The coronavirus crisis

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THE SPREAD OF THE VIRUS
Coronavirus: According to the WHO data

Italy

China

Spain

United States

Deaths (right)  Cumulative (left)
THE MARKET REACTION
The S&P500: January 2\textsuperscript{nd} 2020 – March 16\textsuperscript{th} 2020
FTSE100: January 2\textsuperscript{nd} 2020 – March 17\textsuperscript{th} 2020

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Nikkei 225: January 6th 2020 – March 17th 2020

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Ibex35: January 2nd 2020 – March 17th 2020

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Bovespa: January 2\textsuperscript{nd} 2020 – March 17\textsuperscript{th} 2020
By sectors: February 2\textsuperscript{nd} – March 18\textsuperscript{th} 2020

MSCI World relative performance by industry group contraction
What do markets tell you about the economic impact of coronavirus?

- Can we infer from (some) market prices the likely impact of the coronavirus on economic growth?

- Gormsen and Koijen (2020) use* dividend futures to estimate the impact of the coronavirus crisis on future dividend and GDP growth

  - Dividend futures are contracts that give the holders the dividends paid by, for instance, the SP500 at a particular date

  - The idea can be grasped quickly by looking at the plot in the next page in which

    \[ D_n = (1 + g_n) \times D_0 \]

    \[ Q_n \text{ is the price an investor is willing to pay for the dividends delivered at date n: This is the price that is observed in dividend futures markets.} \]

    \[ \text{By arbitrage, the price of the stock today, } P_0, \text{ has to be the sum of those prices} \]

    - Idea: Make assumptions about “r” to infer “g_n” from observed prices “Q_n”

What do markets tell you about the economic impact of coronavirus?

\[
\begin{align*}
P_0 &= Q_1 + Q_2 + \ldots + Q_n + \ldots \\
Q_1 &= \frac{(1+g_1) \times D_0}{(1+r)} \\
Q_2 &= \frac{(1+g_2) \times D_0}{(1+r)^2} \\
& \quad \vdots \\
Q_n &= \frac{(1+g_n) \times D_0}{(1+r)^n}
\end{align*}
\]
What do markets tell you about the economic impact of coronavirus?

Gormsen and Koijen (2020): Change in expected dividend and GDP growth relative to expected dividend and GDP growth for the US (blue) and the EU (red)
What do markets tell you about the economic impact of coronavirus?

- The figure in the previous page shows that
  - By March 18\textsuperscript{th} the expected dividend growth is down by 28% in the US and 25% in the EU
  - The response was slow: In March 11\textsuperscript{th} it was down by barely 5%
  - Expected GDP growth for next year is down by 2.6% in both the US and the EU

- The caveats are
  - These estimates are based on historical relations between asset prices and growth in dividends and GDP. Do these relations hold in this unusual time?

- We are going to do a similar exercise with one company now, Nike, which we saw on February 12\textsuperscript{th} of this year … is it a better deal than it was then?

- But before that …
What does the market want to see to “calm down”?

● All crises have the same “flavor” to it:
  
  – A phenomenal increase in uncertainty that results in a fattening of the left hand side tail of the distribution of outcomes

  • The left tail being where the bad outcomes are; think about unemployment rates being high or GDP growth being strongly negative, or millions of people dying because of Coronavirus

  – Markets drop dramatically because they cannot put a floor on asset values


● Two things need to happen:

  a) The market needs to learn how bad things can get to assign a floor to valuations

  b) A policy path to remedy the economic fallout

    • SCAP during the GFC in the US, forced recap and AQR in Spain in July 2012

● Are we on our way to both things happening?
REVISITING NIKE
Revisiting Nike

- On February 12th we did the valuation case for Nike

- Conclusion:
  - Strong strategic position in the market: Essentially a duopoly with Adidas
  - Rich market valuation of growth
    - EPV: ~$67bn vs. Market cap of ~124bn
    - ER\textsubscript{NKE} ~10%
  - Decent compounding but not cheap

- It has gone from $100 to $65 … is it a good buy?

