

Financial Statement Analysis

for

Mastercard Incorporated

Prepared by

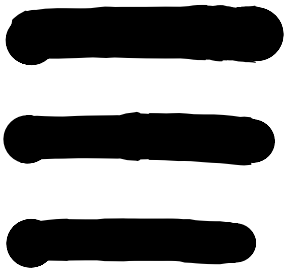


Table of Contents

Table of Contents 2

List of Tables 4

1 Forecasted Financial Statements 5

1.1 Income Statement 5

1.1.1 Revenues 5

1.1.2 Property, Plant, and Equipment and Depreciation 5

1.1.3 Weighted Average Cost of Capital 6

1.1.4 Income Tax Rate 6

1.1.5 Other Income Statement Items 7

1.2 Balance Sheet 12

1.2.1 Current Assets 12

1.2.2 Other Assets 13

1.2.3 Current Liabilities 14

1.2.4 Other Liabilities 14

1.2.5 Redeemable Non-Controlling Interests 15

1.2.6 Shareholder's Equity 15

1.3 Implied Statement of Cash Flows 21

1.4 Reasonableness of Projected Statements 21

1.5 Factors That Could Disrupt the Projections 25
2 Valuation 25
2.1 Dividend Model 27
2.2 Free Cash Flow Model 29
2.3 Earnings Model 31
2.4 Market Methods Model 33
2.4.1 Market to Book Ratio 33
2.4.2 Price-to-Earnings Ratio (P/E ratio) 34
2.4.3 Price -to-Earnings-To-Growth Ratio (PEG ratio) 34
3 Assess the Financial Statements Quality 36
3.1 Earnings Quality 36
3.2 Liability Recognition and Measurement 36
3.3 Asset Recognition and Measurement 37
3.4 One-time items 37
3.5 Changes in Accounting Policy 38
3.6 Does Financial Statement Quality Affect Valuations? 39
4 Summary and Recommendation 39
5 References 40

List of Tables

Table 1. Forecasted Income Statement 9

Table 2. Forecasted Balance Sheet 17

Table 3. Forecasted Statement of Cash Flows 22

Table 4. Forecast Validity Check 23

Table 5. Valuation Input Parameter Assumptions 26

Table 6. Dividend Valuation Model Results 28

Table 7. Free Cash Flow Valuation Model Results 30

Table 8. Dividends and Free Cash Flow Sensitivity Analysis 31

Table 9. Residual Income Valuation Model Results 32

Table 10. Residual Income Valuation Sensitivity Analysis 33

Table 11. Market-to-Book Valuation Model Results 35

1 Forecasted Financial Statements

1.1 Income Statement

Table 1 shows the forecasted income statement. All values are in millions.

1.1.1 Revenues

Since Mastercard's revenue is based on payment processing and usage of its network, rather than on amount of goods sold, we determined projected revenues by setting a future growth rate. Mastercard has multiple segments with similar growth rates, so we chose to determine one growth rate for all revenues. We determined the growth rate for 2019 revenues to be 12% from the 3rd Quarter 10-Q (Ref. 2) for the first nine months of the year. Since Mastercard's business is not seasonal (revenues are consistent throughout the year), this growth rate should be applicable for the entire year. We determined the growth rate for 2016 using revenue of $9,667 million for 2015 from the 2016 10-K (Ref. 3). For future years, we determined the growth rate as the average of the growth rates from 2016-2019, which was about 15%.

1.1.2 Property, Plant, and Equipment and Depreciation

Mastercard's 10-K (Ref. 1) shows acquisition of property, plant, and equipment (PP&E) on the statement of cash flows, and no sales of PP&E. It does not discuss future plans for acquisition or sales of PP&E, so we needed to develop that projection. We projected the net amount spent on PP&E each year based on the total revenues on the income statement, since capital expenses should expand with increasing revenues. The average percent of new capital expenditures versus revenue was 2.2% for 2016-2018, so we used 2.2% of total revenues new capital expenditure going forward each year.

We calculated the implied average useful life for Mastercard's PP&E to be 12.7 years, by dividing the average depreciation expense in 2017 and 2018 by the average PP&E at cost account on the balance sheet for 2017 and 2018. Since Mastercard gives depreciation and amortization together on the income statement, we determined depreciation expense by subtracting accumulated depreciation between the year of interest and the prior year. In Note 1 to the consolidated financial statements (Ref. 1), MA states that it uses the straight-line method of depreciation, so we projected depreciation the same way. We projected depreciation each year by dividing the cost of PP&E by the implied useful life of 12.7 years and applying the appropriate amount of depreciation remaining for each acquisition of PP&E.

1.1.3 Weighted Average Cost of Capital

Mastercard lists all of its long-term debt in its 10-K (Ref. 1), and it has debt maturing in various years within the forecast period. The first maturity is in 2019, so this issue is not considered in the weight average cost of capital (WACC) calculation. Mastercard's 3Q19 10-Q (Ref. 2) shows an additional $2 billion of debt issued in 2019, so this new long-term debt is included in the WACC calculation. The WACC was calculated by multiplying the stated interest rate by the proportion of total debt for each issue, and then summing the resulting value for all issues. The resulting WACC was 2.88%. We assumed that any additional long-term debt was added at an interest rate equal to the WACC, and all maturing debt was refinanced at the original interest rate for that debt issuance, such that the WACC remained constant for the forecast period.

1.1.4 Income Tax Rate

Mastercard's effective income tax rate has varied greatly in the past three years, with 2018 being the lowest due to the reduction in the marginal tax rate for corporations in the U.S. from 35% to 21%. Mastercard's effective income tax rate for 2018 was 18.7%. The 3Q19 10-Q (Ref. 2) states

that the effective tax rate for 2019 through the first three quarters is similar to that in 2018 for the same period, so we expect the 2019 effective tax rate to be similar to the 2018 rate. We chose to use 19% for the effective tax rate through the forecast period, since the two years after the U.S. tax reduction are close to this rate.

1.1.5 Other Income Statement Items

Mastercard's Selling, General and Administrative expenses and advertising and marketing expenses were about the same percentage of total revenues over the past three years. As such, we projected these expenses to be 35% and 6% of total revenues, respectively, for future years. In 2019, we projected these expenses to be the same percent of total revenues as specified in the 3Q19 10-Q (Ref. 2), which was 33.6% and 5.2%, respectively.

Mastercard considers litigation to be a non-recurring expense, so we projected this account to be zero for all future periods, consistent with the 3Q19 10-Q (Ref. 2). Since the other income or gains account was small, we assumed this account was zero for all future periods.

We assumed investment income was the return on the cash and cash equivalents and investments from the balance sheet averaged between the current and prior year. The average rate of return of the prior three years and the first three quarters of 2019 was 1%, so we projected the rate of return Mastercard earned on cash and investments to be 1% for the future periods. Similarly, we assumed the interest expense to be the WACC multiplied by the average of the notes payable and short-term debt, current maturities of long-term debt, and long-term debt accounts from the balance of the current and prior year.

Mastercard has no reported discontinued operations, no reported financial impact from changes in accounting principles, and no reported net income attributable to noncontrolling interests, so

all of these accounts are assumed to be zero for the forecast period. Mastercard does have other comprehensive income items reported; however, since the account fluctuated from positive to negative in the past three years and is small compared to net income, we assumed this account would have a net zero impact during the forecast period. Thus, this account is forecast to be zero.

