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Using Profitability as a Factor? Perhaps You Should Think Twice...

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Using Profitability as a Factor? Perhaps You Should Think Twice...

By [Wesley R. Gray, Ph.D.](#) | June 10th, 2015 | [Value Investing Research](#), [\\$iwd](#), [\\$qual](#) | [8 Comments](#)

Many investors are getting excited about the so-called “[profitability factor](#),” originally posed by Novy-Marx (here is an [alternative story](#)) . Larry Swedroe has a high-level piece advocating the concept [here](#).

The basic idea is simple: Other things being equal, firms with high gross profits (revenue – costs) have earned higher expected returns than firms with low gross profits. Even market heavyweights Eugene Fama and Ken French have integrated the factor into their new “[5-factor model](#),” which consists of a market factor, size factor, value factor, profitability factor, and an investment factor.

About The Editors



Wes Gray



Jack Vogel



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This research was not lost on [Dimensional Fund Advisors](#) (DFA), a massive quantitative asset manager that is essentially an extension of University of Chicago Finance Department. DFA has added the concept of profitability to their process (we assume it is the profitability factor identified by Fama and French). In the words of [Eduardo Repetto](#), DFA's CIO, regarding profitability:

New research has to be very robust, very reliable and have real information that's not already captured in the other dimensions.

But how robust is the so-called profitability factor?

Is it possible that the profitability factor might already be captured in other dimensions?

A [new paper](#) entitled, "A Comparison of New Factor Models," by Kewei Hou, Chen Xue, and Lu Zhang, shows that the profitability factor is not, in fact, a new "dimension," as has been suggested. The authors find that the profitability factor highlighted by Fama and French is captured in cleaner ways by their simpler and [more robust 4-factor model](#), which consists of a market factor, a size factor, an investment factor, and a return-on-equity factor. The authors highlight that there are "four concerns with the motivation of the Fama and French model based on valuation theory," suggesting that the factors chosen by Fama and French are merely descriptive and/or data-mined, but not grounded in economic theory. Ouch.

But the critique of the 5-factor model isn't only on theoretical grounds, it is also based on the evidence. The Hou, Xue, and Zhang 4-factor model captures all the returns associated with the new factors outlined by Fama and French. Note the alpha estimates below. The yellow box highlights the alphas associated with the FF factors, controlling for the Hou, Xue, and Zhang factors and the blue box highlights the alphas associated with the Hou, Xue, and Zhang factors, controlling for the FF factors. The Hou, Xue, and Zhang factors can explain the FF factors, but the FF factors cannot explain the Hou, Xue, and Zhang factors. This suggests that the "new" profitability factor may not be a new dimension at all, since it can be explained via exposures to the market, size, and Hou, Xue, and Zhang's investment and ROE factors.

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Panel B: The FF five factors

	m	α	β_{MKT}	β_{SMB}	β_{HML}	β_{UMD}	R^2
SMB	0.28 (2.02)	-0.02 (-1.26)	0.01 (0.99)	1.00 (88.07)	0.13 (8.12)	0.00 (0.11)	0.99
HML	0.37 (2.63)	0.00 (1.49)	-0.00 (-0.68)	0.00 (0.37)	1.00 (1752.68)	0.00 (0.97)	1.00
RMW	0.27 (2.58)	0.34 (3.36)	-0.04 (-1.38)	-0.27 (-3.08)	-0.00 (-0.07)	0.04 (0.83)	0.19
CMA	0.36 (3.68)	0.19 (2.82)	-0.09 (-4.42)	0.04 (0.90)	0.46 (13.43)	0.04 (1.52)	0.55
		α_q	β_{MKT}	β_{ME}	$\beta_{I/A}$	β_{ROE}	R^2
SMB		0.05 (1.58)	-0.00 (-0.48)	0.94 (58.83)	-0.09 (-4.72)	-0.10 (-5.61)	0.96
HML		0.04 (0.36)	-0.05 (-1.37)	0.00 (0.01)	1.03 (11.67)	-0.17 (-2.19)	0.50
RMW		0.04 (0.49)	-0.03 (-1.07)	-0.12 (-1.70)	-0.03 (-0.37)	0.52 (8.54)	0.49
CMA		0.02 (0.45)	-0.05 (-3.65)	0.04 (1.58)	0.93 (33.68)	-0.11 (-3.90)	0.85

The results are hypothetical results and are NOT an indicator of future results and do NOT represent returns that any investor actually attained. Indexes are unmanaged, do not reflect management or trading fees, and one cannot invest directly in an index. Additional information regarding the construction of these results is available upon request.

Profitability is also questionable in international markets. In a working paper, “[The Five-Factor Fama-French Model: International Evidence](#),” by Nusret Cakici, the author looks at the performance of the five-factor model in 23 developed stock markets. There is only marginal evidence the factor works globally. In some markets the factor is effective, but in other regions such as Japan and Asia Pacific, the factor simply doesn’t explain returns. Our own internal research on the matter is consistent with this result.

Concluding remarks regarding the profitability factor

A lack of unified results often hints towards a lack of robustness and/or data-mining. Only time will tell if the out-of-sample performance of the so-called profitability factor will hold. There are certainly a lot of smart academics and investment houses leveraging the factor as a way to capture higher returns, so we can’t rule anything out. However, our advice is to tread lightly in the factor jungle, being sure to always carry a heavy machete to chop away at noisy data and the overfitting problems that accompany them.

