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Quantitative Momentum

A Practitioner's Guide to Building a Momentum-Based Stock Selection System

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WESLEY R. GRAY, PH.D.
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Quantitative Momentum

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Buy cheap; buy strong; hold ’em long.

—Wes and Jack

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Preface

The efficient market hypothesis suggests that past prices cannot predict future success. But there is a problem: past prices *do* predict future expected performance and this problem is generically labeled "momentum." Momentum is the epitome of a simple strategy even your grandmother would understand—buy winners. And momentum is an open secret. The track record associated with buying past winners now extends over 200 years and has become the ultimate black eye for the efficient market hypothesis (EMH). So why isn't everyone a momentum investor? We believe there are two reasons: hard-wired behavioral biases cause many investors to be anti-momentum traders, and for the professional, who wants to exploit momentum, marketplace constraints make this a challenging enterprise.

As long as human beings suffer from systematic expectation errors, prices have the potential to deviate from fundamentals. In the context of value investing, this expectation error seems to be an *overreaction* to negative news, on average; for momentum, the expectation error is surprisingly tied to an *underreaction* to positive news (some argue it is an overreaction, which cannot be ruled out, but the collective evidence is more supportive of the undereaction hypothesis). So investors that believe that behavioral bias drives the long-term excess returns associated with value investing already believe in the key mechanism that drives the long-term sustainability of momentum. In short, value and momentum represent the two sides of the same behavioral bias coin.

But why aren't momentum strategies exploited by more investors and arbitraged away? As we will discuss, the speed at which mispricing opportunities are eliminated depends on the cost of exploitation. Putting aside an array of transaction and information acquisition costs, which are nonzero, the biggest cost to exploiting long-lasting mispricing opportunities are career risk concerns on behalf of delegated asset managers. The career risk aspect develops because investors often delegate to a professional to manage their capital on their behalf. Unfortunately, the investors that delegate their capital to the professional fund managers often assess the performance of their hired manager based on their short-term relative performance to a benchmark. But this creates a warped incentive for the professional fund manager. On the one hand, fund managers want to exploit mispricing opportunities because of

the high expected long-term performance, but on the other hand, they can do so only to the extent to which exploiting the mispricing opportunities doesn't cause their expected performance to deviate too far—and/or for too long—from a standard benchmark. In summary, strategies like momentum presumably work because they sometimes *fail spectacularly* relative to passive benchmarks, creating a "career risk" premium. And if we follow this line of reasoning, we only need to assume the following to believe that a momentum strategy, or really any anomaly strategy, can be sustainable in the future:

- Investors will continue to suffer behavioral bias.
- Investors who delegate will be short-sighted performance chasers.

We think we can rely on these two assumptions for the foreseeable future. And because of our faith in these assumptions, we believe there will always be opportunities for process-driven, long-term focused, disciplined investors.

Assuming we are prepared to be a momentum investor and we've internalized the reality that the journey has to be painful in order to be sustainable, we need to address a simple question: ***How do we build an effective momentum strategy?*** In this book we outline the multiyear research journey we undertook to build our stock selection momentum strategy. The conclusion of our adventure is the quantitative momentum strategy, which can be summarized as a strategy that seeks to *buy stocks with the highest quality momentum*. And to be clear up front, we do not claim to have the "best" momentum strategy, or a momentum strategy that is "guaranteed" to work, but we do think our process is reasonable, evidence-based, and ties back to behavioral finance in a coherent and logical way. We also provide radical transparency into how and why we've developed the process. We want readers to question our assumptions, reverse engineer the results, and tell us if they think our process can be improved. You can always reach us at AlphaArchitect.com and we'll be happy to address your questions.

We hope you enjoy the story of quantitative momentum.

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About the Authors

Wesley R. Gray, PhD After serving as a Captain in the United States Marine Corps, Dr. Gray received a PhD, and was a finance professor at Drexel University. Dr. Gray's interest in entrepreneurship and behavioral finance led him to found Alpha Architect, an asset management firm that delivers affordable active exposures for tax-sensitive investors. Dr. Gray has published four books and multiple academic articles. Wes is a regular contributor to the Wall Street Journal, Forbes, and the CFA Institute. Dr. Gray earned an MBA and a PhD in finance from the University of Chicago and graduated magna cum laude with a BS from The Wharton School of the University of Pennsylvania.

John (Jack) R. Vogel, PhD Dr. Vogel conducts research in empirical asset pricing and behavioral finance, and has published two books and multiple academic articles. His academic background includes experience as an instructor and research assistant at Drexel University in both the Finance and Mathematics departments, as well as a Finance instructor at Villanova University. Dr. Vogel is currently a Managing Member of Alpha Architect, an SEC-Registered Investment Advisor, where he serves as the Chief Financial Officer and Co-Chief Investment Officer. He has a PhD in Finance and a MS in Mathematics from Drexel University, and graduated summa cum laude with a BS in Mathematics and Education from the University of Scranton.

Quantitative Momentum

PART One

Understanding Momentum

This book is organized into two parts. Part One sets out the rationale for using momentum as a systematic stock selection tool. In Chapter 1, "Less Religion; More Reason," we provide a discussion of the two dominant investment religions: fundamental and technical. We propose that evidence-based investors consider both approaches. Next, in Chapter 2, "Why Can Active Investment Strategies Work?" we outline our sustainable active investing framework, which helps us identify why a strategy will work over the long haul (i.e., the "edge"). In Chapter 3, "Momentum Investing is Not Growth Investing," we propose that momentum investing, like value investing, is arguably a sustainable anomaly. Finally, we end Part One with Chapter 4, "Why All Value Investors Need Momentum," a discussion of the evidence related to momentum investing, which suggests that most investors should at least consider momentum investing when constructing their diversified investment portfolio.

CHAPTER 1

Less Religion; More Reason

Child: "Dad, are you sure Santa brought the presents?"
Father: "Yes, Santa carried them on his sleigh."
Child: "I guess that makes sense. He did eat the cookies and milk we left by the fireplace."

—Typical adult/child chat on Christmas Day

TECHNICAL ANALYSIS: THE MARKET'S OLDEST RELIGION

During the 1600s, the Dutch had a large merchant fleet and the port city of Amsterdam was a dominant commercial hub for trade from around the world. Based on the growing influence of the Dutch Republic, in 1602 the Dutch East India Company was founded, and its evolution into the first publicly traded global corporation drove a number of financial innovations to the Amsterdam Stock Exchange, including the subsequent listing of additional companies and even short selling.

In 1688, Joseph de la Vega, a successful Dutch merchant, wrote *Confusion De Confusiones*, one of the earliest known books to describe a stock exchange and stock trading. Some researchers today argue that he should be considered the father of behavioral finance. De la Vega vividly described excessive trading, overreaction, underreaction, and the disposition effect well before they were documented by modern finance journals.[1]

In his book, de la Vega describes the day-to-day business of the Exchange and alludes to how prices are set:

> *When a bull enters such a coffee-house during the Exchange hours, he is asked the price of the shares by the people present. He adds one to two per cent to the price of the day and he produces a notebook*