Table 1. Forecasted Income Statement

INCOME STATEMENT	Actuals			Forecasts					
Year	2016	2017	2018	2019	2020	2021	2022	2023	2024
Revenues	**10,776.0**	**12,497.0**	**14,950.0**	**16,744.0**	**19,255.6**	**22,143.9**	**25,465.5**	**29,285.4**	**30,163.9**
growth rate				12.0%	15.0%	15.0%	15.0%	15.0%	
Depreciation and Amortization	**373.0**	**436.0**	**459.0**	**168.1**	**201.5**	**239.8**	**283.9**	**334.7**	**344.7**
Selling, General and Administrative Expenses	**3,827.0**	**4,653.0**	**5,174.0**	**5,618.5**	**6,739.5**	**7,750.4**	**8,912.9**	**10,249.9**	**10,557.4**
percent of total revenue	35.5%	37.2%	34.6%	33.6%	35.0%	35.0%	35.0%	35.0%	
Advertising and Marketing	**698.0**	**771.0**	**907.0**	**864.8**	**1,155.3**	**1,328.6**	**1,527.9**	**1,757.1**	**1,809.8**
percent of total revenue	6.5%	6.2%	6.1%	5.2%	6.0%	6.0%	6.0%	6.0%	
Provision for Litigation Settlements	**117.0**	**15.0**	**1,128.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Income from equity investees	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Non-recurring operating gains <losses>	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Operating Income	**5,761.0**	**6,622.0**	**7,282.0**	**10,092.6**	**11,159.3**	**12,825.1**	**14,740.7**	**16,943.7**	**17,452.0**
percent of total revenue	53.5%	53.0%	48.7%	60.3%	58.0%	57.9%	57.9%	57.9%	57.9%
Investment income	**43.0**	**56.0**	**122.0**	**81.0**	**82.1**	**90.2**	**99.1**	**108.9**	**112.2**
interest rate				1.0%	1.0%	1.0%	1.0%	1.0%	
<Interest expense>	**-95.0**	**-154.0**	**-186.0**	**-202.7**	**-237.2**	**-251.6**	**-251.6**	**-251.6**	**-259.2**
interest rate				-2.88%	-2.88%	-2.88%	-2.88%	-2.88%	

INCOME STATEMENT	Actuals			Forecasts					
Year	2016	2017	2018	2019	2020	2021	2022	2023	2024
Income <Loss> from equity affiliates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other income or gains <Other expenses or losses>	-63.0	-2.0	-14.0	0.0	0.0	0.0	0.0	0.0	0.0
Income before Tax	5,646.0	6,522.0	7,204.0	9,971.0	11,004.2	12,663.6	14,588.1	16,801.0	17,305.0
percent of total revenue	52.4%	52.2%	48.2%	59.5%	57.1%	57.2%	57.3%	57.4%	57.4%
<Income tax expense>	-1,587.0	-2,607.0	-1,345.0	-1,864.6	-2,090.8	-2,406.1	-2,771.7	-3,192.2	-3,288.0
tax rate				18.7%	19.0%	19.0%	19.0%	19.0%	
Income <Loss> from discontinued operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Changes in accounting principles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Income	4,059.0	3,915.0	5,859.0	8,106.4	8,913.4	10,257.5	11,816.4	13,608.8	14,017.1
percent of total revenue	37.7%	31.3%	39.2%	48.4%	46.3%	46.3%	46.4%	46.5%	46.5%
Net income attributable to noncontrolling interests	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Income attributable to common shareholders	4,059.0	3,915.0	5,859.0	8,106.4	8,913.4	10,257.5	11,816.4	13,608.8	14,017.1
percent of total revenue	37.7%	31.3%	39.2%	48.4%	46.3%	46.3%	46.4%	46.5%	46.5%
Other comprehensive income items	-248.0	427.0	-221.0	0.0	0.0	0.0	0.0	0.0	0.0

INCOME STATEMENT	Actuals			Forecasts					
Year	2016	2017	2018	2019	2020	2021	2022	2023	2024
Comprehensive Income	**3,811.0**	**4,342.0**	**5,638.0**	**8,106.4**	**8,913.4**	**10,257.5**	**11,816.4**	**13,608.8**	**14,017.1**
percent of total revenue	35.4%	34.7%	37.7%	48.4%	46.3%	46.3%	46.4%	46.5%	46.5%

1.2 Balance Sheet

Table 2 shows the forecasted balance sheet. All values are in millions.

1.2.1 Current Assets

Mastercard made an acquisition in 2019 for which it paid $1.2 billion (Ref. 2). The cash and cash equivalents and short-term investments accounts were reduced in the 3Q19 10-Q, presumably for this acquisition. In the forecast for 2019, we assumed that cash was reduced by $1.2 billion from the end of 2018. Going forward from 2019, we assumed cash and cash equivalents grew 10%, which is approximately the amount that total assets grew each year in the forecast period. The short-term investments account has been approximately 8.5% of total assets in the past three year, so we have projected this account to remain at 8.5% of total assets. We ignored the reduction seen in the 3Q19 10-Q because it is likely that Mastercard will grow this account back to the prior percent of total assets.

The accounts and notes receivable and prepaid and other current assets accounts are projected to increase at the same annual growth rate as revenues. Since these accounts are related to operations, we expect them to scale with revenues. Mastercard carries no inventory, since it is not in sales or manufacturing, so this account is zero throughout the forecast period.

We increased restricted cash for litigation settlement to be equal to the amount in the 3Q19 10-Q (Ref. 2), and then projected a decrease of 10% per year for the rest of the forecast period. We expect litigation to be a nonrecurring expense, so we expect Mastercard to eventually reduce this account as litigation is settled. However, we don’t know when this reduction would occur, so a 10% reduction each year seems reasonable.

We assumed settlement due from customers to increase by 10% per year for the forecast period, consistent with growth of total assets. As Mastercard increases its business, we expect Mastercard to continue settling transactions at a rate consistent with the growth in business. We assumed the same growth rate for the same reasons for the settlement due to customers in current liabilities.

Restricted security deposits held for customers is found both in current assets and in current liabilities. We assumed both accounts to stay at 5% of total assets, consistent with the approximate size of the account past three years.

1.2.2 Other Assets

Mastercard does not differentiate between long-term and short-term investments, so we include all investments as short term investments, resulting in zero long-term investments. Mastercard also has no equity and cost investments.

We discussed development of the property, plant, and equipment account and depreciation in Section 1.1.2. We calculated the accumulated depreciation by subtracting the current year's depreciation expense from the previous year's accumulated depreciation.

We assumed deferred income taxes decrease at 10% per year in the forecast period, we expect Mastercard to utilize these assets to decrease tax expense in future years.

We assumed other assets grew at a rate of 10%, consistent with the approximate growth in total assets. We chose a growth rate of 5% for goodwill and other intangible assets. Goodwill increased in 2019 due to an acquisition (Ref. 2), so we chose the value on the 3Q19 10-Q for that account to be the Goodwill amount for 2019. After 2019, we assumed Goodwill will increase by 5% a year. Mastercard has made multiple acquisitions in the past three years and has written

down some amount of goodwill and other intangible assets, so we expect this 5% growth rate to reflect future acquisitions and write-downs of these accounts.

1.2.3 Current Liabilities

We assumed the following accounts were best forecasted as percentage of total assets: accounts payable, accrued liabilities, other current liabilities, and restricted security deposits held for customers. All of these accounts were a similar percent of total assets in the previous three years, so we assumed their size would continue to be relative to Mastercard's total assets. Table 2 shows the percents we used for each of these accounts.

Mastercard had zero notes payable and short-term debt in all three previous years, so we projected those accounts to continue to be zero. We moved issues of long-term debt to current maturities of long-term debt the year before they matured, resulting in $650 million, $801 million, and $1 billion in this account for 2020, 2021, and 2023, respectively. The rest of the forecast period had zero in this account.

