Undergraduate Student Investment Management Fund

Semi-Annual Presentation

Team A | May 2020
# Table of Contents

I. Investment Thesis & Strategy

II. Rebalancing and Processes

III. Performance

IV. Appendix
Investment Thesis & Strategy
Graphical Representation of Equity as a Call Option

Equity of a firm with debt in its capital structure is analogous to a call option on the written assets of a firm.

Eisdorfer, Goyal, and Zhdanov hypothesize that if investors do not value the default option, misvaluation can occur.

<table>
<thead>
<tr>
<th></th>
<th>High Default Option</th>
<th>Low Default Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional Valuation</td>
<td>Misvalued</td>
<td>Appropriate Valuation</td>
</tr>
<tr>
<td>(e.g. DCF)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valuation with Default</td>
<td>Appropriate Valuation</td>
<td>Appropriate Valuation</td>
</tr>
<tr>
<td>Option</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Valuation of Equity in the Model

There are two components to valuing equity within the model, 1) value to the equity holders (if they were to operate into perpetuity), 2) value of default option.

Value of Equity = Value to Equity Holders + Value of Default Option

Comparing Model Value to Market Value

Stocks are sorted into deciles according to the ratio of the equity value implied by the valuation model to the actual equity value.

\[
\frac{4 \text{ B}}{3.5 \text{ B}} = 1.14 \quad \text{Undervalued}
\]

\[
\frac{3.5 \text{ B}}{4 \text{ B}} = 0.88 \quad \text{Overvalued}
\]
Portfolio Construction Process Overview

Source accounting and return data from Bloomberg and CRSP/Compustat, respectively

Matlab Code

Returns Model Equity Value

Calculate:

\[
\frac{\text{Model Equity Value}}{\text{Current Equity Value}}
\]

Trim the Bottom and Top 2% of the Ratios

Sort Ratios into Deciles and Invest in 10th Decile

*CRSP/Compustat till 2018, supplemented with Bloomberg for current info
Rebalancing and Processes
Several criteria motivated our decision to continue with the strategy through the final rebalance rather than moving to a market (S&P 500) portfolio.

1. Back-testing data from paper
2. Frequency of rebalance
3. Learning opportunity
Roadblocks Due to COVID-19

Due to the ongoing pandemic, we were unable to physically access the Bloomberg terminal provided on campus to access portfolio performances.

However, we were thankfully able to remotely access the necessary information to continue our strategy for the remainder of the investment horizon.

Unfortunately, we were unable to track shadow portfolio performances throughout the entire timeline and to perform any attribution analyses.
Security Selection Process

Given market backdrop of the final rebalance, we decided to deviate from previous rebalances in terms of our security selection.

- Remove travel-related companies
- Eliminate securities with retail exposure
- Avoid highly levered companies
Performance
Performance vs Benchmarks

- Portfolio Return
- Russel 3000 Return
- Vanguard Small/Value Return
Long-Short Performance

<table>
<thead>
<tr>
<th>Date</th>
<th>Long P/L</th>
<th>Short P/L</th>
<th>Net P/L</th>
<th>Live Port P/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/6</td>
<td>-</td>
<td></td>
<td>$(500,000.00)</td>
<td></td>
</tr>
<tr>
<td>12/13</td>
<td>-</td>
<td></td>
<td>$(400,000.00)</td>
<td></td>
</tr>
<tr>
<td>12/20</td>
<td>-</td>
<td></td>
<td>$(300,000.00)</td>
<td></td>
</tr>
<tr>
<td>12/27</td>
<td>-</td>
<td></td>
<td>$(200,000.00)</td>
<td></td>
</tr>
<tr>
<td>12/28</td>
<td>-</td>
<td></td>
<td>$(100,000.00)</td>
<td></td>
</tr>
<tr>
<td>1/3</td>
<td>$100,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/10</td>
<td>$200,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/17</td>
<td>$300,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/24</td>
<td>$400,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/31</td>
<td>$500,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2/7</td>
<td>$600,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2/14</td>
<td>$700,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2/21</td>
<td>$800,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2/28</td>
<td>$900,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/6</td>
<td>$100,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/13</td>
<td>$200,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/20</td>
<td>$300,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/27</td>
<td>$400,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4/3</td>
<td>$500,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4/10</td>
<td>$600,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4/17</td>
<td>$700,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4/24</td>
<td>$800,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix
Value of Default Option

The default option can be deconstructed into two parts: 1) discounting the cash flows of a firm until an optimal stopping time, 2) discounting the cash flows of a firm into perpetuity.

Optimal Stopping Time

\[
\text{Default option} = \sup_{T_{x_d(t)}} \mathbb{E}^Q_{x_0} \int_0^{T_{x_d(t)}} e^{-rt} CF_{it} dt - \mathbb{E}^Q_{x_0} \int_0^\infty e^{-rt} CF_{it} dt \geq 0
\]

Shadow Portfolios: Active Portfolio vs. Total Decile 10

December 6th, 2019 – March 23rd, 2020

Δ = -2.41%
Shadow Portfolios: Active Portfolio vs. Decile 10 Stocks Not Invested In

December 6th, 2019 – March 23rd, 2020

$\Delta = -4.12\%$

Total Return Sim Fund Holdings vs. Total Return Decile 10 - Sim Fund Holdings