Environmental Reserve

In 2017, the Company failed to appropriately update the discount rate used to calculate a long-term environmental remediation reserve, which had the effect of understating Other expense by $0.5 million. The misstatement overstated previously reported Income before taxes by $0.5 million for the year ended December 31, 2017.

(e) Classification of Business Restructuring Expense

The Company misclassified the release of the unused portion of the reserve related to the 2015 business restructuring program in 2016 of $3.4 million. The income associated with the release of the reserve was classified as Other income rather than as a reduction to Business restructuring in the Consolidated Statement of Income. The misclassification had no impact on Income before taxes.

(f) Income Taxes

Adjustments related to the income tax effects of other restatement adjustments noted above.

The financial statements included in this Form 10-K/A have been restated to reflect the adjustments described above. The tables below summarize the effects of the restatement on PPG’s Consolidated Statements of Income for the years ended December 31, 2017 and 2016, Consolidated Statements of Comprehensive Income for the years ended December 31, 2017 and 2016, and Consolidated Balance Sheets at December 31, 2017 and 2016.

In addition to the restatement of the financial statements, certain information within the following notes to the financial statements and financial statement schedule has been restated to reflect the corrections of misstatements discussed above as well as to add disclosure language as appropriate:

Note 3. Acquisitions and Divestitures
Note 4. Working Capital Detail
Note 8. Business Restructuring
Note 11. Earnings Per Common Share
Note 12. Income Taxes
Note 17. Other Income
Note 18. Stock-Based Compensation
Note 20. Reportable Business Segment Information

Additionally, see Note 19 “Quarterly Financial Information (unaudited) (As Restated)” for the Condensed Consolidated financial statements and notes to the condensed consolidated financial statements (unaudited) as well as tables that summarize the effects of the restatement on the Condensed Consolidated Statements of Income, Condensed Consolidated Statements of Comprehensive Income and Condensed Consolidated Balance Sheets for the appropriate quarterly periods within 2017 and 2016.

Notes to the Consolidated Financial Statements

Summary of Restatement - Consolidated Statement of Income

	For the Year Ended December 31, 2017			
($ in millions, except per share amounts)	As Previously Reported	Restatement Adjustment	Reference	As Restated
Net sales	$14,750	($2)	(a)	$14,748
Cost of sales, exclusive of depreciation and amortization	8,204	3	(b)	8,207
Selling, general and administrative	3,570	(6)	(c)	3,564
Other charges	64	—	(d)	64
Other income	(154)	4	(b)	(150)
Income before income taxes	$2,008	($3)		$2,005
Income tax expense	616	(1)	(f)	615
Income from continuing operations	$1,392	($2)		$1,390
Income from discontinued operations, net of tax	220	5	(b)	225
Net income attributable to the controlling and noncontrolling interests	$1,612	$3		$1,615
Less: net income attributable to noncontrolling interests	21	—		21
Net income (attributable to PPG)	$1,591	$3		$1,594
Amounts Attributable to PPG				
Continuing operations	$1,371	($2)		$1,369
Discontinued operations	220	5		225
Net income	$1,591	$3		$1,594
Earnings per common share				
Continuing operations	$5.35	($0.01)		$5.34
Discontinued operations	0.86	0.02		0.88
Net income (attributable to PPG)	$6.21	$0.01		$6.22
Earnings per common share - assuming dilution				
Continuing operations	$5.32	($0.01)		$5.31
Discontinued operations	0.85	0.02		0.87
Net income (attributable to PPG)	$6.17	$0.01		$6.18