The settlement due to customers account is the same as the one in current assets.

1.2.4 Other Liabilities

Mastercard issued $2 billion of long-term debt in 2019 (Ref. 2), and we took the long-term debt account value from the 3Q19 10-Q, assuming Mastercard would not issue more long-term debt prior to the end of the year. Because Mastercard has been taking advantage of low interest rates to issue more debt in the past few years, we assumed Mastercard would issue another $1 billion of long-term debt in 2020. We assumed this debt was issued at the WACC calculated above in Section 1.1.3. After that, we assumed Mastercard would only issue new debt to replace maturing long-term debt, and this new debt would be issued at the same interest rate as the retired debt.

This assumption is reasonable because we expect interest rates to remain low for an extended period of time. Mastercard has some debt denominated in Euros, which is exposed to currency fluctuations. Since we do not know where the value of currencies will be in 2022 when the first issue of this debt matures, we assumed the face value of this debt in dollars as specified in the 2018 10-K (Ref. 1) is a representative value.

We make the same assumption for deferred tax liabilities as we did for deferred tax assets, that they will decrease by 10% per year as they are realized.

Mastercard's other noncurrent liabilities averaged about 7% of total assets over the past two years, so we project this account will continues to be 7% of total assets over the forecast period.

1.2.5 Redeemable Non-Controlling Interests

Mastercard has an additional account on its balance sheet titled redeemable non-controlling interests. Since this is a small account, we assume it is divested in 2019 and is zero going forward in the forecast period.

1.2.6 Shareholder's Equity

Mastercard has not issued any preferred shares, so we forecast that account to continue to be zero. Since the common stock and additional paid in capital account has grown approximately 4.5% in the past three years, we forecast this account to grow at that rate. Since noncontrolling interests are small with respect to total equity, we assumed Mastercard would divest of them such that they would be zero for the forecast period.

Since the other comprehensive income account on the income statement was forecasted to be zero, we assumed the accumulated other comprehensive income account to be unchanged from

the 2018 amount. While the 3Q19 10-Q (Ref. 2) shows a decrease in this account, we chose not to include that change since future changes could negate its impact.

Retained earnings are calculated as previous year's retained earnings plus current year net income minus total dividends paid for the year. Treasury stock (share repurchases) is used as the flexible account to balance the balance sheet, so this account fluctuates each year. In December 2018, Mastercard authorized up to $6.5 billion of share repurchases (Ref. 2), and in December 2019, it authorized an additional $8 billion of share repurchases (Ref. 4). Our forecast assumes share repurchases continue at this amount and grow further later in the forecast period.

Since most of 2019 has already passed, we used the 3Q19 and 2Q19 10-Q documents (Ref. 2 and 5) to determine the appropriate dividend payment for 2019. We multiplied the dividends paid in the cash flow statement of the 3Q19 10-Q by 4/3 and the dividends paid in the 2Q19 10-Q by 2 to estimate the full year dividend payment. These calculations resulted in approximately $1.35 billion, so we used this amount as the 2019 dividend payment. The average dividend payment over the three previous years and 2019 is 20% of net income attributable to common shareholders, so we assumed the dividend payment would continue to be 20% of net income attributable to common shareholders for each year in the forecast period.

Table 2. Forecasted Balance Sheet

BALANCE SHEET	Actuals			Forecasts					
	2016	2017	2018	2019	2020	2021	2022	2023	2024
ASSETS:									
Cash and cash equivalents	6,721.0	5,933.0	6,682.0	5,482.0	6,030.2	6,633.2	7,296.5	8,026.2	8,267.0
annual growth rate				0%	10%	10%	10%	10%	
Short-term investments	1,614.0	1,849.0	1,696.0	2,343.8	2,561.4	2,805.3	3,078.2	3,383.6	3,485.1
percent of total assets	8.6%	8.7%	6.8%	8.5%	8.5%	8.5%	8.5%	8.5%	
Accounts and notes receivable - net	1,416.0	1,969.0	2,276.0	2,549.1	2,931.5	3,371.2	3,876.9	4,458.4	4,592.2
annual growth rate				12%	15%	15%	15%	15%	
Inventories	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
annual growth rate				0%	0%	0%	0%	0%	
Prepaid expenses and other current assets	850.0	1,040.0	1,432.0	1,603.8	1,844.4	2,121.1	2,439.2	2,805.1	2,889.3
annual growth rate				12%	15%	15%	15%	15%	
Restricted cash for litigation settlement	543.0	546.0	553.0	666.0	599.4	539.5	485.5	437.0	450.1
annual growth rate				0%	-10%	-10%	-10%	-10%	
Settlement due from customers	1,093.0	1,375.0	2,452.0	2,697.2	2,966.9	3,263.6	3,590.0	3,949.0	4,067.4
annual growth rate				10%	10%	10%	10%	10%	
Restricted security deposits held for customers	991.0	1,085.0	1,080.0	1,378.7	1,506.7	1,650.2	1,810.7	1,990.4	2,050.1
annual growth rate				5%	5%	5%	5%	5%	
Current Assets	13,228.0	13,797.0	16,171.0	16,720.7	18,440.6	20,384.0	22,577.1	25,049.6	25,801.1
common size	70.8%	64.7%	65.0%	60.6%	61.2%	61.8%	62.3%	62.9%	62.9%
rate of change	0.0%	4.3%	17.2%	3.4%	10.3%	10.5%	10.8%	11.0%	3.0%
Long-term investments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

BALANCE SHEET	Actuals			Forecasts					
	2016	2017	2018	2019	2020	2021	2022	2023	2024
Equity and cost investments	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Property, plant, and equipment - at cost	**1,336.0**	**1,543.0**	**1,768.0**	**2,136.5**	**2,560.4**	**3,047.8**	**3,608.3**	**4,252.8**	**4,380.4**
<Accumulated depreciation>	**-603.0**	**-714.0**	**-847.0**	**-1,015.1**	**-1,216.6**	**-1,456.4**	**-1,740.4**	**-2,075.0**	**-2,137.3**
Deferred income taxes - noncurrent	**307.0**	**250.0**	**570.0**	**513.0**	**461.7**	**415.5**	**374.0**	**336.6**	**346.7**
annual growth rate				-10%	-10%	-10%	-10%	-10%	
Other assets	**1,929.0**	**2,298.0**	**3,303.0**	**4,172.6**	**4,589.8**	**5,048.8**	**5,553.7**	**6,109.1**	**6,292.3**
annual growth rate				10%	10%	10%	10%	10%	
Other intangible assets	**722.0**	**1,120.0**	**991.0**	**1,322.4**	**1,388.5**	**1,457.9**	**1,530.8**	**1,607.4**	**1,655.6**
annual growth rate				5%	5%	5%	5%	5%	
Goodwill	**1,756.0**	**3,035.0**	**2,904.0**	**3,724.0**	**3,910.2**	**4,105.7**	**4,311.0**	**4,526.5**	**4,662.3**
annual growth rate				5%	5%	5%	5%	5%	
Total Assets	**18,675.0**	**21,329.0**	**24,860.0**	**27,574.0**	**30,134.6**	**33,003.3**	**36,214.5**	**39,807.0**	**41,001.2**
percent of total assets	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
rate of change	0.0%	14.2%	16.6%	10.9%	9.3%	9.5%	9.7%	9.9%	3.0%
LIABILITIES:									
Accounts payable	**609.0**	**933.0**	**537.0**	**965.1**	**1,054.7**	**1,155.1**	**1,267.5**	**1,393.2**	**1,435.0**
percent of total assets	3.3%	4.4%	2.2%	3.5%	3.5%	3.5%	3.5%	3.5%	
Accrued liabilities	**4,040.0**	**4,640.0**	**6,338.0**	**6,893.5**	**7,533.6**	**8,250.8**	**9,053.6**	**9,951.8**	**10,250.3**
percent of total assets	21.6%	21.8%	25.5%	25.0%	25.0%	25.0%	25.0%	25.0%	
Notes payable and short-term debt	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

