The Company has received and may in the future receive communications alleging possible infringements of third party patents or other third party intellectual property rights. Furthermore, the Company from time to time enters into discussions regarding a broad patent cross license arrangement with other industry participants. There is no assurance that such discussions may be brought to a successful conclusion and result in the intended agreement. The Company may become involved in costly litigation brought against the Company regarding patents, mask works, copyrights, trademarks or trade secrets. In the event that the outcome of any litigation would be unfavorable to the Company, the Company may be required to take a license to third party patents and/or other intellectual property rights at economically unfavorable terms and conditions, and possibly pay damages for prior use and/or face an injunction, all of which individually or in the aggregate could have a material adverse effect on the Company's results of operations, cash flows, financial position and/or ability to compete. The Company is otherwise also involved in various lawsuits, claims, inquiries, inspections, investigations and/or proceedings incidental to its business and operations. Such matters, even if not meritorious, could result in the expenditure of significant financial or managerial resources. Any of the foregoing could have a material adverse effect on the Company's results of operations, cash flows or its financial position.

The Company regularly evaluates claims and legal proceedings together with their related probable losses to determine whether they need to be adjusted based on the current information available to the Company. There can be no assurance that its recorded reserves will be sufficient to cover the extent of its potential liabilities. Legal costs associated with claims are expensed as incurred. In the event of litigation which is adversely determined with respect to the Company's interests, or in the event the Company needs to change its evaluation of a potential third-party claim, based on new evidence or communications, a material adverse effect could impact its operations or financial condition at the time it were to materialize.

As of December 31, 2019, provisions for estimated probable losses with respect to claims and legal proceedings were not considered material.

27. FINANCIAL INSTRUMENTS AND RISK MANAGEMENT

27.1 Financial risk factors

The Company is exposed to changes in financial market conditions in the normal course of business due to its operations in different foreign currencies and its ongoing investing and financing activities. The Company's activities expose it to a variety of financial risks: market risk (including foreign exchange risk, fair value interest rate risk, cash flow interest rate risk and price risk), credit risk and liquidity risk. The Company's overall risk management program focuses on the unpredictability of financial markets and seeks to minimize potential adverse effects on the Company's financial performance. The Company uses derivative financial instruments to hedge certain risk exposures.

Financial risk management is carried out by a central treasury department (Corporate Treasury). Additionally, a Treasury Committee, chaired by the CFO, steers treasury activities and ensures compliance with corporate policies. Treasury activities are thus regulated by the Company's policies, which define procedures, objectives and controls. The policies focus on the management of financial risk in terms of exposure to market risk, credit risk and liquidity risk. Treasury controls are subject to internal audits. Most treasury activities are centralized, with any local treasury activities subject to oversight from Corporate Treasury. Corporate Treasury identifies, evaluates and hedges financial risks in close cooperation with the Company's operating units. It provides written principles for overall risk management, as well as written policies covering specific areas, such as foreign exchange risk, interest rate risk, price risk, credit risk, use of derivative financial instruments, and investments of excess liquidity. The majority of cash and cash equivalents is held in U.S. dollars and Euros and is placed with financial institutions rated at least a single "A" long-term rating from two of the major rating agencies, meaning at least A3 from Moody's Investor Service and A- from Standard & Poor's and Fitch Ratings, or better. These ratings are closely and continuously monitored in order to manage exposure to the counterparty's risk. Hedging transactions are performed only to hedge exposures deriving from operating, investing and financing activities conducted in the normal course of business.

Market risk

Foreign exchange risk

The Company conducts its business on a global basis in various major international currencies. As a result, the Company is exposed to adverse movements in foreign currency exchange rates, primarily with respect to the Euro. Foreign exchange risk mainly arises from recognized assets and liabilities at the Company's subsidiaries and future commercial transactions.