- How are we to interpret the drop in the share price? What kind of drop in earnings is the market pricing? Do we have already any information about Nike’s sales even in the middle of this crisis?
Nike: January 2\textsuperscript{nd} 2020 – March 20\textsuperscript{th} 2020 (but wait …)
Nike: Four scenarios

Case A

Case B

Case C

Case D
Thinking through this crisis with a DCF approach – I

- Recall that
  \[ EV_0 = PV(\text{Future FCFs}) = \frac{FCF_1}{(1+r)} + \frac{FCF_2}{(1+r)^2} + \ldots \]

  - \( FCF_1 \): Free Cash Flow in one year defined as

    - \( FCF = \text{Net income} + \text{Depreciation} – \text{Capex} – \text{Change in Working Capital} \)

  - \( r \): Weighted average costs of capital

  - \( EV_0 \): Enterprise value today

- Assume that the rate of growth of free cashflows, \( g \), and \( r \) are constants

  - For \( g \) take the long-run growth rate of firm’s operating income; triangulate with revenues

- The Gordon Growth Model:

  \[ EV_0 = \frac{FCF_1}{r-g} = \frac{(1+g) \times FCF_0}{r-g} \]  
  (Eq. 1)
Thinking through this crisis with a DCF approach – 2

- We are going to use the expression below to estimate the discount rate, r, using data from February 12th when we valued Nike in class.

- Procedure:
  
  a) Estimate FCF₀
  
  b) Estimate the discount rate under “normal conditions”, using the Feb. 12th as EV₀:

\[
r = g + (1 + g) \times \frac{FCF₀}{EV_{-1}} \quad (Eq. 2)
\]

  a) Take as the long rate of growth of FCFs the rate of growth of operating income

    - About ~6.0% (see next page or page 44 of the Nike case)
  
  b) Conduct scenario analysis along the lines in page 20 (we are not going to do Case D)
Nike: The rate of growth of revenue and earnings

- How is FY 2020 going?
  - FY 2020Q1: June– August 2019
    - Rev: $10.7bn & Net Income: $1.4bn
  - FY 2020Q2: September – November 2019
    - Rev: 10.3bn & Net Income: $1.1bn
  - FY 2020Q3: December – February 2020
    - Just wait …
Nike: Timing

Jan 31st First US Coronavirus case


-1  0  1  2

\[
\begin{align*}
F CF_0 &= r \quad F CF_1 = (1 + g_1) \times F CF_0 \\
\frac{(1 + g_1) \times F CF_0}{1 + r} &= F CF_2 = (1 + g_2) \times F CF_1 \\
(1 + g_1) \times (1 + g_2) \times F CF_0 &= \frac{(1 + g_1) \times F CF_0}{(1 + r)^2}
\end{align*}
\]
Thinking through this crisis with a DCF approach

<table>
<thead>
<tr>
<th>Table I</th>
<th>item</th>
<th>In millions of US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Net income FY2019</td>
<td>4,029</td>
</tr>
<tr>
<td>2</td>
<td>Depreciation</td>
<td>705</td>
</tr>
<tr>
<td>3</td>
<td>Capex</td>
<td>1,119</td>
</tr>
<tr>
<td>4</td>
<td>Net Working Capital FY 2019</td>
<td>8,659</td>
</tr>
<tr>
<td>5</td>
<td>Net Working Capital FY 2018</td>
<td>9,094</td>
</tr>
<tr>
<td>6=4-5</td>
<td>Change in NWC</td>
<td>(435)</td>
</tr>
<tr>
<td>7=1+2-3-6</td>
<td>Free Cash Flow (FCF)</td>
<td>4,050</td>
</tr>
<tr>
<td>8</td>
<td>Market capitalization in February 11th 2020</td>
<td>124,300</td>
</tr>
<tr>
<td>9</td>
<td>Debt (including the current portion)</td>
<td>3,470</td>
</tr>
<tr>
<td>10</td>
<td>Cash</td>
<td>4,466</td>
</tr>
<tr>
<td>11=8+9-10</td>
<td>Enterprise Value in February 11th 2020</td>
<td>123,304</td>
</tr>
<tr>
<td>12=7/11</td>
<td>FCF/sub 1/1 (%)</td>
<td>3.3</td>
</tr>
<tr>
<td>13</td>
<td>g (%)</td>
<td>5.9</td>
</tr>
<tr>
<td>14</td>
<td>Weighted average cost of capital, r (%)</td>
<td>9.4 (see Eq. 2 in page 22)</td>
</tr>
<tr>
<td>15</td>
<td>Discount rate used in the case (%)</td>
<td>8.0 (see p. 40 of the Nike Case)</td>
</tr>
</tbody>
</table>
Nike: Case A