BALANCE SHEET	Actuals			Forecasts					
	2016	2017	2018	2019	2020	2021	2022	2023	2024
Current maturities of long-term debt	**0.0**	**0.0**	**500.0**	**0.0**	**650.0**	**801.0**	**0.0**	**1,000.0**	**0.0**
debt principal				0.0	650.0	801.0	0.0	1000.0	
Other current liabilities	**620.0**	**792.0**	**949.0**	**1,103.0**	**1,205.4**	**1,320.1**	**1,448.6**	**1,592.3**	**1,640.0**
percent of total assets	3.3%	3.7%	3.8%	4.0%	4.0%	4.0%	4.0%	4.0%	
Settlement due to customers	**946.0**	**1,343.0**	**2,189.0**	**2,407.9**	**2,648.7**	**2,913.6**	**3,204.9**	**3,525.4**	**3,631.2**
annual growth rate				10%	10%	10%	10%	10%	
Restricted security deposits held for customers	**991.0**	**1,085.0**	**1,080.0**	**1,378.7**	**1,506.7**	**1,650.2**	**1,810.7**	**1,990.4**	**2,050.1**
percent of total assets	5.3%	5.1%	4.3%	5.0%	5.0%	5.0%	5.0%	5.0%	
Current Liabilities	**7,206.0**	**8,793.0**	**11,593.0**	**12,748.2**	**14,599.2**	**16,090.8**	**16,785.4**	**19,453.0**	**19,006.6**
percent of total assets	38.6%	41.2%	46.6%	46.2%	48.4%	48.8%	46.3%	48.9%	46.4%
rate of change	0.0%	22.0%	31.8%	10.0%	14.5%	10.2%	4.3%	15.9%	
Long-term debt	**5,180.0**	**5,424.0**	**5,834.0**	**7,735.0**	**8,085.0**	**7,934.0**	**8,735.0**	**7,735.0**	**8,967.1**
change in debt					1000	650	801	0	
Long-term accrued liabilities	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
annual growth rate				0%	0%	0%	0%	0%	
Deferred tax liabilities-noncurrent	**81.0**	**106.0**	**67.0**	**60.3**	**54.3**	**48.8**	**44.0**	**39.6**	**40.7**
annual growth rate				-10%	-10%	-10%	-10%	-10%	
Other noncurrent liabilities	**524.0**	**1,438.0**	**1,877.0**	**1,930.2**	**2,109.4**	**2,310.2**	**2,535.0**	**2,786.5**	**2,870.1**
percent of total assets	2.8%	6.7%	7.6%	7.0%	7.0%	7.0%	7.0%	7.0%	
Total Liabilities	**12,991.0**	**15,761.0**	**19,371.0**	**22,473.6**	**24,847.9**	**26,383.9**	**28,099.3**	**30,014.1**	**30,884.5**
percent of total assets	69.6%	73.9%	77.9%	81.5%	82.5%	79.9%	77.6%	75.4%	75.3%
rate of change	0.0%	21.3%	22.9%	16.0%	10.6%	6.2%	6.5%	6.8%	

BALANCE SHEET	Actuals			Forecasts					
	2016	2017	2018	2019	2020	2021	2022	2023	2024
Redeemable Non-controlling Interests	**0.0**	**71.0**	**71.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
SHAREHOLDERS' EQUITY									
Preferred stock	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Common stock + Additional paid in capital	**4,183.0**	**4,365.0**	**4,580.0**	**4,786.1**	**5,001.5**	**5,226.5**	**5,461.7**	**5,707.5**	**5,878.7**
annual growth rate				4.5%	4.5%	4.5%	4.5%	4.5%	
Retained earnings <deficit>	**19,418.0**	**22,364.0**	**27,283.0**	**34,039.4**	**41,170.1**	**49,376.1**	**58,829.2**	**69,716.3**	**80,929.9**
Accumulated other comprehensive income <loss>	**-924.0**	**-497.0**	**-718.0**	**-718.0**	**-718.0**	**-718.0**	**-718.0**	**-718.0**	**-718.0**
annual growth rate				0.0	0.0	0.0	0.0	0.0	
<Treasury stock> and other equity adjustments	**-17,021.0**	**-20,764.0**	**-25,750.0**	**-33,007.1**	**-40,166.8**	**-47,265.2**	**-55,457.8**	**-64,912.9**	**-75,973.9**
price of shares				-7,257	-7,160	-7,098	-8,193	-9,455	-11061
Total Common Shareholders' Equity	**5,656.0**	**5,468.0**	**5,395.0**	**5,100.4**	**5,286.7**	**6,619.5**	**8,115.2**	**9,792.9**	**10,116.7**
percent of total assets	30.3%	25.6%	21.7%	18.5%	17.5%	20.1%	22.4%	24.6%	
rate of change	0.0%	-3.3%	-1.3%	-5.5%	3.7%	25.2%	22.6%	20.7%	3.3%
Noncontrolling interests	**28.0**	**29.0**	**23.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Total Equity	**5,684.0**	**5,497.0**	**5,418.0**	**5,100.4**	**5,286.7**	**6,619.5**	**8,115.2**	**9,792.9**	**10,116.7**
percent of total assets	30.4%	25.8%	21.8%	18.5%	17.5%	20.1%	22.4%	24.6%	
Total Liabilities and Equities	**18,675.0**	**21,329.0**	**24,860.0**	**27,574.0**	**30,134.6**	**33,003.3**	**36,214.5**	**39,807.0**	**41,001.2**

1.3 Implied Statement of Cash Flows

We determined the values in the statement of cash flows by subtracting the value of each account on the balance sheet that impacts cash from value for the previous year. Table 3 shows the resulting implied statement of cash flows, and all values are in millions.

1.4 Reasonableness of Projected Statements

Table 4 shows a validity check of the forecasted financial statements. We calculated various ratios and compared them to prior year values to show that the values for the forecast period are reasonable as compared to the actual data from the prior three years.

The only check that appears out of the ordinary is the net income growth rate. 2017-2019 are anomalous years, because the growth rate was below 10% prior to 2017. Mastercard experienced a must higher effective income tax rate in 2017 (Ref. 1), causing a decline in net income. In 2018, the U.S. reduced the marginal income tax rate, which didn't appear to fully permeate Mastercard's financial statements until after 2019. 2020 and forward show a return to normal net income growth rates.

