The Importance of Being Value

A different definition.

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Value stocks are generally recognized as equities with distinctive price performance. Their prices are believed to trend higher than the market in the long run, and their price volatility is considered to be different.

Fama and French [1992, 1996, 1998] explore the value phenomenon, and conclude that the premium on value stocks is related to a sense of distress in the underlying firms. Distress depresses stock prices—low prices are generally attributed to value stocks—and gives stocks a risk profile that is distinctly different from that of other stocks and that is apparently rewarded in the long run.

Fama and French's position has been a matter for debate. Daniel and Titman [1997] suggest value is instead a proxy for certain fundamental firm characteristics, and that there is a premium associated with these characteristics. Others like De Bondt and Thaler [1987] explain the value premium by investor behavior; investors seem to systematically overreact to certain market events.

There are also non-believers in the value effect. Philips [2002] argues that the premium must be offset by free cash flows such as dividends and share buy-backs that are not included in the test experiments. Black [1993] considers the value evidence a chance result.

We enter the debate from another angle. We focus on the definition that is generally used to identify value stocks, and decompose it along a time axis into a structural component and a transitory component. In doing this, we discover very different price behaviors for the two components. In Bourguignon and de Jong [2003] we provided evidence that only the transitory component of value gives rise to systematic outperformance, not the structural component. Here we extend this result by showing with another set of experiments that both the structural and the transitory value component play a significant role in explaining price volatilities across stocks.

We conclude that *value*, in the way it is generally defined, represents two separate factors of risk, but only one is remunerated. We believe this is a new line of argument that throws new light on the ongoing value debate.

DECOMPOSING VALUE

According to the principle that value stocks are relatively low-priced compared to company fundamentals, value stocks are usually recognized by comparing the share price with the firm value (per share), which can be measured by book value. A high book-to-price (BP) ratio indicates a value stock. Value stocks are thus, according to the standard definition, the highest ones in a stock ranking based on BP ratios measured at a particular time.

In Bourguignon and de Jong [2003] we began to cast doubt on the validity of this definition. Stock rankings compare stocks without considering that some may be in price equilibrium with respect to their firm fundamentals, while others are not, because of some (temporary) market-related event. Thus, this definition may confuse structural elements with more temporary price effects, ignoring a time dimension of BP ratios.

To avoid such confusion, we sharpened the definition, distinguishing explicitly between stocks that are low-priced *structurally* and those that are low-priced *temporarily*, by decomposing BP ratios into the historic average book-to-price, denoted as $\overline{BP}$, and the deviation from the average, as follows:

$$BP_{it} = \overline{BP}_{it} + \left(BP_{it} - \overline{BP}_{it}\right) \tag{1}$$

for stock $i = 1, \ldots, N$ at time $t = 1, \ldots, T$

Stocks with a high average BP ratio are called the *structural* value stocks, and stocks with a BP higher than the average the *transitory* value stocks.

Our experiments have revealed a difference in price performance between the two value groups. Now we expand the analysis, and explore whether the two groups differ in their risk behavior as well.

To analyze risk, we consider a standard factor risk model that allows explicitly for value factors. As a starting point, we adopt the Fama and French [1998] two-factor model, which they use to demonstrate that value does represent a source of risk. They define:

$$R_{it} = \alpha_i + \beta_i M_t + \gamma_i V_t + \varepsilon_{it} \tag{2}$$

where R_{it} is the excess return of stock i at time t in excess of the risk-free rate, α_i is the stock i alpha, β_i is its market beta, M_t is the excess market return at time t, γ_i is the stock's exposure to the value factor, and V_t is the value factor return at time t. Finally, ε_{it} are residual random terms that are assumed to be iid over time and independent of the factors.

The value factor is constructed, according to the standard definition, on the basis of BP stock rankings that are carried out once a year. Its returns are thus the returns of a zero-invested portfolio that is long high BP stocks and short low BP stocks.