Case A

Case B

Case C

Case D
What is the market thinking? Case A – I

- The shock results in a permanent drop in the rate of growth of earnings.
- Then we can use the discount rate calculated for the data on February 11th to infer the rate of growth of FCFs given the multiple on March 24th 2020.
- That is, we can solve for (Eq. 1) for $g$ as:

$$g_1 = \frac{r - \frac{FCF_0}{EV_0}}{1 + \frac{FCF_0}{EV_0}}$$

(Eq. 3)
What is the market thinking? Case A – 2

<table>
<thead>
<tr>
<th>Table II</th>
<th>item</th>
<th>In millions of US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Free Cash Flow (FCF) (see line 7 in Table I)</td>
<td>4,050</td>
</tr>
<tr>
<td>2</td>
<td>Market capitalization in March 24\textsuperscript{th} 2020</td>
<td>107,801</td>
</tr>
<tr>
<td>3</td>
<td>Debt (including the current portion)</td>
<td>3,470</td>
</tr>
<tr>
<td>4</td>
<td>Cash</td>
<td>4,466</td>
</tr>
<tr>
<td>5=2+3-4</td>
<td>Enterprise Value in March 24\textsuperscript{th} 2020</td>
<td>106,805</td>
</tr>
<tr>
<td>6=1/5</td>
<td>$\text{FCF}_0/\text{EV}_0$ (%)</td>
<td>3.8</td>
</tr>
<tr>
<td>7</td>
<td>Discount rate (see line 14 in Table I)</td>
<td>9.4</td>
</tr>
<tr>
<td>8</td>
<td>Long run rate of growth g (%)</td>
<td>5.9</td>
</tr>
<tr>
<td>9</td>
<td>Inferred rate of growth of FCFs (see Eq. 3) on March 24\textsuperscript{th}</td>
<td>5.4</td>
</tr>
<tr>
<td>10=8-9</td>
<td>Permanent drop in the rate of growth of FCFs (%)</td>
<td>0.5</td>
</tr>
</tbody>
</table>
What is the market thinking? Case B – 1

- In case B there is a temporary shock and then a return to the long run average but notice that we never “make up” for the lost cash

- Consider the fact that the drop in earnings lasts only one year. Then

\[
EV_0 = \frac{(1+g_1) \times FCF_0}{(1+r)} + \frac{(1+g_1) \times (1+g) \times FCF_0}{(1+r) \times (r-g)}
\]  
(Eq. 4)

- We can use the discount rate (r in line 14 of Table 1), the rate of growth of future earnings (g, line 13 of Table 1), the enterprise value as of March 24th 2020, \( EV_1 \), and the free cash flow for FV2019, \( FCF_0 \) (see line 7 of Table I) to estimate \( g_1 \)
## What is the market thinking? Case B – 2