Notes to the Consolidated Financial Statements

($ in millions, except per share amounts)	For the Year Ended December 31, 2016 As Previously Reported	Restatement Adjustment	Reference	As Restated
Selling, general and administrative	$3,581	$7	(c)	$3,588
Business restructuring	195	(4)	(e)	191
Other income	(131)	4	(e)	(127)
Income before income taxes	$786	($7)		$779
Income tax expense	217	(3)	(f)	214
Income from continuing operations	$569	($4)		$565
Income from discontinued operations, net of tax	330	—		330
Net income attributable to the controlling and noncontrolling interests	$899	($4)		$895
Less: net income attributable to noncontrolling interests	22	—		22
Net income (attributable to PPG)	$877	($4)		$873
Amounts Attributable to PPG				
Continuing operations	$547	($4)		$543
Discontinued operations	330	—		330
Net income	$877	($4)		$873
Earnings per common share				
Continuing operations	$2.06	($0.01)		$2.05
Discontinued operations	1.24	—		1.24
Net income (attributable to PPG)	$3.30	($0.01)		$3.29
Earnings per common share - assuming dilution				
Continuing operations	$2.05	($0.01)		$2.04
Discontinued operations	1.23	—		1.23
Net income (attributable to PPG)	$3.28	($0.01)		$3.27

Summary of Restatement - Consolidated Statement of Comprehensive Income

($ in millions)	For the Year Ended December 31, 2017 As Previously Reported	Restatement Adjustment	Reference	As Restated
Net income attributable to the controlling and noncontrolling interests	$1,612	$3	(a),(b),(c),(d),(f)	$1,615
Unrealized foreign currency translation gains/(losses)	248	—		248
Defined benefit pension and other postretirement benefit adjustments	78	—		78
Unrealized (losses)/gains – derivative financial instruments	(10)	—		(10)
Other comprehensive income/(loss), net of tax	316	—		316
Total comprehensive income	$1,928	$3		$1,931
Less: amounts attributable to noncontrolling interests:				
Net income	(21)	—		(21)
Unrealized foreign currency translation (losses)/gains	(17)	—		(17)
Comprehensive income attributable to PPG	$1,890	$3		$1,893

Notes to the Consolidated Financial Statements

($ in millions)	For the Year Ended December 31, 2016 As Previously Reported	Restatement Adjustment	Reference	As Restated
Net income attributable to the controlling and noncontrolling interests	$899	($4)	(c),(f)	$895
Unrealized foreign currency translation gains/(losses)	(476)	—		(476)
Defined benefit pension and other postretirement benefit adjustments	808	—		808
Unrealized (losses)/gains – derivative financial instruments	4	—		4
Other comprehensive income/(loss), net of tax	336	—		336
Total comprehensive income	$1,235	($4)		$1,231
Less: amounts attributable to noncontrolling interests:				
Net income	(22)	—		(22)
Unrealized foreign currency translation (losses)/gains	10	—		10
Comprehensive income attributable to PPG	$1,223	($4)		$1,219

Summary of Restatement - Consolidated Balance Sheet

($ in millions)	As of December 31, 2017 As Previously Reported	Restatement Adjustment	Reference	As Restated
Liabilities and Shareholder's Equity				
Accounts payable and accrued liabilities	$3,780	$1	(a),(d),(f)	$3,781
Total current liabilities	3,894	1		3,895
Total liabilities	10,865	1		10,866
Retained earnings	17,141	(1)		17,140
Total PPG shareholders' equity	5,558	(1)		5,557
Noncontrolling interests	115	—		115
Total shareholders' equity	5,673	(1)		5,672
Total liabilities and shareholder's equity	$16,538	$—		$16,538

($ in millions)	As of December 31, 2016 As Previously Reported	Restatement Adjustment	Reference	As Restated
Assets				
Deferred income taxes	$184	$2	(f)	$186
Total Assets	15,769	2		15,771
Liabilities and Shareholder's Equity				
Additional paid-in capital	701	6	(c)	707
Retained earnings	15,984	(4)		15,980
Total PPG shareholders' equity	4,826	2		4,828
Noncontrolling interests	87			87
Total shareholders' equity	4,913			4,915
Total liabilities and shareholder's equity	$15,769	$2		$15,771

Summary of Restatement - Consolidated Statement of Cash Flows

There was no net impact of the 2017 and 2016 restatement adjustments on net cash provided by operating activities, net cash provided by investing activities or net cash used in financing activities in the Consolidated Statement of Cash Flows. The adjustments only had an impact on certain captions within cash from operating activities.

