Corporate Innovation, Price Momentum, and Equity Returns*

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Abstract

We define corporate innovation (CI) as the proportion of a firm's change in gross profit margin not explained by the change in the capital and labor it utilizes. We show that CI contains important information about expected equity returns. This information is very different from information contained in earnings surprises variables. It is however strongly related to the information contained in past returns, and can explain much of the performance of price momentum strategies.

Keywords: Corporate innovation, earnings surprises, price momentum, reversals.

JEL classification: G12, G14.

How easily can a firm replicate the success of another? Can a firm match the profit margins of a successful firm in the same line of business by simply putting in place the same amount of capital and labor as that of the firm it tries to mimic?

Most economists and strategists would agree that matching a firm's amount of labor and capital is not sufficient for replicating its performance in terms of market share and profits. Several other factors play a pivotal role including, but not limited to, the quality of its management, its commitment to innovation, marketing efforts, and brand name. Such factors can substantially differentiate two firms with otherwise identical amounts of capital and labor in place, and lead to very different levels of profits. In fact, such factors may contribute either positively, or negatively to a firm's profits. For simplicity, we will refer to such non-capital and non-labor productivity factors as corporate innovation.

The purpose of this paper is to examine the effects that corporate innovation has on equity returns, and compare its relation to earnings and price momentum. The reasons we focus on these particular relations are the following. First, whereas it may appear prima facie that corporate innovation can be simply a variation of earnings variables often used in the earnings momentum literature, we show here that corporate innovation contains markedly different information about equity returns than the commonly used earnings variables. Second, our analysis reveals that corporate innovation is closely related to price momentum, and can explain a large part of its performance. Both results are important because they establish an interpretation of price momentum based on an economically motivated variable that is other than earnings surprises.[3]

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[3] There is a large body of literature that explores explanations for price momentum. They include the papers of Conrad and Kaul (1988, 1989), Lo and MacKinlay (1988), Jagadeesh and Titman (1993), Barberis et al (1998), Daniel et al (1998), Berk et al (1999), Hong and Stein (1999), Rowenhorst (1998), Moskowitz and Griblatt (1999), Lee and Swaminathan (2000), Chordia and Shivakumar (2002), Grinblatt and Han (2002), Korajczyk and Sadka (2003), and Grinblatt and Moskowitz (2004), among others.

We measure corporate innovation as the component of a firm’s change in Gross Profit Margin (GPM) not explained by the growth in capital and labor it has in place. At an aggregate level, our measure is equivalent to a scaled Total Factor Productivity (TFP) variable. At a firm level, it captures the contribution of non-labor, non-capital production factors to a firm’s gross profits.

The aggregate version of our measure is not a new variable. Total factor productivity (TFP), and consequently the measure used here is a well-known business cycle variable. In dynamic equilibrium representative agents macro models (see for instance, Kydland and Prescott (1982), Long and Plosser (1983), Hansen (1985), King, Plosser, Rebelo (1988), Danthine and Donaldson (1993) for an excellent survey of the early literature, and Horvath (1998, 2000) for more recent multi-sector examples), TFP is a state variable that affects, among other things, the investment opportunity set, and therefore equity returns. However, to our knowledge, a firm-level equivalent of TFP has not been previously used in the finance literature to explain equity returns, neither has its relation to earnings and price momentum been previously investigated.

We show that firms with high CI earn subsequent equity returns that are significantly higher than those of firms with low (in fact negative) CI. When CI is measured over the past two quarters, and portfolios are rebalanced every six months, the spread in returns between high and low CI firms is broadly of similar order of magnitude as that obtained for the six-month, six-month price momentum strategy, or for earnings momentum strategies, based on standardized unexpected earnings (SUE), and cumulative abnormal equity returns (ABR).

While the returns of the above long-short strategies are not very different, the information they contain about equity returns is. In particular, double sorts of stocks on CI and SUE, or CI and ABR reveal that both sets of variables contain information about equity returns, but none subsumes the other. In other words, CI contains different information about equity returns than both SUE and ABR.

CI is however strongly related to price momentum. “Winners”, the firms with the highest past returns, are also the firms with the highest average CI among price momentum portfolios. Similarly, “losers”, the firms with the lowest past returns, are also the firms with the lowest (negative) average CI among price momentum portfolios. Recall that price momentum portfolios are not constructed using any CI-related information. Nevertheless, they exhibit monotonicity with respect to CI. In addition, deciles constructed on the basis of CI have broadly similar characteristics in terms of size, book-to-market, and market betas as those of price momentum deciles. Double sorts on the basis of CI and past six-month returns show that CI subsumes returns continuation for all but the portfolios with the highest CI. In other words, within CI-sorted quintiles, price momentum is profitable only if performed using high CI stocks. Price momentum is not profitable among low CI firms. On the other hand, CI-sorted portfolios always deliver a positive and statistically significant spread, independently of whether the firms considered had high or low past returns. Regressions of returns of CI-based long-short strategies on returns of price momentum strategies reveal that CI can explain a significant portion of the time-series variation in price momentum. The adjusted R-squared from such regressions vary between 14 and 33 percent.

While the above evidence is not equivalent to a complete explanation of price momentum, it does show that CI-sorted portfolios share important similarities with portfolios sorted on the basis of past returns, and that CI can be viewed as a partial explanation of the price momentum phenomenon.