Table 3. Forecasted Statement of Cash Flows

IMPLIED STATEMENT OF CASH FLOWS	Forecasts					
	2019	2020	2021	2022	2023	2024
Net Income	**8,106.4**	**8,913.4**	**10,257.5**	**11,816.4**	**13,608.8**	**14,017.1**
Add back depreciation and amortization expense (net)	**168.1**	**201.5**	**239.8**	**283.9**	**334.7**	**62.3**
Change in receivables - net	**-273.1**	**-382.4**	**-439.7**	**-505.7**	**-581.5**	**-133.8**
Change in inventories	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Change in prepaid expenses	**-171.8**	**-240.6**	**-276.7**	**-318.2**	**-365.9**	**-84.2**
Change in settlements due from customers	**-245.2**	**-269.7**	**-296.7**	**-326.4**	**-359.0**	**-118.5**
Change in Restricted security deposits held for customers	**-298.7**	**-128.0**	**-143.4**	**-160.6**	**-179.6**	**-59.7**
Change in accounts payable - trade	**428.1**	**89.6**	**100.4**	**112.4**	**125.7**	**41.8**
Change in current accrued liabilities	**555.5**	**640.1**	**717.2**	**802.8**	**898.1**	**298.6**
Change in other current liabilities	**154.0**	**102.4**	**114.8**	**128.4**	**143.7**	**47.8**
Change in settlements due to customers	**218.9**	**240.8**	**264.9**	**291.4**	**320.5**	**105.8**
Change in restricted security deposits held for customers	**298.7**	**128.0**	**143.4**	**160.6**	**179.6**	**59.7**
Net change in deferred tax assets and liabilities	**-62.7**	**111.9**	**100.7**	**90.6**	**81.6**	**-22.0**
Change in long-term accrued liabilities	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Change in other noncurrent liabilities	**53.2**	**179.2**	**200.8**	**224.8**	**251.5**	**83.6**
Net Cash Flows from Operations	**8,931.3**	**9,586.3**	**10,983.0**	**12,600.5**	**14,458.1**	**14,298.4**
Change in property, plant, & equipment at cost	**-368.5**	**-423.8**	**-487.4**	**-560.5**	**-644.6**	**-127.6**
Change in short-term investments	**-647.8**	**-217.6**	**-243.8**	**-272.9**	**-305.4**	**-101.5**
Change in long-term investments	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Change in amortizable intangible assets (net)	**-331.4**	**-66.1**	**-69.4**	**-72.9**	**-76.5**	**-48.2**
Change in goodwill and nonamortizable intangibles	**-820.0**	**-186.2**	**-195.5**	**-205.3**	**-215.5**	**-135.8**
Change in other assets	**-869.6**	**-417.3**	**-459.0**	**-504.9**	**-555.4**	**-183.3**

IMPLIED STATEMENT OF CASH FLOWS	Forecasts					
	2019	2020	2021	2022	2023	2024
Net Cash Flows from Investing Activities	-3,037.3	-1,311.0	-1,455.2	-1,616.5	-1,797.4	-596.4
Change in short-term debt	-500.0	650.0	151.0	-801.0	1,000.0	-1,000.0
Change in long-term debt	1,901.0	350.0	-151.0	801.0	-1,000.0	1,232.1
Change in preferred stock	0.0	0.0	0.0	0.0	0.0	0.0
Change in common stock + paid in capital	206.1	215.4	225.1	235.2	245.8	171.2
Change in accumulated other comprehensive income	0.0	0.0	0.0	0.0	0.0	0.0
Change in treasury stock and other equity adjustments	-7,257.1	-7,159.7	-7,098.4	-8,192.6	-9,455.1	-11,061.1
Dividends paid	-1,350.0	-1,782.7	-2,051.5	-2,363.3	-2,721.8	-2,803.4
Change in noncontrolling interests	-94.0	0.0	0.0	0.0	0.0	0.0
Net Cash Flows from Financing Activities	-7,094.0	-7,727.0	-8,924.8	-10,320.7	-11,931.1	-13,461.2
Net Change in Cash	-1,200.0	548.2	603.0	663.3	729.7	240.8

Table 4. Forecast Validity Check

	Actuals			Forecasts					
	2016	2017	2018	2019	2020	2021	2022	2023	2024
GROWTH									
Revenue Growth Rates:	11.5%	16.0%	19.6%	12.0%	15.0%	15.0%	15.0%	15.0%	3.0%
Net Income Growth Rates:	6.6%	-3.5%	49.7%	38.4%	10.0%	15.1%	15.2%	15.2%	3.0%
Total Asset Growth Rates	60.2%	14.2%	16.6%	10.9%	9.3%	9.5%	9.7%	9.9%	3.0%
RETURN ON ASSETS (based on reported amounts):									
Profit Margin for ROA	38.2%	32.1%	40.2%	49.4%	47.3%	47.2%	47.2%	47.2%	47.2%
x Asset Turnover	0.7	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.7

	Actuals			Forecasts					
	2016	2017	2018	2019	2020	2021	2022	2023	2024
= Return on Assets	27.2%	20.1%	26.0%	31.5%	31.6%	33.1%	34.7%	36.3%	35.2%
RETURN ON COMMON EQUITY (based on reported amounts):									
Profit Margin for ROCE	37.7%	31.3%	39.2%	48.4%	46.3%	46.3%	46.4%	46.5%	46.5%
x Asset Turnover	0.7	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.7
x Capital Structure Leverage	3.1	3.6	4.3	5.0	5.6	5.3	4.7	4.2	4.1
= Return on Common Equity	84.0%	70.4%	107.9%	154.5%	171.6%	172.3%	160.4%	152.0%	140.8%
OPERATING PERFORMANCE:									
Operating Profit Before Taxes / Revenues	53.5%	53.0%	48.7%	60.3%	58.0%	57.9%	57.9%	57.9%	57.9%
ASSET TURNOVER:									
Revenues / Average. Accounts Receivable	8.6	7.4	7.0	6.9	7.0	7.0	7.0	7.0	6.7
Revenues / Average Fixed Assets	15.3	16.0	17.1	16.4	15.6	15.1	14.7	14.5	13.6
LIQUIDITY:									
Current Ratio	1.8	1.6	1.4	1.3	1.3	1.3	1.3	1.3	1.4
Quick Ratio	1.4	1.1	0.9	0.8	0.8	0.8	0.8	0.8	0.9
SOLVENCY:									
Total Liabilities / Total Assets	69.6%	73.9%	77.9%	81.5%	82.5%	79.9%	77.6%	75.4%	75.3%
Total Liabilities / Total Equity	228.6%	286.7%	357.5%	440.6%	470.0%	398.6%	346.3%	306.5%	305.3%
Interest Coverage Ratio	60.4	43.4	39.7	50.2	47.4	51.3	59.0	67.8	67.8

1.5 Factors That Could Disrupt the Projections

As discussed in part 1 of this report, Mastercard faces a risk that new competitors of the alternate value chain (Alipay, WeChat) could take over its business. If these other companies make significant inroads into the U.S. and other large markets, Mastercard's future could be vastly different than projected here. We see the likelihood of this change occurring as low, since Mastercard and its competitors are very ingrained in the financial system in the U.S. and there is likely to be hesitation to switch to non-U.S. companies. Mastercard could also alter its business to move toward this new value chain to reduce the risk of business loss.

Mastercard is party to many lawsuits, and it has set aside cash and other assets for eventual settlements or judgements on these lawsuits. If the resulting expense is significantly greater than what Mastercard has anticipated, then its financial condition could be very different in the future than this forecast shows.

The valuation models used in this report are very sensitive to the assumed cost of equity and long-run growth rate. If these were to change substantially in the future, then the valuations depicted below may no longer be accurate. However, they are set up to be easily updated if these conditions were to change.

2 Valuation

The valuation models described below require the inputs found in Table 5. We obtained the current share price and equity risk factor (beta) from Yahoo! Finance (Ref. 6). The number of shares outstanding was taken from the 3Q19 10-Q (Ref. 2). Since we did not have any further detailed information on the current number of shares outstanding at 12/13/19, we assumed the

amount reported on the 10-Q was close enough for the valuation. Current market value was calculated as current share price multiplied by the number of shares outstanding.

We chose 3% as the long-run growth rate. This value is supposed to approximate the expected inflation amount and population growth (Ref. 7). Mastercard is a global company, so many inflation rates and population

We chose to use the current 10-year treasury yield as the risk-free rate. The 10 year is a better proxy for the risk-free rate than the 30-year yield, because the 30 year has more exposure to systematic risk due to its long maturity (Ref. 7). We chose a market risk premium of 5.6% as close to the average of two sources (Ref. 8 and Ref. 9). Using the capital asset pricing model, we calculated the required rate of return on common equity to be 7.65%.