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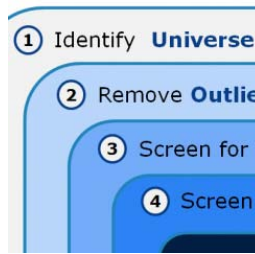


About the Author: [Wesley R. Gray, Ph.D.](#) ---



After serving as a Captain in the United States Marine Corps, Dr. Gray earned a PhD, and worked as a finance professor at Drexel University. Dr. Gray's interest in bridging the research gap between academia and industry led him to found Alpha Architect, an asset management that delivers affordable active exposures for tax-sensitive investors. Dr. Gray has published four books and a number of academic articles. Wes is a regular contributor to multiple industry outlets, to include the following: Wall Street Journal, Forbes, ETF.com, 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.

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8 Comments



jimhsu June 10, 2015 at 5:12 pm

Is that sort of a tautology? Profitability (RMW) can be captured by a model with a profitability factor (ROE). The international evidence is more interesting though. Also reconciling profitability with behavioral finance (why people “avoid” profitable firms) is a bit troubling without resorting to other factors for explanation (growth stocks, etc).



Jack Vogel, PhD June 11, 2015 at 11:47 am

We agree — the international evidence is troubling.

One behavioral reason it may work would be investor inattention to fundamentals (who wants to read a 10-K!).



Steve June 11, 2015 at 9:29 pm

Now, I’ve been wary of the profitability factor ever since Novy-Marx started doing papers on it. I’m still unconvinced.

My current take on the profitability factor:

1) It seems to not be a “very significant” or even “significant” factor. Therefore I won’t make it the primary / central / major factor in my investing.

2a) The above statement probably does not mean that profitability is not a useful factor at all. It seems that it

might be useful still, *within the context of* a value strategy, for example. Seems to improve the downside stuff. High(er) quality value – we hope – gets us closer to the “bargains” than the low(er) quality value – the below average stocks that are oversold / too cheap. Of course, this is the idea in your QV. So – significance and practical implementation are maybe slightly different things.

2b) Having said all that; I’m not sure even that can be taken as a given. For example, Carlisle (Deep Value, ch. 10) argues that whilst profitability improves a value universe over all (his) data, it does so only inconsistently. Furthermore, it doesn’t even do *that* over the first half of the data! If that research is correct, then that is truly worrying in my opinion – even from within a value context.

3) Finally – although I’m obviously reserved on the value of profitability as a factor, IF I were to argue for it, my take would be the following.

It’s similar to the idea of value (below average stocks being TOO cheap, with above average stocks being TOO expensive), though I’ve not really heard it articulated in relation to profitability.

It comes from what I learned in a (distant and misspent) youth playing around in the world of horse race handicapping and other like pursuits (where the quantitative side always appealed to me, surprise surprise). In the horse racing world (and this plays out internationally) there tends to be what is called a “favourite – longshot” bias. The market, in aggregate is actually excellent at picking out the best horse(s). As is

commonly known, the favourite wins the most races. The public have no problem identifying "quality" vs "junk". The same would be true in the stock market. We know which stocks belong in which category. However, when it comes to betting time, our biases get in the way. So we underbet the favourite (quality) and we overbet the long shot (junk). Using decimal odds (and ignoring the house take) for ease of explanation: the \$2.50 favourite (rated a 40% chance) should maybe be only paying \$2.20 (a 45% chance). Why? Because on the other end of the spectrum...that horse going out at \$50 (rated a 2% chance)...is in reality maybe a 0.2% chance and should be going out at \$500! But that doesn't happen. There are enough punters that overbet that \$500 long shot (sending it out at an overbet \$50) causing the \$2.20 favourite to drift out to a "value bet" of \$2.50.

You can see from some basic maths that, over the long term...betting on long shots (in aggregate) is a much worse bet (losing 90 cents on the dollar, in this example) than betting on the favourite (in this case making money. In reality it's simply that betting on the favourite only loses a few percent on the dollar, leaving an opportunity for the selective bettor to make a profit if they are selective about which they bet, and about which markets they bet into).

That's my theory on the profitability factor, IF I wanted to argue for it. It's simply the favourite - longshot bias. The quality stocks in fact ARE more expensive than the junk stocks (just the favourite IS a shorter price than the long shot horse). It's just that the quality stocks aren't quite as

expensive as they “should” be, and the junk stocks aren’t as “cheap” as they should be.

Or, something like that!



Jack Vogel, PhD June 12, 2015 at 11:04 am

Thanks for sharing — we believe quality (similar to profitability) can help within Value stocks, as outlined in Wes’ book Quantitative Value.



Michael Milburn June 10, 2015 at 11:10 pm

Philosophical Econ blog did an interesting post on profit margin a short while ago.

<http://www.philosophicaleconomics.com/2015/05/profit-margins-in-a-winner-take-all-economy/>

Philosophical Econ references Patrick O’Shaughnessy’s post:

<http://investorfieldguide.com/the-rich-are-getting-richer/>

The finding is that high profit margins might be structurally reinforcing, and over time have been expanding among high margin firms. I wonder if this auto-correlated aspect of expanding high margins (good to know) might be contributing to result. I guess the underlying argument is that the structure of the market/economy helps create barriers to sustain and extend margins for certain companies, and the dynamic may be becoming stronger over time.



Jack Vogel, PhD June 11, 2015 at 11:47 am

Thanks for sharing the links!



Leonardo Kubota June 11, 2015 at 3:27 pm

Great article! I have a question regarding the profitability factor. Basically it says that high profit

firms should earn higher expected returns than low profit firms. In Brazil, high profits just dont seem to be enough. Besides (and perhaps more important than) being high, profits must also increase on a yearly basis. Does the 5 factor model take that into account ? Consistently increasing profits = consistently increasing expected returns.

Thank you.



Jack Vogel, PhD June 11, 2015 at 4:22 pm

No, the model simply sorts on one-year profitability.

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