Since ABR is the cumulative abnormal stock return around the most recent announcement date of earnings, the fact that CI is very different in content than ABR suggests that the profitability of the CI strategy is not concentrated on earnings announcement dates. Furthermore, our tests show that the profitability of the CI strategy is not due to low CI firms continuing to underperform more than it is on high CI firms continuing to outperform. In Section 4 we argue that CI can be viewed, however, as a rational structural uncertainty estimator, in the class of rational structural uncertainty theories discussed in Brav and Heaton (2002). In their paper, rational structural uncertainty theories are rational theories that incorporate incomplete incomplete information about structural parameters of the economy, which may vary stochastically over time.

Regression analysis of the relation between CI and price momentum reveals the following. Whereas the Capital Asset Pricing Model (CAPM) and the Fama-French (1996) model are unable to explain the alphas of the price momentum deciles and the spread between winners and losers, the addition of a CI-based variable in the Fama-French model renders the alphas economically and statistically insignificant, with the exception of the decile of the "winners". Furthermore, the loadings of momentum deciles on the CI-based variable exhibit monotonicity across the momentum deciles, independently of whether they are estimated together with loadings on the market or Fama-French (1996) factors. The loading on the momentum spread is always large and statistically significant. In addition, regressions of the CI-based variable on alternative sets of factors reveal that CI is not related to any of the well-known factors in the asset pricing literature, except of course the momentum factor.

Interestingly, CI shares a relation not only with price momentum, but also with long-term return reversals. This is a comforting result. Although long-term reversals are not a persistent anomaly, as it can be explained by the Fama-French (1996) factors, it is reassuring to know that the same variable that partly explains medium-term return continuation is also related to long-term reversals.

The rest of the paper is organized as follows. Section 1 discusses the measure of corporate innovation used in the study. Section 2 presents the data. Section 3 contains the main body of our empirical results about the relation between CI and future equity returns, as well as the relation of CI with price and earnings momentum. Section 4 provides a discussion on the nature of the CI variable, and explores whether popular momentum explanations could apply in the case of CI as well. Section 5 compares the information in Gross Profit Margin (GPM) with that in CI. Section 6 presents empirical results on the relation between CI and long-horizon returns reversals. We conclude in Section 7 with a brief summary of our results.

1. Measuring a Firm's Corporate Innovation

As mentioned earlier, corporate innovation is measured as the change in a firm's Gross Profit Margin (GPM) not explained by the growth rate of capital and labor it utilizes. We define GPM as the difference between a firm's sales and the cost of the goods it sells. We should emphasize once more that corporate innovation need not be always positive. Just like in the case of TFP, it can take any value. Corporate innovation represents production factors other than capital and labor that have an effect on the profitability of the firm.

Although we do not aim to provide here a full-blown theoretical justification for our measure of corporate innovation, our formulation can be understood by reference to a standard Cobb-Douglas production function. In particular, assume that a firm's output is given by

$$Y_t = A_t K_t^{\alpha_1} L_t^{\alpha_2} \quad (1)$$

where Y_t denotes the firm's value of output at time t, K_t is the firm's capital stock used for the production of Y_t, L_t is the labor input in the production process, and A_t is the total factor productivity at time t, which is often interpreted in the literature as capturing technology shocks. The exponents α_1 and α_2 denote the shares of capital and labor respectively. In a competitive labor market, and assuming for simplicity absence of intermediate goods in the production function, the gross profit margin of the firm is defined as follows:

$$GPM_t = Y_t - L_t MP_L \quad (2)$$

where *GPM* denotes the gross profit margin, and MP_L is the marginal product of labor. Note that MP_L is given by

$$MP_L = a_2 A_t K_t^{a_1} L_t^{a_2 - 1} \tag{3}$$

Therefore,

$$\begin{aligned} GPM_t &= A_t K_t^{a_1} L_t^{a_2} - a_2 A_t K_t^{a_1} L_t^{a_2} \Rightarrow \\ GPM_t &= (A_t - a_2 A_t) K_t^{a_1} L_t^{a_2} \end{aligned} \tag{4}$$

Equation (4) says that a firm's gross profit margin at time *t* is a function of the firm's capital and labor at time *t*, as well as the term $(A_t - a_2 A_t)$, which we call Corporate Innovation (*CI*). Note that *CI* is equal to a "shrunk" A_t, which corresponds to the TFP of the firm.

Our next task is to estimate the *CI* term at time *t* for all US firms. To do that, we run rolling regression with an expanding window of the form:

$$\Delta^i gpm_{jt} = \beta_{j0} + \beta_{j1} \Delta^i k_{jt} + \beta_{j2} \Delta^i l_{jt} + \varepsilon_{jt}, \qquad i = 1, 2, 3, 4 \qquad j=1,\ldots,N \tag{5}$$

where $\Delta^i gpm_{jt} = \log\left({GPM_{jt}} \big/ {GPM_{jt-i}} \right)$ is the change in the j^{th} firm's log GPM from quarter $t-i$ to quarter t, $\Delta^i k_{jt} = \log\left({K_{jt}} \big/ {K_{jt-i}} \right)$ is the change in the log capital stock from quarter $t-i$ to quarter t for firm *j*, and $\Delta^i l_{jt} = \log\left({L_{jt}} \big/ {L_{jt-i}} \right)$ is the change for firm *j* in the log labor employed from quarter $t-i$ to quarter t. Note that i denotes the horizon over which the growth in the variables of interest is computed.