Table 5. Valuation Input Parameter Assumptions

Date of Valuation	**12/13/2019**
Current share price	**$296.09**
Number of shares outstanding	**1,010.4**
Current market capitalization	**$299,169**
Long-run growth rate	**3.0%**
Beta	**1.04**
Risk free rate	**1.824%**
Market risk premium	**5.6%**
Required rate of return on common equity:	**7.65%**

2.1 Dividend Model

Mastercard currently has a dividend yield of 0.55% (Ref. 6). During the first three quarters of 2019, Mastercard paid $1 billion in dividends (Ref. 2), which is a significant increase over the $785 million that was paid in the same time period in 2018 (Ref. 2).

During 2017, the Board of Directors for Mastercard authorized the company to repurchase $4 billion shares of its common stock at a value worth. The company repurchased 26.2 million shares during 2018 at a cost of $4.933 billion (Ref. 1). This authorization amount continued to increase in 2019 and 2020 with budgets of $6.5 billion and $8 billion, respectively (Ref. 1 and Ref. 4).

The dividend valuation model considers all of the net cash flows between Mastercard and its common equity shareholders, which includes dividend payments, stock repurchases, and new share issuances. We projected future dividends using the method described in Ref. 7. We then discounted future total dividends to the present value, adjusting for midyear discounting (since dividends are paid quarterly and not at the beginning or end of the year) to produce a projected value per share, which is $266.92 as of 12/13/19. Mastercard's current stock price $296.09 per share which is 9.85% higher than the derived value. The details of this calculation are shown in Table 6 below and the sensitivity analysis is shown in Table 8.

Table 6. Dividend Valuation Model Results

Dividend Valuation Model	2019	2020	2021	2022	2023	2024
Dividends Paid	1,350.0	1,782.7	2,051.5	2,363.3	2,721.8	
Share Issues	-206.1	-215.4	-225.1	-235.2	-245.8	
Share Repurchases	7,257.1	7,159.7	7,098.4	8,192.6	9,455.1	
Dividends to Common Equity	8,401.0	8,727.0	8,924.8	10,320.7	11,931.1	13,693.3
Present Value Factors	0.996	0.925	0.860	0.799	0.742	
Present Value of Dividends	8,368.8	8,076.0	7,672.2	8,241.8	8,850.9	
Sum of PV of Dividends	41,209.8					
PV of Continuing Value	218,550.2					
Total	259,759.9					
Midyear discount adjustment	1.0382					
PV of Dividends	269,693.2					
Shares Outstanding	1,010.4					
Share Value	$ 266.92					
Current stock price	$ 296.09					
Difference	-9.85%					

2.2 Free Cash Flow Model

The forecast of a company's future cash flows can be used to gauge the company value. Free cash flows represent cash the company has on hand after all cash obligations have been satisfied. Free cash flows represent cash available for further investment in the company or cash available to be distributed to the investors in the form of dividends or share repurchases. The higher projected free cash flow, the more valuable the company is to an investor.

We projected future free cash flow for common equity using the method described in Ref. 7. We then computed the present value for free cash flows for each year in the forecast period and the continuing value, and added the sum of present value free cash flows to present value of continuing value of stock. We multiplied the total by 1.038 to adjust for mid-year discounting to calculate present value of free cash flows to equity, and then divided by shares outstanding to compute an estimated value per share of $266.92. This estimated value is 9.85% lower than the share price of $296.09 at 12/13/19. The details of this calculation are shown in Table 7 and the results of the sensitivity analysis are shown in Table 8.

Table 7. Free Cash Flow Valuation Model Results

Free Cash Flows for Common Equity	Year +1	Year +2	Year +3	Year +4	Year +5	Year +6
Net Cash Flow from Ops	8,931.3	9,586.3	10,983.0	12,600.5	14,458.1	14,298.4
Change in Cash Required for Ops	1,200.0	-548.2	-603.0	-663.3	-729.7	-240.8
Net Investing Cash Flow	-3,037.3	-1,311.0	-1,455.2	-1,616.5	-1,797.4	-596.4
Net Debt Financing Cash Flows	1,401.0	1,000.0	0.0	0.0	0.0	232.0
Net Cash Flows for Noncontrolling Interests	-94.0	0.0	0.0	0.0	0.0	0.0
Free Cash Flow for Common Shareholders	8,401.0	8,727.0	8,924.8	10,320.7	11,931.1	13,693.3
Present Value Factors	0.996	0.925	0.860	0.799	0.742	
Free Cash Flows Present Values	8,368.8	8,076.0	7,672.2	8,241.8	8,850.9	
Sum of Free Cash Flow PV	41,209.8					
Continuing Value PV	218,550.2					
Total	259,759.9					
Midyear discount adjustment	1.038					
Free Cash Flows PV	269,693.2					
Shares Outstanding	1,010.4					
Value per Share	$ 266.92					
Current share price	$ 296.09					
Difference	-9.85%					

Table 8. Dividends and Free Cash Flow Sensitivity Analysis

Dividend Valuation Sensitivity Analysis:									
		Long-Run Growth Assumptions							
	266.92	0.0%	1.0%	2.0%	2.5%	3.0%	3.5%	4.0%	5.0%
Discount	6.00%	227.11	263.85	318.97	358.34	410.83	484.32	594.55	1145.72
Rates:	6.50%	209.86	240.18	283.98	314.10	352.82	404.44	476.72	765.82
	6.70%	203.68	231.88	272.08	299.36	334.01	379.49	441.81	676.45
	7.00%	195.08	220.47	256.01	279.71	309.33	347.41	398.19	575.91
	7.20%	189.75	213.48	246.34	268.01	294.84	328.92	373.66	524.13
	7.50%	182.29	203.81	233.15	252.22	275.52	304.66	342.12	462.00
	7.70%	177.64	197.84	225.13	242.70	264.02	290.42	323.94	428.25
	8.00%	171.11	189.54	214.10	229.74	248.50	271.43	300.09	386.08
	8.50%	161.26	177.18	198.01	211.02	226.40	244.86	267.42	331.87
	9.00%	152.51	166.38	184.22	195.20	208.00	223.13	241.29	291.23
	9.50%	144.70	156.87	172.28	181.64	192.44	205.04	219.94	259.64
	10.00%	137.67	148.42	161.85	169.91	179.12	189.75	202.15	234.39
	11.00%	125.57	134.08	144.49	150.61	157.50	165.31	174.23	196.53
	12.00%	115.51	122.38	130.64	135.41	140.72	146.65	153.32	169.53

2.3 Earnings Model

A company's earnings are a core measurement of its performance and a measure of wealth creation. Earnings can also have an impact on the pricing of shares. The wealth created by Mastercard and the money invested by shareholders decides the cash flows that will be paid to shareholders and for the company's internal capital allocation.

The earnings-based valuation model model utilizes the book value of common shareholders equity and Mastercard's projected future comprehensive income to determine the residual income created by Mastercard, as discussed in Ref. 7. We then discounted the resulting future residual income to the present value, adjusting for midyear discounting (since earnings are produced throughout the year) to produce a projected value per share, which is $267.01 as of 12/13/19. Mastercard's current stock price $296.09 per share which is 9.82% higher than the derived value. The details of this calculation are shown in Table 9 below.

