

The total fair value of RSUs and PSUs granted and vested during the years ended December 31, 2019, 2018 and 2017 were as follows:

(\$ in millions)			
For the year ended December 31:	2019	2018	2017
RSUs			
Granted	\$674	\$583	\$484
Vested	428	381	463
PSUs			
Granted	\$164	\$118	\$113
Vested	118	101	51

As of December 31, 2019, there was \$1.1 billion of unrecognized compensation cost related to non-vested RSUs, which will be recognized on a straight-line basis over the remaining weighted-average contractual term of approximately 2.5 years.

In connection with vesting and release of RSUs and PSUs, the tax benefits realized by the company for the years ended December 31, 2019, 2018 and 2017 were \$131 million, \$117 million and \$180 million, respectively.

Stock Options

In 2016, the company made one grant of 1.5 million premium-priced stock options. The option award was granted with a three-year cliff vesting period and a 10-year contractual term. The award's cost of \$12 million was recognized ratably over the three-year vesting period. As of December 31, 2019, these options were vested with a weighted-average exercise price of \$140 per share and had a remaining weighted-average contractual life of approximately 6.1 years. The options were exercisable within a range of \$129 to \$154. The total intrinsic value of these vested options as of December 31, 2019 was \$1.9 million.

The company has not granted options since 2016. No stock options were exercised, forfeited or canceled during the years ended December 31, 2019 and 2018. The total intrinsic value of options exercised during the year ended December 31, 2017 was \$7 million. In connection with this exercise, \$11 million in cash was received from employees and the company realized a tax benefit of \$2 million.

The company settles employee stock option exercises primarily with newly issued common shares and, occasionally, with treasury shares. Total treasury shares held at December 31, 2019 and 2018 were approximately 1,351 million and 1,341 million shares, respectively.

Acquisitions

In connection with the acquisition of Red Hat, the company issued and assumed 6.4 million stock awards with a fair value of \$845 million. A share conversion ratio of 1.35 was applied to convert Red Hat's outstanding equity awards for Red Hat's common stock into IBM stock awards. At December 31, 2019, there were 4.6 million of these stock awards outstanding with a weighted-average grant price of \$140 per share.

In connection with various other acquisition transactions, there was an additional 0.1 million stock options outstanding at December 31, 2019, as a result of the company's conversion of stock-based awards previously granted by acquired entities. The weighted-average exercise price of these awards was \$43 per share.

IBM Employees Stock Purchase Plan

The company maintains a non-compensatory Employees Stock Purchase Plan (ESPP). The ESPP enables eligible participants to purchase shares of IBM common stock at a 5 percent discount off the average market price on the day of purchase through payroll deductions of up to 10 percent of eligible compensation. Eligible compensation includes any compensation received by the employee during the year. The ESPP provides for semi-annual offering periods during which shares may be purchased and continues as long as shares remain available under the ESPP, unless terminated earlier at the discretion of the Board of Directors. Individual ESPP participants are restricted from purchasing more than \$25,000 of common stock in one calendar year or 1,000 shares in an offering period.

Employees purchased approximately 1.0 million shares under the ESPP during each year ended December 31, 2019, 2018 and 2017. Cash dividends declared and paid by the company on its common stock also include cash dividends on the company stock purchased through the ESPP. Dividends are paid on full and fractional shares and can be reinvested. The company stock purchased through the ESPP is considered outstanding and is included in the weighted-average outstanding shares for purposes of computing basic and diluted earnings per share.

Approximately 18.8 million shares were available for purchase under the ESPP at December 31, 2019.