Corporate innovation is then given by:

$$CI^i_{jt} = \Delta^i gpm_{jt} - \left(\hat{\beta}_{j1} \Delta^i k_{jt} + \hat{\beta}_{j2} \Delta^i l_{jt} \right) \tag{6}$$

where $\hat{\beta}_{j1}$ and $\hat{\beta}_{j2}$ are the OLS estimates of $\beta_{j1}$and β_{j2} respectively. Again, notice that the computation of CI_t used here is very similar to that of TFP or Solow (1957) residuals, as it is often termed in the literature.[4]

For the purpose of our empirical analysis, we compute CI_{jt} over the horizons of past 1, 2, 3 and 4 quarters. To prevent look-ahead bias, we use only information that is available to the investor at time *t*. We obtain a time-series of CI_t's by performing rolling regressions. The CI_j at time t is computed using the parameters estimated from a regression run with data up to time t. Similarly, CI_{jt+1} is obtained by re-estimating the parameters after adding one new observation to the rolling regression window without dropping the first one.

The reader may observe that some of the production factors captured by our definition of CI can simply be intangible assets such as Research and Development (R&D) expenditure, or licensing and patents. Such factors have been considered in previous papers.[5] However, CI_t is much more general than any particular intangible asset category considered in previous research. It can be viewed as the return on capital for a particular firm, and factors such as R&D or patents simply contribute positively or negatively to this rate of return. In addition, the focus of the current paper is different. Whereas most previous work focuses on how accounting practices treat intangible assets, our paper focuses on the effects that non-capital and non-labor production factors have on a firm's gross profits and its expected returns.

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[4] Some assumptions of the original Solow (1957) derivation do not hold in our application. In particular, Solow (1957) assumes that the productivity growth is not directly affected by any exogenous shifts in the firm's demand function or in the prices of its factors of production. As noted in Hall (1990), when there is a correlation between an exogenous variable and the Solow residual, the assumptions of perfect competition and constant returns to scale no longer hold. Our estimation of corporate innovation is simply *in the spirit* of Solow residuals.

A study that considers the effects of intangible assets on equity returns is that of Chan, Lakonishok, and Sougiannis (2001). They examine whether stock prices fully reflect R&D expenditure. They find that the average historical returns of firms that do R&D are the same as those of firms that do not. As it is apparent from the previous discussion, the focus and results of our paper differ substantially from those of Chan, Lakonishok and Sougiannis (2001).

As noted earlier, CI is largely unrelated to earnings variables, whereas it is strongly related to price momentum. There is good reason why CI does not capture the same information as earnings variables. In the representative agent's business cycle models, free cash flows (*FCF*), which proxy for earnings, are given by

$$\begin{aligned} FCF_t &= output_t - wages_t - investments_t \\ &= Y_t - \alpha_2 Y_t - I_t \\ &= \alpha_1 A_t K_t^{\alpha_1} L_t^{a_2} - I_t \end{aligned} \tag{7}$$

where I_t denotes investments at time t, a stochastic variable. Therefore, even if *K* and *L* do not vary significantly, *FCF* will not capture the same information as *CI*, exactly because investments, *I*, are stochastic. Furthermore, whereas it is common to view *K* and *L* as not varying much over time at the economy level, there is no reason to believe that they are constant or approximately constant at a firm level. For a recent discussion of these issues, see McGrattan and Prescott (2000).

2. Data

The inputs needed to compute a firm's *CI* are obtained from COMPUSTAT. In terms of data series used, we define a firm's gross profit margin as the difference between a firm's sales (COMPUSTAT

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[5] See for instance, the studies of Hall (1993), Barth and Clinch (1998), and Lev, Nissim, and Thomas (2002), among others.

industrial quarterly data item 2) minus its cost of goods sold (COMPUSTAT industrial quarterly data item 30).

A firm's labor is proxied by the number of its employees (COMPUSTAT industrial annual data item 29).[6] Furthermore, the capital stock of a firm is measured using the series "Property, Plant and Equipment – Total (Net)" (COMPUSTAT industrial annual data item 8 before 1976, and COMPUSTAT industrial quarterly data item 42 after 1976).

We convert data available at an annual frequency to quarterly observations by simply assigning for the quarters of the year the annual observation of that year. As a robustness check, we also experimented with simple interpolating techniques to transform annual data into quarterly. The results of the paper remain qualitatively the same, and for that reason we do not report them here.

We use the fiscal year-end month data (FYR) variable in the COMPUSTAT industrial annual file to arrange the annual data into the appropriate calendar period. To make sure that there is no look-ahead bias in our analysis, an observation is used about 3 months after it is published. For instance, in the case of an annual observation with YEARA (fiscal year) equal to 1966 and FYR (fiscal year end month of data) equal to 3, the observation is first used as an end-of-quarter observation for the second quarter of 1967. By the same token, we lag quarterly series by one quarter. In this manner, we ensure that the information used to compute CI_{lt} is known to the investors at the time of the computation of CI_{lt}.

The capital, labor, and output data are transformed into one-, two-, three-, and four-quarter growth rates, giving us a total of four different growth rates data sets. We do that in order to be able to measure CI_t over different horizons. To compute the CI_t for the current quarter, we require a firm to

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[6] We prefer the data item 29 over the series "labor and related expenses" (Compustat industrial annual data item 42) because the latter is only sparsely collected for most of the firms in Compustat.

have at least 7 years of prior data, or a total of 28 consecutive quarterly observations for the GPM, labor, and capital stock series. Table 1 reports the number of firms included in each of the four data sets, as well as the mean and standard deviation of the corporate innovation measure each year. In addition, we report the average adjusted R-squared from the regressions run to compute the firms' CI components.

Our analysis covers the period from the first quarter of 1967 to the last quarter of 2002, which represents the period for which data for all variables are available. Since we require a minimum of 28 consecutive observations to compute the CI_t, the first $CI's$ are computed for the first quarter of 1975. However, only a small number of firms is available for that year, making the portfolio results for 1975 relatively unreliable. For that reason, we present results on portfolio returns starting January 1976.