Table 9. Residual Income Valuation Model Results

RESIDUAL INCOME VALUATION	Year +1	Year +2	Year +3	Year +4	Year +5	Year +6
Comprehensive Income for Common Shareholders	8,106.4	8,913.4	10,257.5	11,816.4	13,608.8	14,017.1
Common Shareholders' Book Value of Equity at beginning of period	5,395.0	5,100.4	5,286.7	6,619.5	8,115.2	9,792.9
Required Earnings	412.6	390.1	404.3	506.3	620.6	749.0
Residual Income	7,693.8	8,523.3	9,853.2	11,310.1	12,988.1	13,268.1
Present Value Factors	0.996	0.925	0.860	0.799	0.742	
Residual Income PV	7,664.3	7,887.4	8,470.3	9,032.0	9,635.1	
Total Residual Income Sum	42,689.2					
Continuing Value PV	211,764.2					
Total	254,453.4					
Initial Equity Book Value	5,395.0					
Equity PV	259,848.4					
Midyear discount adjustment	1.0382					
Equity PV	269,785.0					
Shares Outstanding	1,010.4					
Value per Share	$ 267.01					
Current share price	$ 296.09					
Difference	-9.82%					

Table 10. Residual Income Valuation Sensitivity Analysis

RESIDUAL INCOME VALUATION SENSITIVITY ANALYSIS:									
		Long-Run Growth Assumptions							
	267.01	0.0%	1.0%	2.0%	2.5%	3.0%	3.5%	4.0%	5.0%
Discount	6.00%	231.14	267.18	321.23	359.84	411.32	483.40	591.51	1132.05
Rates:	6.50%	213.46	243.09	285.90	315.32	353.16	403.60	474.23	756.73
	6.70%	207.13	234.65	273.87	300.49	334.30	378.67	439.48	668.42
	7.00%	198.32	223.03	257.64	280.71	309.55	346.62	396.06	569.09
	7.20%	192.85	215.92	247.86	268.93	295.01	328.15	371.64	517.92
	7.50%	185.20	206.07	234.53	253.03	275.64	303.90	340.24	456.52
	7.70%	180.44	200.00	226.43	243.46	264.10	289.67	322.14	423.17
	8.00%	173.74	191.55	215.29	230.40	248.53	270.69	298.39	381.49
	8.50%	163.64	178.97	199.02	211.55	226.36	244.13	265.85	327.91
	9.00%	154.66	167.97	185.08	195.61	207.89	222.41	239.83	287.73
	9.50%	146.64	158.27	173.01	181.95	192.27	204.32	218.55	256.50
	10.00%	139.43	149.66	162.45	170.12	178.89	189.01	200.82	231.51
	11.00%	127.00	135.04	144.88	150.66	157.17	164.55	172.98	194.06
	12.00%	116.66	123.10	130.84	135.32	140.30	145.86	152.12	167.32

2.4 Market Methods Model

2.4.1 Market to Book Ratio

The market to book ratio is used to evaluate a company's current market value relative to its book value. Mastercard's book value was $5.33 per share on 12/31/18 and it is projected to be $5.05 per share on 12/31/19. Using the end of 2019 projection, and the current share price of $296.09, the market-to-book ratio is 58.66. The ratio indicates the company has healthy future profit projections for which investors are willing to pay a premium.

The market-to-book approach of the residual income valuation model is very similar to the earnings approach discussed above. The difference is the use of return on common equity (ROCE) in the valuation equation instead of residual income. Following the method described in Ref. 7, we calculated implied and residual ROCE's and the cumulative growth factor for all years in the forecast period. We then discounted the resulting future residual ROCE, adjusted for

cumulative growth, to the present value, adjusting for midyear discounting (since earnings are produced throughout the year) to produce a projected value per share, which is $267.01 as of 12/13/19. Mastercard's current stock price $296.09 per share which is 9.82% higher than the derived value. The details of this calculation are shown in Table 11 below.

2.4.2 Price-to-Earnings Ratio (P/E ratio)

The price-to-earnings ratio (P/E ratio) is used for valuing a company measuring its current share price relative to its per-share earnings. The current share price for Mastercard is $296.09. The trailing twelve month (TTM) P/E ratio relies on past performance and divides the current share price by the EPS for trailing twelve months. Mastercard's TTM earnings per share (EPS) was $6.72 (Ref. 6). Industry peer Visa had a TTM EPS for $5.32 (Ref. 14), and American Express had a TTM EPS $8.28 (Ref. 15). The TTM P/E ratio for Mastercard is 44.03 (Reg. 6), compared to Visa at 34.82 (Ref. 14) and American Express at 15.06 (Ref. 15). The TTM P/E ratio for American Express is substantially lower due to its function as a bank and the lower PE applied for that business. The forward P/E ratio for Mastercard is 32.72 (Ref. 6), compared to Visa at 25.57 (Ref. 14) and American Express at 13.86 (Ref. 15). These forward P/E ratios use consensus forecast values from Thompson Reuters. The forward P/E will be lower if earnings are expected to grow in the future and greater if earnings are expected to lower. A comparison of the P/E ratios shows that Mastercard is valued at a premium to its peers.

2.4.3 Price -to-Earnings-To-Growth Ratio (PEG ratio)

The PEG ratio measures the relationship between the P/E ratio and earnings growth to provide investors with more information than the P/E ratio only, since the P/E ratio assumes one year of earnings represents future growth. The PEG ratio allows investors to calculate whether the stock's price is overvalued or undervalued by analyzing today's earnings and the expected

growth rate for the company's future. Mastercard's PEG ratio is calculated as 2.25 using the growth rate for the next five years (Ref. 6). The industry PEG ratio is calculated as 1.44 (Ref. 16), Visa's PEG ratio is 1.93 (Ref. 14), and American Express' PEG ratio is 1.53 (Ref. 15). Mastercard's PEG ratio is higher than all of these, which suggests the stock may be overvalued.

Table 11. Market-to-Book Valuation Model Results

Market-to-Book Approach	Year +1	Year +2	Year +3	Year +4	Year +5	Year +6
Comprehensive Income to Common Shareholders	8,106.4	8,913.4	10,257.5	11,816.4	13,608.8	14,017.1
Common Equity Book Value at beginning of year	5,395.0	5,100.4	5,286.7	6,619.5	8,115.2	9,792.9
Implied ROCE	150.3%	174.8%	194.0%	178.5%	167.7%	143.1%
Residual ROCE	142.6%	167.1%	186.4%	170.9%	160.0%	135.5%
Beginning of year cumulative growth factor	100.0%	94.5%	98.0%	122.7%	150.4%	181.5%
Residual ROCE multiplied by growth	142.6%	158.0%	182.6%	209.6%	240.7%	245.9%
Present Value Factors	0.996	0.925	0.860	0.799	0.742	
Residual ROCE * growth PV	1.421	1.462	1.570	1.674	1.786	
Residual ROCE * growth PV Sum	7.91					
Continuing Value PV	39.25					
Residual ROCE PV	47.16					
Plus one	1.0					
Sum	48.16					
Mid-year discount adjustment	1.038					
Implied M/B Ratio	50.006					
Equity book value at beginning of year	5,395.0					
Equity PV	269,785.0					
Shares Outstanding	1,010.4					
Value per Share	$ 267.01					
Current share price	$ 296.09					
Difference	-9.82%					

3 Assess the Financial Statements Quality

3.1 Earnings Quality

The quality of income ratio calculated for 2016-2018 indicates Mastercard has a quality income due to a ratio over 1.0 for each of the three years (Ref. 12). This income ratio indicates management has not intervened in the earnings reporting process and earning performance is faithfully represented in the financial statements.