For several reasons (discussed in detail below), we specify the factor risk model in a slightly different way. Following Fama and MacBeth [1973], we fix the exposures to the value factor rather than the return to this factor. Econometrically, therefore, it is the value factor return, V_t, that is to be estimated at all times, rather than the exposure of the stock, γ_i. Exposures are fixed according to the level of BP ratios, so that a high BP stock is positively exposed to the value factor and a low BP stock is negatively exposed.

Model (2) is thus transformed into the two-factor model:

$$R_{it} = \alpha_i + \beta_i M_t + BP_{it} V_t + \eta_{it} \tag{3}$$

where BP_{it} or some linear transformation of it is observed, and the value factor, V_t, is to be estimated.

A natural extension of this risk model to the differentiation between a structural and a transitory value factor based on the decomposition identity (1) leads to a three-factor model:

$$R_{it} = \alpha_i + \beta_i M_t + \overline{BP}_{it} V_t^{struc} + (BP_{it} - \overline{BP}_{it}) V_t^{trans} + \theta_{it} \tag{4}$$

In this model, the factor exposures $\overline{BP}_{it}$ and $(BP_{it} - \overline{BP}_{it})$, and the market factor (M_t) are the observed variables, while the stock alphas (α_i), the market betas (β_i), and the *structural* and the *transitional* value factors denoted V_t^{struc} and V_t^{trans} are to be estimated.[1]

The three-factor model would naturally collapse to the two-factor model, if the two value factors were identical:

$$V_t^{struc} = V_t^{trans} \quad t = 1, \ldots, T \tag{5}$$

Hence to establish which of the two models is to be preferred, one can apply standard likelihood ratio (LR) tests for testing the statistical validity of the constraints given in (5). If the constraints prove to be binding, we may conclude with a certain level of confidence that there are two distinct sources of risk attributable to value; otherwise we may conclude that there is only one.[2]

So why do we specify the factor models along the lines of Fama and MacBeth, with observed exposures and unknown factor values, rather than the opposite as in standard specifications? The first reason is obviously to establish a framework for testing the hypothesis of two sources of value risk against the standard view of a single source. The second reason is a more conceptual one.

There is an important difference in the way the stock exposures are specified. In the Equation (2) (Fama-French) model, stock exposures are assumed to be constant over time during the entire estimation period, while in the Equation (3) (two-factor) model they are allowed to vary. We find the FF model not intuitive in this regard.

Fama and French relate value directly to distress in firms and assume that stocks have a fixed sensitivity to a value (or distress) factor. This assumption seems to require the interpretation that stocks have a constant price reaction to a general distress factor that is present in the market and varies over time. Instead, it seems more intuitive to think that distress is essentially firm-specific, priced by the market in a certain way, relative to other factors. The latter is the interpretation that may be given to our Equations (3) and (4).

This issue is important in view of our decomposition of the value factor into two components. Under our specification, the structural component leads to relatively constant exposures over time, and should thus not be too different from the Fama-French specification, except of course that, in our case, (constant) exposures are set *a priori* rather than estimated. On the other side, the hypothesis that stocks might have a constant exposure to the transitory value factor is clearly untenable. By definition, the BP of a stock cannot be permanently above or below its mean.

THERE ARE TWO VALUE FACTORS

We estimate Equations (3) and (4) separately in 13 major equity markets over a 15-year period between 1989 and 2003 using Morgan Stanley Capital International (MSCI) monthly data, and then test the equations against each other by LR. The test statistics are reported in Exhibit 1.[3]

It turns out that the three-factor model is accepted in all markets at a confidence level of 95%, which confirms (or fails to reject) the hypothesis of two distinct sources of value risk. On the one hand, prices of structural value stocks behave the opposite from prices of stocks with a low structural BP ratio. On the other hand, opposite price movements appear to take place between stocks with a BP above their average and stocks with BP below their average.

EXHIBIT 1
Likelihood Ratio Tests

Six largest markets	LR*	Other markets	LR *
United States	390	Australia	335
Japan	225	Belgium	880
Great Britain	533	Hong Kong	641
Germany	270	Italy	261
France	527	Netherlands	554
Switzerland	331	Singapore	414
		Sweden	590

*Critical value at a 95% confidence level lies at 212.