<table>
<thead>
<tr>
<th>Table III</th>
<th>item</th>
<th>In millions of US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Free Cash Flow (FCF)</td>
<td>4,050</td>
</tr>
<tr>
<td>2</td>
<td>Enterprise Value in March 24\textsuperscript{th} 2020</td>
<td>106,805</td>
</tr>
<tr>
<td>3</td>
<td>Long run growth rate g (%)</td>
<td>5.9</td>
</tr>
<tr>
<td>4</td>
<td>Weighted average cost of capital r (%)</td>
<td>9.4</td>
</tr>
<tr>
<td>5</td>
<td>Rate of growth of FCF in the next year (from March 2020 to March 2021; see (Eq. 4))</td>
<td>(8.7)</td>
</tr>
</tbody>
</table>
Nike: Case C

Case A

Case B

Case C

Case D
Case C: A sharp contraction followed by an equally sharp recovery. Let

- $g_1$: Rate of growth between March 2020 and March 2021

- $g_2$: Rate of growth between March 2021 and March 2022

- $g$: Long run rate of growth.

Thus

$$\text{FCF}_2 = \left(1+g_1\right) \times \left(1+g_2\right) \times \text{FCF}_0 = (1+g)^2 \times \text{FCF}_0$$
What is the market thinking? Case C – 2

The graph illustrates the change in FCF (Free Cash Flow) over time. The x-axis represents time with March 20, March 21, and March 22 marked. The y-axis represents FCF, with FCF₀, FCF₁, and FCF₂ indicated.

- FCF₀: Baseline FCF before any changes.
- FCF₁: FCF after a significant dip during March 21.
- FCF₂: Recovery and growth in FCF from March 22 onwards.

The graph shows a decline in FCF during March 21 followed by a recovery and increase in March 22.
• Case C: A sharp contraction followed by an equally sharp recovery. Let

- $g_1$: Rate of growth between March 2020 and March 2021

- $g_2$: Rate of growth between March 2021 and March 2022

- $g$: Long run rate of growth.

• Thus

$$\text{FCF}_2 = (1+g_1) \times (1+g_2) \times \text{FCF}_0 = (1+g)^2 \times \text{FCF}_0$$

• In this case the valuation

$$\text{EV}_0 = \frac{(1+g_1) \times \text{FCF}_0}{(1+r)} + \frac{(1+g)^2 \times \text{FCF}_0}{(1+r)^2} + \frac{(1+g)^3 \times \text{FCF}_0}{(1+r)^2(r-g)}$$

Cash flows in March 2021
Cash flows in March 2022
Enterprise value in March 2022
What is the market thinking? Case C – 3

- Case C: A sharp contraction followed by an equally sharp recovery. Let
  - $g_1$: Rate of growth between March 2020 and March 2021
  - $g_2$: Rate of growth between March 2021 and March 2022
  - $g$: Long run rate of growth.

- Thus
  \[
  \text{FCF}_2 = (1+g_1)(1+g_2) \times \text{FCF}_0 = (1+g)^2 \times \text{FCF}_0 \quad (\text{Eq. 5})
  \]

- In this case the valuation
  \[
  \text{EV}_0 = \frac{(1+g_1) \times \text{FCF}_0}{(1+r)} + \frac{(1+g)^2 \times \text{FCF}_0}{(1+r)^2} + \frac{(1+g)^3 \times \text{FCF}_0}{(1+r)^2(r-g)} \quad (\text{Eq. 6})
  \]

These are the two equations that we are going to use to calculate $g_1$ and $g_2$.
What is the market thinking? Case C – 4

- A trivial observation. Recall that

$$EV_0 = \frac{(1+g_1) \times FCF_0}{(1+r)} + \frac{(1+g)^2 FCF_0}{(1+r)^2} + \frac{(1+g)^3 FCF_0}{(1+r)^2 (r-g)}$$

- So that if the first two terms are positive (as it is typically the case with NKE):

$$EV_0 > \frac{(1+g)^2 FCF_0}{(1+r)^2} + \frac{(1+g)^3 FCF_0}{(1+r)^2 (r-g)}$$

- If instead the inequality goes the other way (<), then it must be that the first term is negative: There will be substantial losses this coming year!