Notes to the Consolidated Financial Statements

3. Acquisitions and Divestitures (As Restated)
Acquisitions
The Crown Group
On October 2, 2017, PPG acquired The Crown Group ("Crown"), a U.S.-based coatings application services business, which is reported as part of PPG's Industrial Coatings reportable segment. Crown is one of the leading component and product finishers in North America. Crown applies coatings to customers' manufactured parts and assembled products at 11 U.S. sites. Most of Crown's facilities, which also provide assembly, warehousing and sequencing services, are located at customer facilities or positioned near customer manufacturing sites. The company serves manufacturers in the automotive, agriculture, construction, heavy truck and alternative energy industries. Crown has annual sales of approximately $125 million.
Taiwan Chlorine Industries
Taiwan Chlorine Industries ("TCI") was established in 1986 as a joint venture between PPG and China Petrochemical Development Corporation ("CPDC") to produce chlorine-based products in Taiwan, at which time PPG owned 60 percent of the venture. In conjunction with the 2013 separation of its commodity chemicals business, PPG conveyed to Axiall Corporation ("Axiall") its 60% ownership interest in TCI. Under PPG's agreement with CPDC, if certain post-closing conditions were not met following the three year anniversary of the separation, CPDC had the option to sell its 40% ownership interest in TCI to Axiall for $100 million. In turn, Axiall had a right to designate PPG as its designee to purchase the 40% ownership interest of CPDC. In April 2016, Axiall announced that CPDC had decided to sell its ownership interest in TCI to Axiall. In June 2016, Axiall formally designated PPG to purchase the 40% ownership interest in TCI. In August 2016, Westlake Chemical Corporation acquired Axiall, which became a wholly-owned subsidiary of Westlake. On April 11, 2017, PPG finalized its purchase of CPDC's 40% ownership interest in TCI. The difference between the acquisition date fair value and the purchase price of PPG's 40% ownership interest in TCI has been recorded as a loss in discontinued operations during the year-ended December 31, 2017.
MetoKote Corporation
In July 2016, PPG completed the acquisition of MetoKote Corporation ("MetoKote"), a U.S.-based coatings application services business. MetoKote applies coatings to customers' manufactured parts and assembled products. It operates on-site coatings services within several customer manufacturing locations, as well as at regional service centers, located throughout the U.S., Canada, Mexico, the United Kingdom, Germany, Hungary and the Czech Republic. Customers ship parts to MetoKote service centers where they are treated to enhance paint adhesion and painted with electrocoat, powder or liquid coatings technologies. Coated parts are then shipped to the customer's next stage of assembly. MetoKote coats an average of more than 1.5 million parts per day.
The following table summarizes the estimated fair value of assets acquired and liabilities assumed as reflected in the final purchase price allocation for MetoKote.

($ in millions)			
Current assets		$38	
Property, plant, and equipment	73		
Identifiable intangible assets with finite lives	86		
Goodwill	166		
Deferred income taxes [(a)]	(12		)
Total assets		$351	
Current liabilities	(23		)
Other long-term liabilities	(22		)
Total liabilities		($45	)
		$306	

Total purchase price, net of cash acquired

(a) The net deferred income tax liability is included in assets due to the Company's tax jurisdictional netting.

The pro-forma impact on PPG's sales and results of operations, including the pro forma effect of events that are directly attributable to the acquisition, was not significant. While calculating this impact, no cost savings or operating synergies that may result from the acquisition were included. Since the acquisition, the results of this acquired business comprise the coatings services operating segment, included within the Industrial Coatings reportable segment.