Management has set up a policy to require the Company's subsidiaries to hedge their entire foreign exchange risk exposure with the Company through financial instruments transacted or overseen by Corporate Treasury. To manage their foreign exchange risk arising from foreign-currency-denominated assets and liabilities, subsidiaries use forward contracts and purchased currency options. Foreign exchange risk arises when recognized assets and liabilities are denominated in a currency that is not the entity's functional currency. These instruments do not qualify as hedging instruments for accounting purposes. Forward contracts and currency options, including collars, are also used by the Company to reduce its exposure to U.S. dollar fluctuations in Euro-denominated forecasted intercompany transactions that cover a large part of its research and development, selling, general and administrative expenses as well as a portion of its front-end manufacturing costs of semi-finished goods. The Company also hedges through the use of currency forward contracts certain Singapore dollar-denominated manufacturing forecasted transactions. The derivative instruments used to hedge these forecasted transactions meet the criteria for designation as cash flow hedge. The hedged forecasted transactions have a high probability of occurring for hedge accounting purposes.

It is the Company's policy to have the foreign exchange exposures in all the currencies hedged month by month against the monthly standard rate. At each month end, the forecasted flows for the coming month are hedged together with the fixing of the new standard rate. For this reason, the hedging transactions will have an exchange rate very close to the standard rate at which the forecasted flows will be recorded on the following month. As such, the foreign exchange exposure of the Company, which consists in the balance sheet positions and other contractually agreed transactions, is always close to zero and any movement in the foreign exchange rates will not therefore influence the exchange effect on items of the consolidated statement of income. Any discrepancy from the forecasted values and the actual results is constantly monitored and prompt actions are taken, if needed.

Derivative Instruments Not Designated as a Hedge

The Company enters into foreign currency forward contracts to reduce its exposure to changes in exchange rates and the associated risk arising from the denomination of certain assets and liabilities in foreign currencies in the Company's subsidiaries. These include receivables from international sales by various subsidiaries, payables for foreign currency-denominated purchases and certain other assets and liabilities arising from intercompany transactions.

The notional amount of these financial instruments totaled $575 million, $376 million and $644 million at December 31, 2019, 2018 and 2017, respectively. The principal currencies covered at the end of the year 2019 are the Euro, the Singapore dollar, the Japanese yen, the China Yuan Renminbi, the Indian rupee, the Swiss franc, the Malaysian ringgit, the South Korean won, the Philippines peso and the Taiwan dollar.

The risk of loss associated with forward contracts is equal to the exchange rate differential from the time the contract is entered into until the time it is settled. The risk of loss associated with purchased currency options is equal to the premium paid when the option is not exercised.

Foreign currency forward contracts not designated as cash flow hedge outstanding as of December 31, 2019 have remaining terms of 6 days to 121 days, maturing on average after 30 days.

Derivative Instruments Designated as a Hedge

To further reduce its exposure to U.S. dollar exchange rate fluctuations, the Company hedges through the use of currency forward contracts and currency options, including collars, certain Euro-denominated forecasted intercompany transactions that cover at year-end a large part of its research and development, selling, general and administrative expenses, as well as a portion of its front-end manufacturing costs of semi-finished goods within cost of sales. The Company also hedges through the use of currency forward contracts certain manufacturing transactions within cost of sales denominated in Singapore dollars.

The principles regulating the hedging strategy for derivatives designated as cash flow hedge are established as follows: (i) for R&D and corporate costs, up to 80% of the total forecasted transactions; (ii) for manufacturing costs, up to 70% of the total forecasted transactions. In order to follow a dynamic hedge strategy, the Company may change the percentage of the designated hedged item within the limit of 100% of the forecasted transaction. The maximum length of time over which the Company could hedge its exposure to the variability of cash flows for forecasted transactions is 24 months.