We can get some idea of these price trends, or more precisely of the difference in trends, by looking at the estimated value factors. The return to these factors can be interpreted as the return of a portfolio that imitates the factor. The portfolio imitating the value factor (standard definition) is a zero-invested portfolio that is long high BP stocks and short low BP stocks, much like the Equation (2) model. It is the optimal portfolio an investor would hold who wants to pursue a value investment strategy (according to the standard definition once again), disregarding practical considerations such as transaction costs or short-selling constraints.

The performance of the value portfolio is graphed for the U.S. market in Exhibit 2 (in terms of cumulative returns starting at a base of 100). The value factor exhibits a consistent positive price performance over the period, with an annual return of 11.8%. This figure does not include the market trend, which is captured separately by the market factor (not displayed). This significant outperformance over the market confirms the presence of a value premium in the U.S.

The cumulative returns of the structural value factor and the transitory value factor are also displayed in Exhibit 2. Direct comparison of the three value factors over time is made possible by an appropriate rescaling. Interestingly, the transitory value factor returns are higher than those of the value factor (12.7%), and the structural value factor yields lower returns (8.7 %).[4]

EXHIBIT 2
Cumulative Value Factor Returns in United States

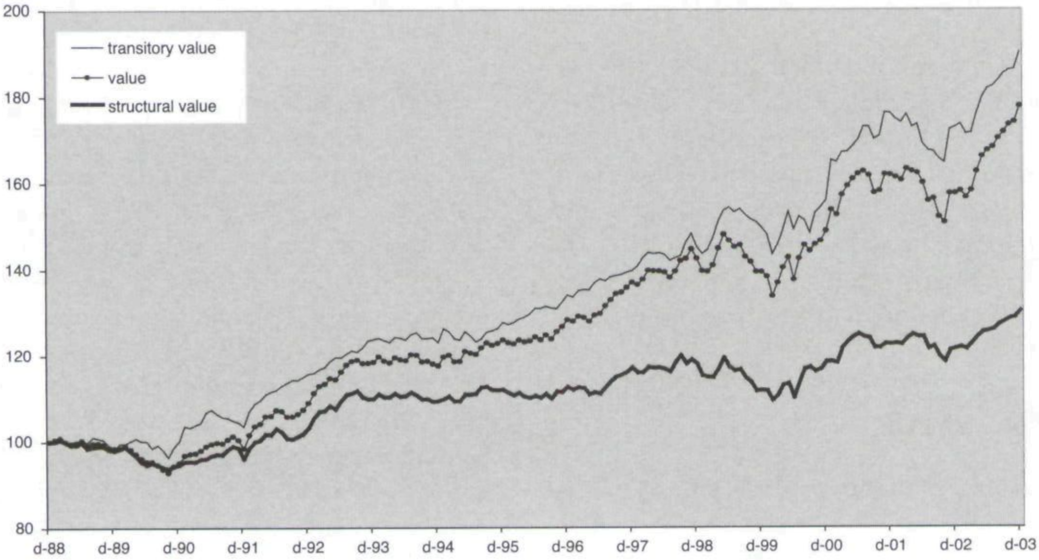

EXHIBIT 3
Performance of Estimated Value Factors

Market	value	structural value	transitory value
Six largest markets			
United States	11.8%	8.7%	12.7%
Japan	12.8%	8.8%	18.2%
Great Britain	10.6%	8.2%	13.3%
Germany	12.4%	8.4%	16.6%
France	11.7%	8.6%	12.5%
Switzerland	13.6%	10.6%	14.3%
average	12 %	9 %	15 %
Other markets			
Australia	10.4%	8.1%	11.4%
Belgium	7.1%	6.2%	10.0%
Hong Kong	10.5%	6.5%	11.5%
Italy	9.5%	8.0%	10.7%
Netherlands	8.7%	7.2%	8.2%
Singapore	8.0%	6.0%	11.7%
Sweden	15.7%	11.1%	14.6%

The same picture is observed in all 13 markets, as can be seen in Exhibit 3 (annual returns per market). The annual return of the value factor is 12% per year on average over the six largest markets. The transitory value factor yields 15% and the structural factor 9% on average (all excluding the market trend). This result confirms our suggestion in Bourguignon and de Jong [2003] that the value premium stems from the transitory component of value.