Notes to the Consolidated Financial Statements

Other Acquisitions

In 2017, 2016, and 2015, the Company completed several smaller business acquisitions. The total consideration paid for these acquisitions, net of cash acquired, debt assumed and other post closing adjustments, was $74 million, $43 million and $371 million, respectively.

In January 2018, PPG acquired ProCoatings, a leading architectural paint and coatings wholesaler located in The Netherlands. ProCoatings, established in 2001, distributes a large portfolio of well-known professional paint brands through its network of 23 multi-brand stores. The company employs nearly 100 people.

Divestitures

Glass Segment (As Restated)

In 2017, PPG completed a multi-year strategic shift in the Company's business portfolio, resulting in the exit of all glass operations which consisted of the global fiber glass business, PPG's ownership interest in two Asian fiber glass joint ventures and the flat glass business. Accordingly, the results of operations, including the gains on the divestitures, and cash flows have been recast as discontinued operations for all periods presented. PPG now has two reportable business segments.

The net sales and income from discontinued operations related to the former Glass segment for the three years ended December 31, 2017, 2016, and 2015 were as follows:

($ in millions)	2017 As Restated	2016	2015
Net sales	$217	$908	$1,089
Income from operations	$30	$111	$137
Net gains on the divestitures of businesses	343	421	—
Income tax expense	140	202	42
Income from discontinued operations, net of tax	$233	$330	$95

North American Fiber Glass Business

On September 1, 2017, PPG completed the sale of its North American fiber glass business to Nippon Electric Glass Co. Ltd. (“NEG”). Cash proceeds from the sale were $541 million, resulting in a pre-tax gain of $343 million, net of certain accruals and contingencies established in conjunction with the divestiture.

PPG’s fiber glass operations included manufacturing facilities in Chester, South Carolina, and Lexington and Shelby, North Carolina; and administrative and research-and-development operations in Shelby and in Harmar, Pennsylvania, near Pittsburgh. The business, which employed more than 1,000 people and had net sales of approximately $350 million in 2016, supplies the transportation, energy, infrastructure and consumer markets.

The Company's December 31, 2016 consolidated balance sheet has been recast to present the assets and liabilities of the North American fiber glass business as held for sale. The major classes of assets and liabilities of the Glass segment included in the PPG consolidated balance sheet at December 31, 2016 were as follows:

($ in millions)	December 31, 2016
Receivables. net	$38
Inventory	32
Other current assets	1
Property, plant, and equipment, net	151
Deferred income taxes [(a)]	(30)
Other non-current assets	1
Assets held for sale	$193
Accounts payable and accrued liabilities	52
Long-term liabilities	12
Liabilities held for sale	$64

(a) The net deferred income tax liability is included in assets held for sale due to the Company's tax jurisdictional netting.

Flat Glass Business

In October 2016, PPG completed the sale of its flat glass manufacturing and glass coatings operations to Vitro S.A.B. de C.V. PPG received approximately $740 million in cash proceeds and recorded a pre-tax gain of $421 million on the sale. Under the terms of the agreement, PPG divested its entire flat glass manufacturing and glass coatings operations, including production sites located in Fresno, California; Salem, Oregon; Carlisle, Pennsylvania; and Wichita Falls, Texas; four distribution/fabrication facilities located across Canada; and a research-and-development center located in Harmar, Pennsylvania. PPG’s flat glass business included approximately 1,200 employees. The business manufactures glass that is fabricated into products used primarily in commercial and residential construction.

European Fiber Glass Business

In October 2016, PPG completed the sale of its European fiber glass business to glass manufacturer NEG. PPG recorded a pre-tax loss of $42 million, consisting predominately of a $46 million pension settlement charge. The European fiber glass business manufactures reinforcement materials for thermoset and thermoplastic composite applications for the transportation, energy, infrastructure and consumer markets. Manufacturing facilities in Hoogezand, Netherlands, and Wigan, England, and a research and development facility in Hoogezand were included in the transaction.