For the year ended December 31, 2019, the Company recorded an increase in cost of sales of $51 million and an increase in operating expenses of $28 million, related to the realized losses incurred on such hedged transactions. For the year ended December 31, 2018, the Company recorded a decrease in cost of sales of $4 million and an increase in operating expenses of $3 million, related to the realized gains (losses) incurred on such hedged transactions. For the year ended December 31, 2017, the Company recorded a decrease in cost of sales of $16 million and a decrease in operating expenses of $14 million, related to the realized gains incurred on such hedged transactions. No significant ineffective portion of the hedge was recorded on the line “Other income and expenses, net” of the consolidated statements of income for the years ended December 31, 2019, 2018 and 2017.

The notional amount of foreign currency forward contracts and currency options, including collars, designated as cash flow hedge totaled $1,328 million, $1,597 million and $1,393 million at December 31, 2019, 2018 and 2017, respectively. The forecasted transactions hedged at December 31, 2019 were determined to have a high probability of occurring.

As of December 31, 2019, $3 million of deferred losses on derivative instruments included in “Accumulated other comprehensive income (loss)” were expected to be reclassified as earnings during the next 12 months based on the monthly forecasted research and development expenses, corporate costs and semi-finished manufacturing costs. No amount was reclassified as “Other income and expenses, net” into the consolidated statement of income from “Accumulated other comprehensive income (loss)” in the consolidated statement of equity. Foreign currency forward contracts, currency options and collars designated as cash flow hedge outstanding as of December 31, 2019 have remaining terms of 6 days to 15 months, maturing on average after 126 days.

As at December 31, 2019, the Company had the following outstanding derivative instruments that were entered into to hedge Euro-denominated and Singapore dollar-denominated forecasted transactions:

In millions of Euros	**Notional amount for hedge on forecasted R&D and other operating expenses**	**Notional amount for hedge on forecasted manufacturing costs**
Forward contracts	203	333
Currency collars	243	309

In millions of Singapore dollars	**Notional amount for hedge on forecasted R&D and other operating expenses**	**Notional amount for hedge on forecasted manufacturing costs**
Forward contracts	—	143

Cash flow and fair value interest rate risk

The Company’s interest rate risk arises from long-term borrowings. Borrowings issued at variable rates expose the Company to cash flow interest rate risk. Borrowings issued at fixed rates expose the Company to fair value interest rate risk.

The Company analyses its interest rate exposure on a dynamic basis. Various scenarios are simulated taking into consideration refinancing, renewal of existing positions, alternative financing and hedging. The Company invests primarily on a short-term basis and as such the Company’s liquidity is invested in floating interest rate instruments. As a consequence, the Company is exposed to interest rate risk due to potential mismatch between the return on its short term floating interest rate investments and the portion of its long term debt issued at fixed rate.

Price risk

As part of its ongoing investing activities, the Company may be exposed to equity security price risk for investments in public entities. In order to hedge the exposure to this market risk, the Company may enter into certain derivative hedging transactions.

Information on fair value of derivative instruments and their location in the consolidated balance sheets as at December 31, 2019 and December 31, 2018 is presented in the table below:

	As at December 31, 2019		As at December 31, 2018	
Asset Derivatives	**Balance sheet location**	**Fair value**	**Balance sheet location**	**Fair value**
Derivatives designated as a hedge:				
Foreign exchange forward contracts	Other current assets	4	Other current assets	2
Currency collars	Other current assets	1	Other current assets	—
Total derivatives designated as a hedge		**5**		**2**
Derivatives not designated as a hedge:				
Foreign exchange forward contracts	Other current assets	3	Other current assets	3
Total derivatives not designated as a hedge:		**3**		**3**
Total Derivatives		**8**		**5**

	As at December 31, 2019		As at December 31, 2018	
Liability Derivatives	**Balance sheet location**	**Fair value**	**Balance sheet location**	**Fair value**
Derivatives designated as a hedge:				
Foreign exchange forward contracts	Other payables and accrued liabilities	(4)	Other payables and accrued liabilities	(22)
Currency collars	Other payables and accrued liabilities	(2)	Other payables and accrued liabilities	(11)
Total derivatives designated as a hedge		**(6)**		**(33)**
Derivatives not designated as a hedge:				
Foreign exchange forward contracts	Other payables and accrued liabilities	(1)	Other payables and accrued liabilities	(1)
Total derivatives not designated as a hedge:		**(1)**		**(1)**
Total Derivatives		**(7)**		**(34)**