In terms of risk, the significance of the two value factors implies there is a higher-than-average correlation among structural value stocks and also among transitory value stocks. This is an important result that has direct implications for stock portfolio optimization. It means that a portfolio optimized on the basis of the Equation (4) model with two value factors is structurally less risky than one optimized with one value factor [Equation (3)]. We show this to be the case in a second experiment, by comparing the ex post volatility of the two risk-optimized portfolios.[5]

To be precise, we want the portfolios to be minimally affected by price divergences in the market. This can be achieved by minimizing the residual risk, or *tracking error,* defined as the volatility of the portfolio return in excess of the market return. The optimized portfolios will typically hold high- as well as low-market beta stocks, so that the total portfolio beta resembles the market beta, which is one by definition. With this *balanced* beta, the portfolio is set to imitate (or track) the general market movements.

In the same way, the portfolio that is optimized using the Equation (3) model will be balanced for high and low BP stocks, in such a way that it is protected against potential price divergences between these stocks. Similarly, the portfolio that is optimized with the Equation (4) model is protected against both transitory value effects and structural value effects.

The results are shown in Exhibit 4. The ex post risk of the latter optimized portfolios is in nearly all markets lower than that of the former optimized portfolios. In other words, the portfolios that anticipate two value effects are structurally less risky than the ones anticipating one value effect. Although the added risk is limited (13 basis points on average), this is a significant result, considering that we measure out-of-sample risk without foresight in the model estimation.

INTERPRETING VALUE

In summary, we find two value effects in the market—a structural value effect and a transitory value effect—and the latter gives rise to systematic outperformance. We interpret these results that the structural value effect corresponds to the value/growths style classification often adopted by researchers and practitioners (see for a general reference Coggin and Fabozzi [2003]).

A high BP level is characteristic of a value firm that has business operations that generate moderate revenue over time. The BP level is high as opposed to that of a growth firm, which typically has an ambitious development program aimed at gaining market share in the short run, at the expense of current revenue. A growth firm has a low book value relative to the stock price, as the price reflects a certain optimism in future growth not yet accounted for in the book value.

It is plausible that, as our experiments indeed show, these two types of firms have different price patterns, since they react differently to market news or events. Yet it is not plausible to think that there is a systematic divergence in their market performance over time. We disagree therefore with Daniel and Titman [1997], who associate the value premium with fundamental firm characteristics.

The transitory value factor is constructed so as to capture short-term price effects. The premium on this factor is evidence of a mean-reversion effect of stock prices; on average, temporarily low-priced stocks appear to outperform temporarily high-priced stocks.

The premium we find in our experiment is interesting in itself. It is important to stress, however, that it does not necessarily disprove market efficiency theory. In order to capture the premium, one should hold the portfolio that imitates the transitory value factor—yet the holdings (factor exposures) vary so much that the transaction costs involved are likely to largely outweigh the apparent opportunity gains.

We intentionally decompose value so that the transitory component varies much more than the structural component. The portfolio that imitates the structural value factor is *de facto* more or less a buy-and-hold portfolio, and, consistent with standard market efficiency theory, such a portfolio indeed should not outperform.

We explain the minor excess return this factor exhibits by the fact that the variability of the exposures is not reduced to exactly zero in the experiment. If it were, the premium on structural value would fall to zero with it, as verified in a separate experiment whose results are not tabulated here. Yet at the same time, we would be introducing foresight into the experiment.[6]

So, we postulate two potential value premiums. Capturing the one we call the transitory value premium requires an effective method to establish the price equilibrium of stocks with respect to their fundamentals, in order to distinguish between a market-related price move and a structural price adjustment due to a fundamental change. The investment strategy would be to invest in stocks that are priced at a certain threshold below their fundamental equilibrium, where the threshold would be set so as to cover the transaction costs. This admittedly is a difficult task.