PFG Fiber Glass Joint Ventures

In November 2016, PPG sold its 50% ownership interests in its two PFG fiber glass joint ventures to its joint venture partner Nan Ya Plastics Corporation (“Nan Ya”). Nan Ya is affiliated with Taiwan-based Formosa Plastics Group. The PFG fiber glass joint ventures supply electronic yarn fibers used in integrated electronic circuit boards and fiber glass reinforcement products for automotive applications. PPG recorded a net pre-tax gain of $36 million on the sale.

Other Divestitures

Plaka Business

In June 2017, PPG completed the sale of the assets of its Mexico-based Plaka plasterboard and cement-board business to Knauf International GmbH and recorded a $25 million pre-tax gain on the sale. The Company's consolidated balance sheet presents the assets and liabilities of the Plaka business as held for sale as of December 31, 2016.

Pittsburgh Glass Works

In April 2016, PPG sold its minority ownership interest in Pittsburgh Glass Works LLC ("PGW") to LKQ Corporation concurrent with the majority partner’s sale of its ownership interest. PPG recorded a pre-tax gain on the sale of $20 million. PPG accounted for its interest in PGW under the equity method of accounting. PPG’s share of net earnings from PGW are reported in “Other income” in the Consolidated Statement of Income for all periods presented and have not been reclassified as discontinued operations, as the divestiture of PGW does not represent a strategic shift in PPG’s operations and PGW did not have a major impact on PPG's ongoing results of operations.

Notes to the Consolidated Financial Statements

4. Working Capital Detail (As Restated)

($ in millions)	2017 As Restated	2016
Receivables		
Trade - net[1]	$2,559	$2,288
Equity affiliates	5	2
Other - net	339	364
Total	$2,903	$2,654
Inventories[2]		
Finished products	$1,083	$947
Work in process	177	165
Raw materials	437	370
Supplies	33	32
Total	$1,730	$1,514
Accounts payable and accrued liabilities		
Trade	$2,321	$1,907
Accrued payroll	441	443
Customer rebates	261	235
Other postretirement and pension benefits	78	124
Income taxes	100	94
Other	580	657
Total	$3,781	$3,460

(1) Allowance for Doubtful Accounts was $25 million and $36 million as of December 31, 2017 and 2016, respectively.

(2) Inventories valued using the LIFO method of inventory valuation comprised 34% and 38% of total gross inventory values as of December 31, 2017 and 2016, respectively. If the FIFO method of inventory valuation had been used, inventories would have been $103 million and $106 million higher as of December 31, 2017 and 2016, respectively. During the years ended December 31, 2017 and 2016, certain inventories accounted for on the LIFO method of accounting were reduced, which resulted in the liquidation of certain quantities carried at costs prevailing in prior years. The effect on income from continuing operations was zero and income of $2 million for the years ended December 31, 2017 and 2016, respectively.

5. Property, Plant and Equipment

($ in millions)	Useful Lives (years)	2017	2016
Land and land improvements	1-30	$487	$451
Buildings	20-40	1,488	1,324
Machinery and equipment	5-25	3,432	3,076
Other	3-20	958	774
Construction in progress		229	380
Total[1]		$6,594	$6,005
Less: accumulated depreciation		3,770	3,397
Net		$2,824	$2,608

(1) Interest capitalized in 2017, 2016 and 2015 was $7 million, $8 million and $9 million, respectively.

6. Investments

($ in millions)	2017	2016
Investments in equity affiliates	$135	$46
Marketable equity securities - Trading (See Note 9)	79	78
Other	54	55
Total	$268	$179

The Company’s investments in equity affiliates are comprised principally of 50% ownership interests in a number of joint ventures that manufacture and sell coatings. In 2017, PPG purchased a 40% ownership interest in TCI. Refer to Note 3, “Acquisitions and Divestitures” for additional information.

Notes to the Consolidated Financial Statements

PPG's share of undistributed net earnings of equity affiliates was $12 million and $7 million as of December 31, 2017 and December 31, 2016, respectively. Dividends received from equity affiliates were $8 million, $7 million and $77 million in 2017, 2016 and 2015, respectively.