- In fact huge …
### Table IV

<table>
<thead>
<tr>
<th>Item</th>
<th>In millions of US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Enterprise Value in March 24(^{th}) 2020</td>
<td>106,805</td>
</tr>
<tr>
<td>2. Enterprise Value in March 2022</td>
<td>115,586</td>
</tr>
<tr>
<td>3. (Discounted) FCF between March 2021 and March 2022</td>
<td>3,797</td>
</tr>
<tr>
<td>4. Enterprise value net of FCF between March of 2020 and March of 2021</td>
<td>119,383</td>
</tr>
<tr>
<td>5. Difference</td>
<td>(12,578)</td>
</tr>
<tr>
<td>6. (g_1) (%)</td>
<td>(440)</td>
</tr>
<tr>
<td>7. (FCF) between March 2020 and March 2021</td>
<td>(13,754)</td>
</tr>
</tbody>
</table>
What is the market thinking? Case C – 6

- Why the huge drop?
  - The next years cash-flow is a tiny percentage of the enterprise value of the firm

<table>
<thead>
<tr>
<th>Table V</th>
<th>item</th>
<th>In millions of $US</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EV in Feb. 11th 2020</td>
<td>123,305</td>
</tr>
<tr>
<td>2</td>
<td>Discounted value of FCF one year hence assuming g=5.88%</td>
<td>3,921</td>
</tr>
<tr>
<td>3 = (2/3)×100</td>
<td>Percentage of enterprise value (%)</td>
<td>3.2</td>
</tr>
</tbody>
</table>

- This is the key when it comes to DCF models:
  a) Next year FCFs are a relatively small percentage of the overall EV.
  b) It is difficult thus to justify big share price moves appealing to movements in FCFs in the next two years: It takes massive movements in those near-term FCFs
  c) Thus the focus on the long term … always
How is FY 2020 going?

- **FY 2020Q1:** June–August 2019
  - Rev: $10.7bn & Net Income: $1.4bn
- **FY 2020Q2:** September–November 2019
  - Rev: $10.3bn & Net Income: $1.1bn
- **FY 2020Q3:** December–February 2020
  - Nike filed an 8-K yesterday (March 24th)
  - Rev: $10.1bn & Net Income: $847mn
    - 23% less than the same period last year
  - This number includes three months of poor sales in China!
## Nike ... in the age of the Coronavirus

<table>
<thead>
<tr>
<th>Table VI</th>
<th>Category</th>
<th>FY2020Q3</th>
<th>FY2019Q3</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Footwear</td>
<td>2,628</td>
<td>2,509</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Apparel</td>
<td>1,228</td>
<td>1,173</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Equipment</td>
<td>123</td>
<td>128</td>
<td>(4)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3,979</td>
<td>3,810</td>
<td>4</td>
</tr>
<tr>
<td>Greater China</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Footwear</td>
<td>1,075</td>
<td>1,115</td>
<td>(4)</td>
</tr>
<tr>
<td></td>
<td>Apparel</td>
<td>400</td>
<td>444</td>
<td>(10)</td>
</tr>
<tr>
<td></td>
<td>Equipment</td>
<td>31</td>
<td>29</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1,506</td>
<td>1,588</td>
<td>(5)</td>
</tr>
<tr>
<td><strong>TOTAL NIKE</strong> (incl. Converse)</td>
<td></td>
<td><strong>10,104</strong></td>
<td><strong>9,611</strong></td>
<td><strong>5</strong></td>
</tr>
</tbody>
</table>
Nike: Rates of growth of revenue and ebit

Nike: Revenue and EBIT growth since the global financial crisis, FY2008 – FY 2019

FY2011: 13.78%
Nike: Stock price: January 2^{nd} 2020 – March 25^{th} 2020
LOOKING ELSEWHERE