The second premium corresponding with the structural value factor cannot be captured by systematically investing in one class of stocks, as the experiments demonstrate. If price levels diverge at times between value and growth stocks, relative gains may be obtained by means of tactical allocation between the classes. Such a strategy is known as style rotation.

EXHIBIT 4
Ex post Portfolio Risk

Six largest markets	2F-model	3F-model	Other markets	2F-model	3F-model
United States	2.96	2.88	Australia	3.17	3.13
Japan	2.57	2.46	Belgium	4.58	3.43
Great Britain	3.17	3.10	Hong Kong	5.27	4.32
Germany	3.79	3.90	Italy	4.60	4.32
France	2.91	2.66	Netherlands	6.66	6.10
Switzerland	4.37	4.14	Singapore	4.41	4.32
			Sweden	6.62	5.66

Annual tracking error on 10-year out-of-sample test period.

We should emphasize that the two investment strategies based on the two definitions of value are not related to one another. De Bondt and Thaler [1987] evidently refer to the transitory definition when they explain the value premium as a systematic overreaction of investors. Daniel and Titman [1997] refer to the structural definition when attributing the value premium to firm characteristics.

It is less obvious to characterize value as in Fama and French. On the one hand, relating value to a distress factor fits the transitory value definition, considering that distress provokes a temporary price distortion rather than a structural price adjustment. On the other hand, the Fama-French main conclusion that "value stocks have higher returns than growth stocks" suggests a relatively permanent classification of stocks along the lines of the structural value definition.

ENDNOTES

[1]Equations (3) and (4) are systems of regression equations including both time series and cross-sectional data. We apply an iterative estimation procedure consisting of two steps. In step one, the market betas are estimated per stock by means of ordinary time series regressions. In step two, the value factor returns are estimated per period by means of cross-sectional regressions. It can easily be shown that the iteration procedure converges toward the maximum-likelihood (ML) estimates.

[2]The two-factor model may similarly be tested against the one-factor market model $R_{it} = \alpha_i + \beta_i M_t + \varepsilon_{it}$ as in Fama and French [1998]. Although we do not report these results, this test is easily passed with our data.

[3]We smooth the published book values using time-weighted averages in order to remove the discontinuities in the time series produced by annual (or quarterly) reporting of book values. In the standard value definition, and in most experiments based on this definition, the issue of discontinuity is not as relevant, because only cross-sectional comparisons are being made. In our experiments, where time series comparisons are made as well, smoothing is necessary.

[4]Direct comparison of the factor returns is valid only if the three value factor exposures are identically scaled across stocks. Yet such rescaling would invalidate the identity Equation (5) and consequently the test framework. Therefore we have rescaled the factor returns instead after estimation, by multiplying at each time t by the standard deviation across the factor exposures at t.

[5]The portfolios are reoptimized every month with models that are reestimated on a five-year trailing time window. It gives a ten-year out-of-sample track record from 1994 to 2003. The tracking problem is interesting only if it applies to a reduced market universe. Otherwise the problem would degenerate, with the market portfolio itself as the optimal solution, independent of the risk model. We reduce the investment universe for practical considerations of limiting transaction costs. As we don't want to introduce any bias in the test, we reduce the universe by means of random draws. Each month 100 random subsamples of stocks are investigated, and we retain the one that leads to the minimum ex ante tracking error. Of course both models investigate the same set of subsamples.

[6]The historic average BP ratios are calculated every month over a trailing time window of a minimum of one year and a maximum of five years, depending on the availability of data. The idea is to capture the structural level of BP, or the equilibrium level. Although the measure we apply may not be the most accurate estimator for an equilibrium level, it generally suffices for our test purposes. Experiments with alternative time windows produce similar results.

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