Monthly stock prices, book-to-market (BM), and market capitalization (ME) information is obtained from the Center for Research in Security Prices (CRSP) database. It includes firms listed on the NYSE, AMEX, and NASDAQ stock exchanges. We restrict our analysis to stocks with codes equal to 10 or 11. This ensures that we work exclusively with returns on common stocks. In other words, closed-end funds, trusts, shares of Beneficial Interest, American Depository Receipts, Real Estate Investment Trusts, etc, are excluded from our analysis. Firm size is defined as the number of shares outstanding times the monthly price. A firm's BM is defined as the COMPUSTAT industrial quarterly data item 59 divided by the firm size.

We consider two commonly used measures of earning news, proposed in Chan, Jegadeesh, and Lakonishok (1996). The first measure is the standardized unexpected earnings (SUE) which is defined as:

$$SUE_{iq} = \frac{EPS_{iq} - EPS_{iq-4}}{\sigma_{iq}} \tag{8}$$

where EPS_{iq} denotes the current quarterly earnings per share (EPS), reported in the database as COMPUSTAT data item 19. Note that EPS_{iq-4} is the earnings per share four quarters ago, and σ_{iq} is the standard deviation of unexpected earnings $EPS_{iq} - EPS_{iq-4}$ over the past eight quarters. In order to avoid again a look-ahead bias, and make sure that we have the same approach as discussed above regarding all the data used, we lag the earnings per share data item by a quarter before computing the SUE variable.

The second measure of earning news is the cumulative abnormal stock return around the most recent announcement date of earnings up to month t (ABR). It is defined as:

$$ABR_{it} = \sum_{j=-2}^{+1} \left(r_{ij} - r_{mj} \right) \tag{9}$$

where r_{ij} is the stock return of firm i on day j with EPS being announced on day 0. Day 0 is the RDQE data item in COMPUSTAT, that is, the report date of quarterly earnings. The variable r_{mj} is the return on the CRSP equally weighted market index.

Data for the 25 Fama-French (1993) portfolios, as well as for the market factor, T-bill rate, the size factor SMB, the BM factors HML, and the momentum factor UMD are obtained from Kenneth French's website.[7]

3. Corporate Innovation and Subsequent Equity Returns

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[7] We would like to thank Kenneth French for making the data publicly available. The website URL is http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/

To construct CI-based portfolios, we use the same methodology as the one employed in Jagadeesh and Titman (1993). This is necessary since part of the paper focuses on comparing the performance of CI-based portfolios with those of momentum strategies.

To render our comparisons more informative, we focus on the 6-month/ 6-month price, SUE, and ABR momentum strategies, which are amongst the most popular in the literature, and compare their performance with the equivalent 2-quarters/6-month *CI*-based strategy.

To compute the returns of CI portfolios for the tests of this section, we first compute the CIs for all stocks in our sample, using growth rates in GPM, capital, and labor over the past two quarters. We then rank stocks on the basis of their CI and create 10 portfolios. The holding period for these portfolios is 6 months. This procedure amounts to creating 10 CI-based portfolios along the lines of the familiar six-month/six month price and earnings momentum portfolios. Note that all portfolios examined are equally-weighted. Their performance and characteristics are reported in Table 2.

Panel A of Table 2 reports the results for the CI-based strategy, Panel B reports the results for the price momentum strategy, whereas Panels C and D reports the results for the SUE, and ABR earnings momentum strategies, respectively. The comparison of the performances of the three strategies reveals the following results. First, the returns of the four strategies are broadly within the same order of magnitude. The CI-based strategy delivers a monthly return of 0.76 percent, the price momentum has a return of 0.57 percent, whereas the earnings momentum strategies SUE and ABR have returns of 0.95 and 0.84 percent respectively. Furthermore, although neither the price momentum nor the earnings momentum strategies use any information about CI in their construction, they all exhibit monotonicity across deciles with respect to the CI variable. This implies that some relation may exist between CI variable and the variables used in the momentum strategies.

Panels A to D also list a number of characteristics for the decile portfolios of the four strategies. They refer to the coefficients from regressions run to compute the CI variable, the idiosyncratic volatilities of the portfolios, the average market capitalization and book-to-market of the deciles, and their market beta. With respect to all those characteristics, the CI and price momentum strategies appear similar, whereas the SUE strategy differs in some dimensions. One of them is the idiosyncratic volatility of the deciles. Idiosyncratic volatilities are computed following the methodology outlined in Campbell, Lettau, Malkiel, and Xu (2001). Both the CI, ABR and price momentum strategies exhibit an asymmetric U-shape pattern across the 10 deciles. This is not the case with the SUE strategy, where the average idiosyncratic volatility of the firms in the deciles decreases monotonically as the SUE of the deciles increases. In addition, whereas the high CI and winners deciles tend to be comprised of relatively larger growth firms than the low CI and losers deciles, in the case of SUE and ABR, the high and low SUE and ABR deciles do not differ with respect to their average market capitalization. It is however the case that the high SUE decile includes stocks with relatively lower average book-to-market than the low SUE decile. This is to a lesser extend true for ABR.

The results of Table 2 provide some first evidence that the CI strategy may share some similarities with the well known price and earnings momentum strategies. The extent of these similarities is not yet transparent. To understand better the degree of common information in the four strategies, we perform double sorts. We sort stocks into five portfolios on the basis of their CIs, and we subsequently subdivide each of the five portfolios into five new portfolios on the basis of either their past returns, SUE, or ABR. We also reverse this procedure, by first sorting stocks into five portfolios on the basis of either their past returns, SUE, or ABR, and subsequently into five portfolios on the basis of their CI. Our choice of working with five portfolios at a time is guided by the number of stocks in our sample, and aims to ensure that the portfolios created contain a sufficient number of stocks to be considered well diversified.