7. Goodwill and Other Identifiable Intangible Assets

Goodwill

($ in millions)	Performance Coatings	Industrial Coatings	Total
January 1, 2016	$3,073	$552	$3,625
Acquisitions	6	168	174
Foreign currency translation	(209)	(18)	(227)
December 31, 2016	$2,870	$702	$3,572
Acquisitions	23	89	112
Foreign currency translation	211	47	258
December 31, 2017	$3,104	$838	$3,942

Identifiable Intangible Assets

($ in millions)	December 31, 2017 Gross Carrying Amount	December 31, 2017 Accumulated Amortization	December 31, 2017 Net	December 31, 2016 Gross Carrying Amount	December 31, 2016 Accumulated Amortization	December 31, 2016 Net
Indefinite-Lived Identifiable Intangible Assets						
Trademarks	$1,158	$—	$1,158	$1,107	$—	$1,107
Definite-Lived Identifiable Intangible Assets						
Acquired technology	$613	($489)	$124	$587	($446)	$141
Customer-related	1,437	(762)	675	1,272	(618)	654
Tradenames	166	(87)	79	142	(71)	71
Other	44	(35)	9	38	(28)	10
Total Definite Lived Intangible Assets	$2,260	($1,373)	$887	$2,039	($1,163)	$876
Total Identifiable Intangible Assets	$3,418	($1,373)	$2,045	$3,146	($1,163)	$1,983

The Company's identifiable intangible assets with definite lives are being amortized over their estimated useful lives. Aggregate amortization expense was $129 million, $121 million and $132 million in 2017, 2016 and 2015, respectively.

($ in millions)	2018	2019	2020	2021	2022
Estimated future amortization expense	$125	$115	$105	$100	$100

8. Business Restructuring (As Restated)

The Company records restructuring liabilities that represent charges incurred in connection with consolidations of certain operations, including operations from acquisitions, as well as headcount reduction programs. These charges consist primarily of severance costs and asset write-downs.

In December 2016, PPG's Board of Directors approved a business restructuring program which includes actions necessary to reduce its global cost structure. The program is focused on certain regions and end-use markets where business conditions are the weakest, as well as reductions in production capacity and various global functional and administrative costs.

A pre-tax restructuring charge of $191 million (as restated) was recorded in December 2016, representing $195 million of restructuring actions, net of the reversal of the remaining reserve of $4 million related to the 2015 restructuring program that was completed in 2016. Related to the $195 million of new restructuring actions approved in December 2016, approximately $136 million represents employee severance and other cash costs and $59 million is related to the write-down of certain assets held for sale and other non-cash costs. The restructuring actions will result in the net reduction of approximately 1,700 positions, with substantially all actions to be completed in the first half of 2018.

Notes to the Consolidated Financial Statements

2016 Restructuring and Associated Reserve Activity

($ in millions, except no. of employees)	Severance and Other Costs	Asset Write-offs	Total Reserve	Employees Impacted
Performance Coatings	$77	$45	$122	1,069
Industrial Coatings	52	14	66	804
Corporate	7	—	7	85
Total 2016 restructuring charge	$136	$59	$195	1,958
2016 Activity	(6)	(59)	(65)	(40)
December 31, 2016	$130	$—	$130	1,918
2017 Activity	(46)	—	(46)	(969)
Foreign currency impact	18	—	18	—
December 31, 2017	$102	$—	$102	949