The effect on the consolidated statements of income for the year ended December 31, 2019 and December 31, 2018 and on the “Accumulated other comprehensive income (loss)” (“AOCI”) as reported in the statements of equity as at December 31, 2019 and December 31, 2018 of derivative instruments designated as cash flow hedge is presented in the table below:

	Gain (loss) deferred in OCI on derivative		Location of gain (loss) reclassified from OCI into earnings	Gain (loss) reclassified from OCI into earnings	
	December 31, 2019	**December 31, 2018**		**December 31, 2019**	**December 31, 2018**
Foreign exchange forward contracts	(1)	(18)	Cost of sales	(36)	(2)
Foreign exchange forward contracts	—	(1)	Selling, general and administrative	(4)	(1)
Foreign exchange forward contracts	(1)	(6)	Research and development	(15)	(2)
Currency collars	(1)	(9)	Cost of sales	(15)	6
Currency collars	—	(1)	Selling, general and administrative	(2)	—
Currency collars	—	(4)	Research and development	(7)	—
Total	**(3)**	**(39)**		**(79)**	**1**

No significant ineffective portion of the cash flow hedge relationships was recorded in earnings for the years ended December 31, 2019 and December 31, 2018. No amount was excluded from effectiveness measurement on foreign exchange forward contracts and collars.

The effect on the consolidated statements of income for the year ended December 31, 2019 and December 31, 2018 of derivative instruments not designated as a hedge is presented in the table below:

	Location of gain recognized in earnings	Gain recognized in earnings	
		December 31, 2019	December 31, 2018
Foreign exchange forward contracts	Other income and expenses, net	1	9
Total		1	9

The Company did not enter into any derivative containing significant credit-risk-related contingent features.

The Company entered into currency collars as combinations of two options, which are reported, for accounting purposes, on a net basis. The fair value of these collars represented as at December 31, 2019 assets totalling $1 million (a gross amount of $2 million recognized as assets offset with a liability of $1 million) and liabilities totalling $2 million (a gross amount of $2 million recognized as liabilities with a nil asset amount). In addition, the Company entered into other derivative instruments, primarily forward contracts, which are governed by standard International Swaps and Derivatives Association ("ISDA") agreements, which are not offset in the statement of financial position and representing total assets of $7 million and liabilities of $5 million as at December 31, 2019.

Credit risk

The Company selects banks and/or financial institutions that operate with the group based on the criteria of long-term rating from at least two major Rating Agencies and keeping a maximum outstanding amount per instrument with each bank not to exceed 20% of the total.

The Company monitors the creditworthiness of its customers to which it grants credit terms in the normal course of business. If certain customers are independently rated, these ratings are used. Otherwise, if there is no independent rating, risk control assesses the credit quality of the customer, taking into account its financial position, past experience and other factors. Individual risk limits are set based on internal and external ratings in accordance with limits set by management. The utilization of credit limits is regularly monitored. Sales to customers are primarily settled in cash. At December 31, 2019 and 2018, no customer represented more than 10% of trade accounts receivable, net. Any remaining concentrations of credit risk with respect to trade receivables are limited due to the large number of customers and their dispersion across many geographic areas.

Liquidity risk

Prudent liquidity risk management includes maintaining sufficient cash equivalents and marketable securities, the availability of funding from committed credit facilities and the ability to close out market positions. The Company's objective is to maintain a significant cash position and a low debt-to-equity ratio, which ensure adequate financial flexibility. Liquidity management policy is to finance the Company's investments with net cash provided from operating activities.

Management monitors rolling forecasts of the Company's liquidity reserve based on expected cash flows.