The results from the double sorts are reported in Table 3. Panel A1 and A2 present the results from double sorts on the basis of CI and SUE. Note that independently of the order used for the sorts, none of the two effects subsumes the other. The SUE strategy remains profitable and the spread statistically significant when created within the five CI-sorted portfolios, and the reverse is also true. The CI strategy provides both an economically and statistically significant spread, even when it is created within SUE-sorted portfolios. The same conclusion emerges from double sorts of stocks on the basis of CI and ABR, as presented in Panels B1 and B2.

Two conclusions emerge from these results. First, CI cannot be considered a proxy for post-earnings announcement drift, a status held by the SUE variable. Second, it is unlikely that the profitability of the CI strategy can be attributed to potential high returns on earnings announcement dates. The implication is that CI is a new variable that contains important information about equity returns.

Panels C1 and C2 of Table 3 present results from double sorts of stocks on CI and past six-month returns. Note that these results are strikingly different from those of the two previous panels. We see that the price momentum strategy is only profitable when constructed within the two high CI portfolios. When the stocks used to construct the price momentum strategy have relative low or negative CI, the momentum spread is zero. In contrast, when the CI strategy is constructed within the price momentum-sorted portfolios, it is profitable independently of the stocks' past returns. In short, CI subsumes price momentum in three of the five CI portfolios, but price momentum does not subsume CI in any return-sorted quintile.

3.1. The Performance of CI Strategies Over Different Formation and Holding Periods

In this section we examine the performance of the CI strategy over different formation and holding periods. This is particularly useful, since price momentum strategies, with whom CI is most similar, are successful over a variety of horizons (see, Jagadeesh and Titman (1993, 2001), and Rowenhorst (1998)).

Table 4 reports the returns of portfolios formed on the basis of past one-quarter *CI* 's, but held for a period of 3, 6, 9, or 12 months. The return of the zero-investment portfolio, P10-P1, decreases as the holding period increases, indicating that the *CI* characteristics of stocks change substantially over time. Indeed, the turnover of portfolios reported in Panel E confirms this indication. Turnover is defined as the proportion of firms in a portfolio that leaves that portfolio each quarter. It is evidently very high for all deciles. High levels of turnover have also been reported in the literature for price momentum portfolios (see for instance, Jagadeesh and Titman (1993, 2001)).

Tables 5, 6, and 7 report the returns of the *CI* strategies when the portfolios are formed on the basis of *CI* 's computed using growth rates in GPM, capital, and labor over the past two, three, and four quarters respectively. The following conclusion emerges from those tables. As formation period increases, the profitability of the zero-investment *CI* strategy tends to increase, whereas as the holding period increases, its profitability typically decreases. The result is that the most profitable *CI* strategy is the one formed on the basis of the past 3 or 4 quarters of *CI* and held for 3 months. Its average return is equal to 1.085% and 1.043% per month, respectively.

Note that as the period over which we compute the growth in GPM, capital and labor increases, the turnover of the extreme decile portfolios P1 and P10 tends to decrease. This may imply that *CI* exhibits greater stability when it is measured over longer periods of time (in our case, three to four quarters). In contrast, when stocks are ranked on the basis of *CI* over the past quarter, the relative ranking may take into account potentially small changes in *CI* , which could be highly transient, or simply due to estimation noise. This is a direct consequence of the fact that *CI* is not observable, but it can be estimated though, albeit with noise.

The general message emerging from this section is that strategies based on *CI*, and constructed along the lines of price momentum strategies, are at least as profitable as the price momentum strategies examined in the literature.

3.2. Further Comparisons of CI and Price Momentum Strategies

As further evidence on the relation between the momentum and *CI* strategies, we report the correlation matrix of various *CI* and price momentum strategies, as well as results based on regression analysis.

Table 8A reports the correlation matrix of the various *CI* strategies discussed in the previous section, and their corresponding momentum strategies. The correlations are relatively high, ranging from 0.33 to 0.59, with an average correlation of around 0.5. Table 8B reports the correlation matrix for the various *CI* strategies examined. The correlations are again relatively high, and vary between 0.17 and 0.99. It seems that the main element that leads to low correlations between two different *CI* strategies is a large difference in the holding periods of the long and short portfolios.

Table 9, Panel A provides results from regressions of the returns on zero-investment price momentum strategies (winners minus losers) on the returns of zero-investment *CI* strategies. The adjusted R-squares vary between 14% and 33%, suggesting that the *CI* strategies can explain a substantial proportion of the returns of the price momentum strategies. These adjusted R-squares are much larger than those previously reported in the literature from regressions of momentum portfolios on economic variables. For a recent examination of the ability of economic variables to explain momentum, see Griffin, Li, and Martin (2003). The average adjusted R-square from analogous regressions reported in that study is around zero.

Panel B of Table 9 reports results from predictive regressions, where the returns of zero-investment momentum strategies are predicted by past month's returns of zero-investment *CI* strategies. The adjusted R-squares vary now between zero and 3%, implying that the returns of *CI* strategies have a rather limited ability to predict the returns of momentum strategies one month ahead. In other words, *CI* and price momentum strategies share a strong contemporaneous relation, but not a lagged one.

4. What is the Nature of the Corporate Innovation Variable?

The evidence presented in the previous sections reveals two facts. First CI does not contain the same information about equity returns as the widely used earnings surprises variables SUE and ABR. Second, CI is strongly related to price momentum, and can explain a substantial proportion of its performance.