9. Borrowings and Lines of Credit

Long-term Debt Obligations

($ in millions)	Maturity Date	2017	2016
3-year variable rate bank loan (€500)	2017	$—	$526
0.00% note (€300)	2019	358	313
2.3% notes	2019	299	298
3.6% notes	2020	497	496
9% non-callable debentures(1)	2021	133	133
0.875% notes (€600)	2022	716	626
0.875% note (€600)	2025	710	621
1.4% notes (€600)	2027	711	620
2.5% note (€80)	2029	95	83
7.70% notes	2038	174	174
5.5% notes	2040	247	247
3% note (€120)	2044	137	118
Various other non-U.S. debt(2)	Various	43	41
Capital lease obligations	Various	15	18
Impact of derivatives on debt(1)	N/A	3	3
Total		$4,138	$4,317
Less payments due within one year	N/A	4	530
Long-term debt		$4,134	$3,787

(1) PPG entered into several interest rate swaps which had the effect of converting fixed rate notes to variable rates, based on the three-month London Interbank Offered Rate (LIBOR). There were no interest rate swaps outstanding related to these instruments as of December 31, 2017 and 2016. The impact of the derivatives on debt represents the fair value adjustment of the debt while the interest rate swaps were outstanding, which is being amortized as a reduction to interest expense over the remaining term of the debt. The weighted average effective interest rate for these borrowings, including the effects of the swaps, was 8.4% and 8.4% for the years ended December 31, 2017 and 2016, respectively. Refer to Note 10, "Financial Instruments, Hedging Activities, and Fair Value Measurements" for additional information.

(2) Weighted average interest rate of 3.7% and 3.8% as of December 31, 2017 and 2016, respectively.

2017 Activities

In November 2017, PPG's €500 million 3-year variable rate bank loan matured and the Company repaid this obligation using $587 million cash on hand.

2016 Activities

In December 2016, PPG's $125 million 6.65% notes, due 2018, were redeemed using $133 million cash on hand. Also, the Company prepaid its $250 million Term Loan Credit Agreements, one with the Bank of Tokyo-Mitsubishi UFJ, Ltd. and the other with BNP Paribas, which PPG entered into during May 2016. The Bank of Tokyo-Mitsubishi UFJ, Ltd. Term Loan would have originally terminated and all amounts outstanding would have been payable in March 2017. The BNP Paribas Term Loan would have originally terminated and all amounts outstanding would have been payable in May 2017.

In November 2016, PPG completed a public offering of €300 million 0.000% Notes due 2019 and €600 million 0.875% Notes due 2025. These notes were issued pursuant to PPG’s existing shelf registration statement and pursuant to an indenture between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee, as supplemented. The Indenture governing these notes contains covenants that limit the Company’s ability to, among other things, incur certain liens securing indebtedness, engage in certain sale-leaseback transactions, and enter into certain consolidations, mergers, conveyances, transfers or leases of all or substantially all the Company’s assets. The terms of these notes also require the Company to make an offer to repurchase Notes upon a Change of Control Triggering Event (as defined in the Indenture) at a price equal to 101% of their principal amount plus accrued and unpaid interest. The Company may issue additional debt from time to time pursuant to the Indenture.

The aggregate cash proceeds from the notes, net of discounts and fees, was $987 million. The notes are denominated in euro and have been designated as hedges of net investments in the Company’s European operations. For more information, refer to Note 10 “Financial Instruments, Hedging Activities and Fair Value Measurements.”

In January 2016, PPG’s $250 million 1.9% notes matured, and the Company repaid these obligations using cash on hand.

2015 Activities

In December 2015, PPG entered into a five-year credit agreement (the “Credit Agreement”) with several banks and financial institutions. The Credit Agreement replaced the Company's Five Year Credit Agreement dated as of September 12, 2012. The Credit Agreement provides for a $1.8 billion unsecured revolving credit facility. The Company has the ability to increase the size of the Credit Agreement by up to an additional $500 million, subject to the receipt of lender commitments and other conditions. The Credit Agreement will terminate on December 18, 2020. The Company has the right, subject to certain conditions set forth in the Credit Agreement, to designate certain subsidiaries of the Company as borrowers under the Credit Agreement. In connection with any such designation, the Company is required to guarantee the obligations of any such subsidiaries under the Credit Agreement. There were no amounts outstanding under the Credit Agreement during the years ended December 31, 2017 and 2016. The available borrowing rate on a one month, U.S. dollar denominated borrowing was 2.56% at December 31, 2017.