3.2 Liability Recognition and Measurement

Revenue is recorded in the period earned, with rebates and incentives recorded as a reduction of revenue over the period of a given contract for volume and transaction-based revenue. Rebates and incentives are calculated based on estimated performance and paid out over the life of the contract. Rebates and incentives are capitalized and amortized over the life of the contract on a straight-line basis.

Deferred revenue is included in other liabilities on the balance sheet. As of September 30, 2019, the company elected the optional exemption to not disclose the remaining performance obligations of $1.0 billion related to its payment network services (Ref. 2). Those services are expected to be recognized through 2022.

Mastercard values long-term debt at fair market value based on market quotes. Accrued litigation is recorded on the balance sheet separately from accrued expenses.

Mastercard is a party to legal and regulatory legal proceedings in its regular course of business. It is not possible to determine probability of loss or estimate damages, so no reserves are established for that purpose. When the company determines loss is probable and reasonably

estimable, Mastercard records the liability and discloses the amount of the liability if it is material. When a material loss contingency is only reasonably possible, no liability is recorded, but the company does disclose the nature and amount of the claim, along with an estimate of the cost if possible.

3.3 Asset Recognition and Measurement

Mastercard acquired a business in 2017 and allocated cash and final contingent consideration in 2018 financial statements (Ref. 1). The contingent consideration attributable to assets acquired in 2017 is based primarily on the 2018 revenue targets and measured at fair value on a recurring basis. Mastercard also acquired a business in 2019 that authorized issuing up to $4.5 billion in outstanding notes for the committed unsecured $4.5 billion revolving credit facility (Ref. 2); however, no borrowings on this credit facility were outstanding as of September 30, 2019 (Ref. 2). Borrowings under the program are to provide liquidity for general corporate purposes and to borrow or repay amounts for business continuity purposes.

Capital leases were included in equipment and accumulated amortization of those leases was included in the financial statements of the company.

3.4 One-time items

Mastercard reclassified advertising and marketing expenses in 2016 and 2017 to general and administrative expenses in 2018. The reclassification did not impact the operating expenses, operating income, or net income for the company.

Mastercard's projected benefit obligation related to its pension plan decreased for 2018 primarily due to foreign currency translation and benefits paid. Those benefits increased in 2017 due to the acquisition of Vocalink. Pension plans include the Vocalink plan that was closed when the

company was acquired. Mastercard had no change to these benefits as a result of the acquisition in 2019.

3.5 Changes in Accounting Policy

Venezuelan subsidiaries transitioned to the cost method of accounting as of December 31, 2017. The accounting change was properly reflected in the financial statements as general and administrative expenses.

The U.S. Tax Reform was enacted into law with an effective date of January 1, 2018. The reform lowered the corporate income tax rate and imposed a transition tax on foreign earnings which affected the financial statements of Mastercard. While the effective date was in 2018, U.S Generally Accepted Accounting Principles (GAAP) required enactment in the 2017 reporting period (Ref. 13).

Mastercard's customer and merchant incentives increased due to the adoption of new accounting standards pertaining to revenue recognition and timing of payments to customers (Ref. 1). In May 2014, the Financial Accounting Standards Board (FASB) issued accounting guidance to provide a single comprehensive revenue recognition model with customers. Under the guidance, an entity should recognize revenue in the amount of expected consideration for the exchange of goods and services. Mastercard adopted the guidance January 1, 2018 and applied to contracts not completed as of that date. The new guidance impacts the timing of incentives as they are recognized over the life of the contract. Previously, such incentives were recognized when earned by the customer. The new guidance also impacts accounting recognition for market development fund contributions and expenditures. Historically, those items were recorded on a net basis, but were changed to a gross basis, resulting in an increase to revenue and expenses.

3.6 Does Financial Statement Quality Affect Valuations?

Poor quality financial statements can be misleading to potential investors and shareholders. High quality financial statements accurately reflect the financial standing of the company. Quality financial statements reduce errors and bias in forecasts for future earnings and cash flows. Mastercard's financial statements are of high quality and leave us with no concerns with our forecast developed for this report.

4 Summary and Recommendation

Mastercard's stock value calculated by the dividend and free cash flow models were slightly different than the residual income models. This difference could be due to some small inconsistency in the forecast, but we attribute this difference to the valuation being done at 12/13/19 rather than at the beginning/end of a period.

Based on the valuation models, we value Mastercard's stock at $267 as compared to the current market price of $296. It is almost 10% higher than our valuation. Since the beginning of 2019, Mastercard's stock price has increased by almost 57% (Ref. 6). We believe this increase is overdone, but due to momentum in the share price and the positive news of late with the fed holding interest rates steady for the foreseeable future (Ref. 10) and a trade deal agreed to between the U.S. and China (ref. 11), we believe the shares could continue to increase in the short term with the market. Eventually, the stock price will decrease to come more in-line with the valuation. As such, we rate Mastercard as a Hold.

5 References

1. "Mastercard Incorporated Fiscal Year 2018 Form 10-K Annual Report". (2019).
2. "Mastercard Incorporated Form 10-Q". (for quarterly period ended September 30, 2019).
3. "Mastercard Incorporated Fiscal Year 2016 Form 10-K Annual Report". (2017).
4. Morningstar. "Mastercard Sets $8 Billion Share Buyback, Raises Dividend". (2019, Dec 3). Retrieved from https://www.morningstar.com/news/dow-jones/20191203l0582/mastercard-sets-8-billion-share-buyback-raises-dividend
5. "Mastercard Incorporated Form 10-Q". (for quarterly period ended June 30, 2019).
6. "Mastercard Incorporated (MA) Stock Price, Quote, History & News". Retrieved from https://finance.yahoo.com/quote/MA
7. James M. Wahlen, Stephen P. Baginski, Mark Bradshaw. "Financial Reporting, Financial Statement Analysis and Valuation". 9th edition. Cengage Learning, Inc, 2018.
8. Duff & Phelps, "U.S. Equity Risk Premium Recommendation". (19 Feb 2019). Retrieved from https://www.duffandphelps.com/insights/publications/valuation-insights/valuation-insights-first-quarter-2019/us-equity-risk-premium-recommendation
9. KPMG, "Equity Market Risk Premium – Research Summary". (30 June 2019). Retrieved from https://assets.kpmg/content/dam/kpmg/nl/pdf/2019/advisory/equity-market-research-summary-300619.pdf
10. Meredith, Sam. "Treasury yields jump after Trump says trade deal with China 'getting very close'". CNBC. (12 Dec 2019). Retrieved from https://www.cnbc.com/2019/12/12/us-bond-markets-federal-reserve-holds-interest-rates-steady.html

11. Mauldin, William, Wei, Lingling, Leary, Alex. “U.S., China Agree to Limited Deal to Halt Trade War”. WSJ (14 Dec 2019). Retrieved from https://www.wsj.com/articles/us-china-confirm-reaching-phase-one-trade-deal-11576234325
12. “Quality of Income Ratio: Definition, Formula & Analysis”. (15 Dec 2019). Retrieved from https://study.com/academy/lesson/quality-of-income-ratio-definition-formula-analysis.html
13. “Staff Accounting Bulletin No. 118”. SEC. (27 Feb 2018). Retrieved from https://www.sec.gov/interps/account/staff-accounting-bulletin-118.htm
14. “Visa Inc. (V) Stock Price, Quote, History & News”. Retrieved from https://finance.yahoo.com/quote/V
15. “American Express Company (AXP) Stock Price, Quote, History & News”. Retrieved from https://finance.yahoo.com/quote/AXP
16. “MA: Mastercard Incorporated”. Zack’s Investment Research. (15 Dec 2019). Retrieved from https://www.zacks.com/stock/research/MA/industry-comparison