Given that existing explanations for the profitability of the price and earnings momentum strategies are mainly behavioral or risk-based in nature, the results of this study lead to the inevitable question: Where does CI fit in the literature?

Brav and Heaton (2002) show that it is often difficult to differentiate empirically between behavioral theories, and rational structural uncertainty theories for a particular asset pricing anomaly. By rational structural uncertainty theories they mean rational theories that incorporate incomplete information about structural parameters of the economy, which may also vary stochastically over time.

The reason that a distinction between behavioral and rational structural theories is often unattainable is because the empirical predictions made by the alternative theories are not sufficiently different.

Indeed, Brav and Heaton demonstrate that the performance of price and earnings momentum is consistent both with the behavioral underreaction theories of Barberis, Shleifer and Vishny (1998) and Hong and Stein (1999), for instance, and rational structural uncertainty theories. We will argue here, that the evidence presented on CI in this study is at least consistent with the rational structural uncertainty theory presented in Brav and Heaton.

In their model, rational investors employ Bayesian methods to estimate their rational structural uncertainty estimator. In our case, the role of this estimator is played by CI. Assume that at the beginning of period t=n+1, and for a given firm, rational investors do not know the value of CI at time n+1, but they can observe past realizations. They can therefore estimate CI at t=n+1, using the information they have up to that point, but also taking into account that the CI of a firm can vary over time. Indeed as Table 10 shows, it is reasonable to assume that CI does vary substantially over time. On average, the number of consecutive quarters a firm stays in the extreme deciles 1 and 10 is no more than 1.45. In addition, it takes on average 6.3 quarters for a firm to reenter an extreme decile after it exits it, and less than 4 quarters to switch between the extreme deciles.

With the help of a prior and posterior distributions, investors estimate the value of CI at t=n+1. The estimator used reflects investors' lack of knowledge as to whether CI has changed at t=n. Depending on investors' beliefs about the probability that CI has changed, the estimator puts different weights on older and newer data used for the estimation. It is exactly this property of the estimator which makes it difficult to differentiate it from estimators obtained from behavioral models. In addition, anytime investors fail to identify exactly changes in CI at t=n, they place the wrong weight on old data when estimating CI in the postchange period. This will manifest itself as return continuation.

Why is CI a reasonable candidate for a rational structural uncertainty estimator? Recall the definition of CI as the component of a firm’s GPM not explained by any changes in its capital and labor. A high CI implies that future cash flows for the firm will be high. The investors will therefore update upwards their expectations about future cashflows. They will also update upwards the discount factor of the firm though. The reason is that with a high CI, a large proportion of the firms profits are due to factors that are potentially ephemeral. In other words, an increase in CI will affect both the expected future cash flows of the firm and its discount rate, increasing investors’ uncertainty about the future performance of the firm.

The same applies when CI is negative. Investors will now update their expectations about future cash flows downwards. They will also increase, however, the discount factor of the firm. Given that the firm does not produce positive CI, but it rather wastes scarce resources such as capital and labor, it has now an increased likelihood of going bankrupt. Through this mechanism, CI affects once again both the expected future cash flows and the discount factor of the firm.

Since CI may affect the discount factor of the firm, the explanation we provide for CI here can be considered partly risk-based. Evidence on the ability of CI to explain equity returns is provided in the following section through regression analysis.

4.1. CI as a factor in asset pricing tests

The aggregate measure of CI used in our regression analysis is the return on a zero-investment portfolio that is long on the decile with the highest CI stocks (decile 10), and short on the decile with the lowest CI stocks (decile 1). This is constructed as in Table 2. For convenience, we call the return of this variable HLCI.

Panel A of Table 11 shows the alphas of momentum deciles when estimated using alternative sets of factors. The models considered are the Capital Asset Pricing Model (CAPM), the Fama-French (1993) (FF) model, and the FF model augmented by the HLCI factor. The first two rows of Panel A verify the results already known in the literature; neither CAPM, nor the FF model can eliminate the statistical and economic significance of the alphas from the momentum deciles. Furthermore, the alpha of the momentum spread (MOM(10-1)) is always statistically significant. Notice though, that when we augment the FF model by the HLCI factor, the statistical significance of those alphas disappear, with the exception of the alpha for decile 10.

Panel B of Table 11 presents loadings with respect to the HLCI variable, when they are estimated alone, or in the presence of the market or FF factors. In all cases, the loadings vary monotonically across deciles. They are negative for the low momentum decile, and increase to be positive for the tenth high momentum decile.

Panel C presents results from regressions of the HLCI variable on the market factor, the FF factors, and the FF factors plus the price momentum factor. The alphas of the HLCI variables are always significant, even when the momentum factor is included in the regression. This result implies that price momentum is not enough to fully explain the return of the HLCI variable, whereas HLCI is sufficient for explaining the return of the momentum spread. In addition, notice that all betas of HLCI with the variables considered are statistically insignificant, apart from one case: The beta with respect to the price momentum spread.

Finally, Panel D shows the correlation matrix of the factors considered in the previous panels. As expected, HLCI has a large correlation only with the price momentum spread.

The results presented here are consistent with the idea of the previous section that CI may affect the discount factors of firms. They are also consistent with the fact that an aggregate measure of

CI proxies for TFP, which is an important state variable in business cycle models that affects the investment opportunity set, and therefore equity returns.

How can the explanation of the previous section be reconciled with the fact that on the aggregate, CI proxies for TFP? It is reasonable to assume that a firm’s CI can be decomposed into two components: An aggregate component, which may contain information similar to that of TFP, and a firm-specific component with the behavior described in the previous section.