Borrowings under the Credit Agreement may be made in U.S. dollars or in euros. The Credit Agreement provides that loans will bear interest at rates based, at the Company’s option, on one of two specified base rates plus a margin based on certain formulas defined in the Credit Agreement. Additionally, the Credit Agreement contains a Commitment Fee, as defined in the Credit Agreement, on the amount of unused commitments under the Credit Agreement ranging from 0.080% to 0.225% per annum. The average Commitment Fee in 2017 was 0.09%, and PPG is committed to pay 0.09% in 2018.

The Credit Agreement also supports the Company’s commercial paper borrowings. There were no commercial paper borrowings outstanding as of December 31, 2017 and 2016.

The Credit Agreement contains usual and customary restrictive covenants for facilities of its type, which include, with specified exceptions, limitations on the Company’s ability to create liens or other encumbrances, to enter into sale and leaseback transactions and to enter into consolidations, mergers or transfers of all or substantially all of its assets. The Credit Agreement maintains the same restrictive covenant as the prior credit agreement whereby the Company must maintain a ratio of Total Indebtedness to Total Capitalization, as defined in the Credit Agreement, of 60% or less. As of December 31, 2017, total indebtedness was 41% of the Company’s total capitalization.

The Credit Agreement also contains customary events of default, including the failure to make timely payments when due under the Credit Agreement or other material indebtedness, the failure to satisfy covenants contained in the Credit Agreement, a change in control of the Company and specified events of bankruptcy and insolvency that would permit the lenders to accelerate the repayment of any loans.

In June 2015, PPG’s €300 million 3.875% notes matured and the Company repaid these obligations using $336 million of cash on hand.

In March 2015, PPG completed a public offering of €600 million 0.875% notes due 2022 and €600 million 1.400% Notes due 2027, or €1.2 billion ($1.26 billion) in aggregate principal amount. These notes were issued pursuant to PPG’s existing shelf registration statement and pursuant to an indenture between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee, as supplemented. The Indenture governing these notes contains covenants that limit the Company’s ability to, among other things, incur certain liens securing indebtedness, engage in certain sale-leaseback transactions, and enter into certain consolidations, mergers, conveyances, transfers or leases of all or substantially all the Company’s assets. The terms of these notes also require the Company to make an offer to repurchase notes upon a Change of Control Triggering Event (as defined in the Indenture) at a price equal to 101% of their principal amount plus accrued and unpaid interest. The Company may issue additional debt from time to time pursuant to the Indenture.

The aggregate cash proceeds from the notes, net of discounts and fees, was $1.24 billion. The notes are denominated in euro and have been designated as hedges of net investments in the Company's European operations. For more information, refer to Note 10 "Financial Instruments, Hedging Activities and Fair Value Measurements."

Notes to the Consolidated Financial Statements

Restrictive Covenants and Cross-Default Provisions
As of December 31, 2017, PPG was in full compliance with the restrictive covenants under its various credit agreements, loan agreements and indentures.
Additionally, the Company’s Credit Agreement contains customary cross-default provisions. These provisions provide that a default on a debt service payment of $50 million or more for longer than the grace period provided under another agreement may result in an event of default under this agreement. The Company’s 9% non-callable debentures also contain a customary cross default provision triggered by the Company’s default on a debt service payment of $10 million or more. None of the Company’s primary debt obligations are secured or guaranteed by the Company’s affiliates.
Long-term Debt Maturities

($ in millions)	Maturity per year
2018	$4
2019	659
2020	497
2021	133
2022	718
Thereafter	$2,127

Short-term Debt Obligations

($ in millions)	2017	2016
Various, weighted average 1.9% and 5.8% as of December 31, 2017 and 2016, respectively.	$8	$99

Lease Obligations
Rental expense for operating leases was $288 million