27.2 Capital risk management

The Company's objectives when managing capital are to safeguard the Company's ability to continue as a going concern in order to create value for shareholders and benefits and returns for other stakeholders, as to maintain an optimal capital structure. In order to maintain or adjust the capital structure, the Company may review the amount of dividends paid to shareholders, return capital to shareholders, or issue new shares.

Consistent with others in the industry, the Company monitors capital on the basis of the net debt-to-equity ratio. This ratio is calculated as the net financial position of the Company, defined as the difference between total cash position (cash and cash equivalents, marketable securities – current and non-current – and current restricted cash, if any) net of total financial debt (bank overdrafts, if any, short-term borrowings and current portion of long-term debt as well as long-term debt), divided by total parent company stockholders' equity.

27.3 Fair value measurement

The fair value of financial instruments traded in active markets is based on quoted market prices at the balance sheet date. The quoted market price used for financial assets held by the Company is the bid price. If the market for a financial asset is not active and if no observable market price is obtainable, the Company measures fair value by using significant assumptions and estimates. When measuring fair value, the Company makes maximum use of market inputs and minimizes the use of unobservable inputs.

The table below details financial assets (liabilities) measured at fair value on a recurring basis as at December 31, 2019:

		Fair Value Measurements using		
	December 31, 2019	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Marketable securities – U.S. Treasury debt securities	133	133	—	—
Equity securities measured at fair value through earnings	23	23	—	—
Derivative assets designated as cash flow hedge	5	—	5	—
Derivative liabilities designated as cash flow hedge	(6)	—	(6)	—
Derivative assets not designated as cash flow hedge	3	—	3	—
Derivative liabilities not designated as cash flow hedge	(1)	—	(1)	—
Contingent consideration on business combinations	—	—	—	—
Total	**157**	**156**	**1**	**—**

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The table below details financial assets (liabilities) measured at fair value on a recurring basis as at December 31, 2018:

		Fair Value Measurements using		
	December 31, 2018	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Marketable securities – U.S. Treasury debt securities	330	330	—	—
Equity securities measured at fair value through earnings	19	19	—	—
Derivative assets designated as cash flow hedge	2	—	2	—
Derivative liabilities designated as cash flow hedge	(33)	—	(33)	—
Derivative assets not designated as cash flow hedge	3	—	3	—
Derivative liabilities not designated as cash flow hedge	(1)	—	(1)	—
Contingent consideration on business combinations	—	—	—	—
Total	**320**	**349**	**(29)**	**—**

There was no material asset (liability) measured at fair value on a recurring basis using significant unobservable inputs (Level 3) as at December 31, 2019 and December 31, 2018.

The liability component of the convertible bonds issued on July 3, 2017 was measured at initial recognition at fair value based on a discount rate adjustment technique (income approach), which corresponds to a Level 3 fair value hierarchy measurement. The fair value of the liability component at initial recognition totaled $1,266 million before allocation of issuance costs, and was estimated by calculating the present value of cash flows using a discount rate of 2.70% and 3.28% (including 0.25% per annum nominal interest), respectively, on each tranche, which were determined to be consistent with the market rates at the time for similar instruments with no conversion rights. The liability component of the convertible bonds was subsequently reported at amortized cost.

The Company evaluated in 2019, 2018 and 2017 for impairment the aggregate carrying amount of long-term investments for which the Company applies the cost method as a measurement alternative, as described in Note 2.25. No significant impairment charge was recorded on these investments in 2019, 2018 and 2017.

The following table includes additional fair value information on financial assets and liabilities as at December 31, 2019 and 2018:

		2019		2018	
	Level	Carrying Amount	Estimated Fair Value	Carrying Amount	Estimated Fair Value
Cash equivalents (1)	**1**	1,691	1,691	2,138	2,138
Long-term debt					
– Bank loans (including current portion)	**2**	718	718	594	594
– Senior unsecured convertible bonds (2)	**1**	1,354	2,103	1,316	1,501

(1) Cash equivalents primarily correspond to deposits at call with banks.