4.2 Corporate Innovation and Behavioral Theories of Momentum

In this section, we examine whether some popular behavioral explanations for momentum are consistent with the behavior of CI presented in this paper.

Chan, Jagadeesh, and Lakonishok (CJL) (1996) provide results related to the performance of momentum strategies which suggest that the market may underreact to past earnings news. This is not apparently consistent with CI. Recall from Table 3 that CI shares little common information with either SUE or ABR. Therefore, it is unlikely that the performance of CI strategies is due to an underreaction to past earnings news.

CJL also show that much of the success of momentum occurs around earnings announcement dates of the individual stocks, which of course occur on different days. Again, this is not consistent with our results on CI. Recall that ABR measures cumulative abnormal stock returns around the most recent announcement date of earnings of a given stock, sorting stocks first on ABR and then on CI should account for much of the profits of the CI strategy that occur around earnings announcement dates. However, when such double sorts are performed in Table 3, ABR is not able to subsume the performance of the CI strategy. It is therefore again unlikely that the profitability of the CI strategy can be attributed to abnormal returns occurring around earnings announcement dates.

Hong and Stein (1999) and Hong, Lim and Stein (2000) argue that momentum is driven more by losers continuing to underperform than by winners outperforming. The idea there is that firms with low analysts' coverage and bad news are not eager to get that bad news out to the market, while they are willing to get out good news. This behavior could lead to an underreaction in the prices of stocks that experienced bad news.

Although this is a plausible hypothesis, it is not supported by our results. In the double sorts of stocks first on CI and then on past returns presented in Table 3, the price momentum strategy is unprofitable within the three lowest CI quintiles. It is only profitable when the CI of the firms is high, as in quintiles four and five. The firms in those quintiles are bound to experience a positive effect on their future cash flows, which is obviously good news. Yet, it is in those cases that the momentum strategy is profitable. This result is in contrast to the Hong and Stein (1999) and Hong, Lim, and Stein (2000) hypothesis, but consistent with the rational structural uncertainty theory of the previous section. Investors are more concerned about estimating well the CI of firms with high CI than that of firms with low or negative CI. The reason is that the profitability of the strategy is not dependent on the stocks they short, but rather on the stocks that go long. Indeed, if we observe the returns of the various portfolios in Panel B1 of Table 3, we will see that it is more important to choose the "right" stocks to buy, than it is to pick the "right" stocks to sell short. If the winners are picked among stocks with negative or low CI, the momentum strategy will be unprofitable. On the other hand, if the winners are picked among firms with high CI, then the momentum strategy will be profitable, even if the losers are picked among stocks with high CI. This observation is also consistent with the results in Grinblatt and Moskowitz (2004) about the consistency of winners and losers in the price momentum strategies.

The discussion of this section is not an exhaustive or detailed analysis of the relevance of existing behavioral theories in the case of CI. Despite the evidence presented here, one may well be able to relate CI to a behavioral theory, as shown in Brav and Heaton (2002). Therefore, one should not interpret the discussion in Section 4 as a general rejection of behavioral explanations in the case of CI.

5. Gross Profit Margin and Corporate Innovation

Given that CI is computed after estimating coefficients from rolling regressions, it is natural to ask, what the contribution of these estimated coefficients is to the performance of the CI strategy.

To that end, we construct portfolios, along the lines of those presented in Table 2, where the sorting variable is now simply a firm's change in GPM. For ease of comparison with the results in Table 2, we compute the change over the past two quarters, and we set the holding period to be equal to 6 months.

The performance of this strategy is presented in Table 12. Note that the return of the zero-investment portfolio in this case is equal to 0.88% per month, which is slightly higher than the 0.76% per month that we obtained for the corresponding CI strategy.

Table 13 presents results from double sorts on the basis of changes in GPM and CI, SUE, ABR, or price momentum. The main result that emerges from this table is that GPM and CI contain largely the same information, although not identical. In particular, in double sorts on the basis of changes in GPM and CI, we observe that the GPM strategy remains economically viable when the stocks are first sorted on the basis of CI, mainly when the average CI of the stocks in the portfolio is low. The same applies when we reverse the order of the sorting. Once again, the CI strategy appears economically viable when the stocks involved have experienced low changes in GPM.[8] However, when stocks are

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[8] By "economically viable" strategy we mean here a strategy whose returns are not only statistically significant, but also large enough to make sense to run it in practice. We arbitrarily consider that a return of 50 basis points per month constitutes the threshold, given that the returns presented here exclude transaction costs.

sorted on the basis of changes in GPM and either SUE, ABR, or past returns, the results obtained are in line with those presented earlier for the case of CI.

Given the evidence in Tables 12 and 13, it follows that for much of our analysis, we can substitute CI with changes in GPM and still obtain largely the same results. Why are we then focusing on CI? The reason is that we consider CI an economically more precise variable for the following reason. CI represents the contribution to the firm's bottom line of non-capital, and non-labor production factors, such as quality of management, research and development, marketing, and intangibles in general. We believe that it is useful to narrow down the factors that contribute importantly to a firm's change in GPM.

6. Corporate Innovation and Long-Run Reversals.

Whereas winners outperform losers in horizons of six to twelve months, they tend to underperform losers in horizons of three to five years. This last observation, attributed to DeBondt and Thaler (1985) is the base for the contrarian strategies. As the term implies, contrarian strategies aim to buy securities that performed poorly in the past and short securities that did well. The holding period for such strategies is typically 3 to 5 years.

The Fama-French factors can explain the performance of contrarian strategies rather well, but it is still interesting to know whether the CI variable, which is so highly related to price momentum, is also somehow connected to long-horizon return reversals. This question is interesting because both medium-term returns continuation and long-horizon reversals are properties of the same underlying returns distribution. One would therefore expect that a credible explanation for one phenomenon cannot be unrelated to the other.