(2) The carrying amount of the senior unsecured convertible bonds as reported above corresponds to the liability component only. For the convertible bonds issued on July 3, 2017 and outstanding as at December 31, 2017, the carrying amount of the senior unsecured convertible bonds corresponds to the liability component only, since, at initial recognition, an amount of $242 million was recorded directly in shareholders' equity as the value of the equity instrument embedded in the convertible instrument.

There were no debt securities that were in an unrealized loss position as at December 31, 2019. The table below details debt securities that were in an unrealized loss position as at December 31, 2018. The securities are segregated by investment type and length of time that the individual securities have been in a continuous unrealized position as at December 31, 2018.

	December 31, 2018					
	Less than 12 months		More than 12 months		Total	
Description	Fair Values	Unrealized Losses	Fair Values	Unrealized Losses	Fair Values	Unrealized Losses
U.S. Treasury Bonds	—	—	330	(2)	330	(2)
Total	—	—	330	(2)	330	(2)

The methodologies used to estimate fair value are as follows:

Debt securities classified as available-for-sale

The fair value of these debt securities is estimated based upon quoted market prices for identical instruments.

Foreign exchange forward contracts, currency options and collars

The fair value of these instruments is estimated based upon quoted market prices for similar instruments.

Equity securities measured at fair value through earnings

The fair value of these instruments is estimated based upon quoted market prices for identical instruments.

Equity securities carried at cost as a measurement alternative

The non-recurring fair value measurement is based on the valuation of the underlying investments on a new round of third party financing or upon liquidation.

Long-term debt and current portion of long-term debt

The fair value of bank loans is determined by estimating future cash flows on a borrowing-by-borrowing basis and discounting these future cash flows using the Company's incremental borrowing rates for similar types of borrowing arrangements.

The senior unsecured convertible bonds have been trading on the open market segment of the Frankfurt Stock Exchange since their issuance on July 3, 2017. The fair value of these instruments is the observable price of the bonds on that market.

Cash and cash equivalents, accounts receivable, short-term borrowings, and accounts payable

The carrying amounts reflected in the consolidated financial statements are reasonable estimates of fair value due to the relatively short period of time between the origination of the instruments and their expected realization.

28. RELATED PARTY TRANSACTIONS

Transactions with significant shareholders, their affiliates and other related parties were as follows:

	December 31, 2019	December 31, 2018	December 31, 2017
Sales & other services	2	—	—
Other purchases	18	15	12
Accounts receivable	—	2	3
Accounts payable	—	52	51

For the years ended December 31, 2019, 2018 and 2017, the related party transactions were primarily with significant shareholders of the Company, or their subsidiaries and companies in which management of the

Company perform similar policymaking functions. These include, but are not limited to: Orange, MicroOLED and Telecom Italia. The related party transactions presented in the table above also include transactions between the Company and its equity-method investments as listed in Note 12.

The Company made a contribution of $0.4 million for the year ended December 31, 2019 and $0.5 million for each of the years ended December 31, 2018 and 2017 to the ST Foundation, a non-profit organization established to deliver and coordinate independent programs in line with its mission. Certain members of the Foundation’s Board are senior members of the Company’s management.

STMICROELECTRONICS N.V.

VALUATION AND QUALIFYING ACCOUNTS

Valuation and qualifying accounts deducted from the related asset accounts	Balance at beginning of period	Translation adjustment	Charged to costs and expenses	Additions/ (Deductions)	Balance at end of period
			(Currency—millions of U.S. dollars)		
2019					
Accounts Receivable	15	—	—	1	16
Deferred Tax Assets	1,548	(4)	—	(10)	1,534
2018					
Accounts Receivable	15	—	—	—	15
Deferred Tax Assets	1,502	(16)	143	(81)	1,548
2017					
Accounts Receivable	12	—	—	3	15
Deferred Tax Assets	1,578	24	3	(103)	1,502