We rank stocks on the basis of their past 5-year returns and form 10 portfolios.[9] We go long on the past winners and short on the past losers, as we would do in a momentum strategy. We then hold this zero-investment portfolio for 5 years. If a reversal is present in the return continuation of stocks over long horizons, the return of the zero-investment portfolio should be negative.

Table 14 shows that this is indeed the case. It confirms previous findings that a contrarian strategy may be profitable in long horizons, although the return difference in our results is only 44 basis points per month.

Table 14 also reports the evolution over time of the average *CI* for the ten portfolios, measured using growth rates in GPM, capital and labor over the past 4 quarters. We chose to compute *CI's* over the past four quarters since the results of Section 3 show that *CI's* are more stable over time at this horizon. Consistent with the results of Table 2, we observe monotonicity with respect to current average *CI* across the portfolios. The losers have the lowest level of current *CI* and the winners the highest. However, as we track the evolution of *CI* over time for these 10 portfolios, the above monotonicity gets distorted. By the end of the holding period (year 5), the losers have a higher average level of *CI* than the winners.

Notice that losers are firms that use scarce resources inefficiently. They cannot afford to be losers in the long-run or they will be punished with extinction (bankruptcy). Therefore, they will need to innovate in order to continue to exist. Similarly, while there is some degree of persistence in corporate innovation, top levels of *CI* may not be sustainable over very long periods of time as Table 10 reveals. Successful ideas are often imitated by competitors, leading innovators to lose part of their competitive edge.

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[9] We choose for our experiment the 5-year horizon because contrarian strategies over this period are considered the most popular and profitable. In tests not presented here, we verify that our results remain unchanged when the formation and holding period horizons vary between 3 and 5 years.

Table 15 provides further evidence of the relation between performance of the contrarian strategy and CI. It reports results from regressions of the return on the contrarian zero-investment strategy of Table 14 on various factors. The FF factors are sufficient to explain the returns of the strategy. However, HLCI still loads significantly on the contrarian spread (long minus short position).These results imply medium-term return continuation and long-horizon reversals are related phenomena through their link to our concept of corporate innovation.

7. Conclusions

This paper proposes the concept of corporate innovation as an explanation for the performance of price momentum strategies.

We define corporate innovation (CI) as the change in a firm’s gross profit margin not explained by the change in the capital and labor it has in place. Our measure of corporate innovation corresponds to a “shrunk” firm-level total factor productivity, or Solow residual.

Portfolios sorted on the basis of corporate innovation have very similar properties to those sorted on the basis of past returns. In particular, “winners”, the portfolio with the highest past returns in the price momentum strategy, are also firms with the highest levels of corporate innovation among momentum deciles. Similarly, “losers”, the portfolio with the lowest past returns, are firms with the lowest (negative) levels of corporate innovation. Further experiments confirm the existence of a strong relation between corporate innovation and return continuation.

Comparisons of the informational content of CI and earnings momentum variables show clearly that the two sets of variables are very different in terms of the information they contain about equity returns. This establishes CI as a new and interesting firm-level variable, with important information about equity returns, and the ability to explain much of the performance of price momentum.

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TABLE 1: Description of data

We report the number of firms available for the period during which we construct portfolios based on firms' corporate innovation (CI). A firm's CI is measured over four different horizons, depending on the period over which growth rates for gross profit margin (GPM), labor and capital are measured. As a result, four different datasets are created. One-quarter CI reports the firms available every year when CI is computed using the growth rates in GPM, labor and capital over the previous one quarter. Similarly, four-quarter CI reports the firms available every year when CI is computed using the growth rates in GPM, labor and capital over the previous four quarters. We also report for each year the mean CI, the standard deviation of CI, and the average adjusted R-square of the CI regression. To compute the CI of a firm at time t, the firm must have a minimum of 28 consecutive quarterly observations, including the current quarter, for GPM, capital and labor growth data.

year	One-Quarter CI				Two-Quarter CI				Three-Quarter CI				Four-Quarter CI			
	Number of Firms	Adjusted R-square	mean	std	Number of Firms	Adjusted R-square	mean	std	Number of Firms	Adjusted R-square	mean	std	Number of Firms	Adjusted R-square	mean	std
1976	110	0.0772	-0.0130	0.0192	105	0.0934	0.0447	0.0247	101	0.0701	0.0583	0.0284	40	0.1164	0.0719	0.0426
1977	161	0.0718	0.0695	0.0442	152	0.0833	0.0561	0.0184	150	0.0579	0.0855	0.0215	116	0.0929	0.1216	0.0277
1978	207	0.0749	0.0676	0.0144	197	0.0882	0.0952	0.0386	193	0.0617	0.1640	0.0385	176	0.0965	0.1593	0.0352
1979	250	0.0678	0.0454	0.0131	241	0.0785	0.0952	0.0137	237	0.0571	0.1540	0.0162	217	0.1016	0.1957	0.0178
1980	286	0.0626	0.0532	0.0204	279	0.0698	0.0984	0.0250	275	0.0567	0.1375	0.0169	253	0.1066	0.1511	0.0190
1981	334	0.0629	0.0545	0.0159	314	0.0680	0.0486	0.0176	305	0.0571	0.0671	0.0252	285	0.1040	0.1129	0.0277
1982	643	0.0597	-0.0293	0.0129	558	0.0686	-0.0082	0.0138	507	0.0646	-0.0191	0.0163	332	0.1137	0.0457	0.0193
1983	1029	0.0614	-0.0064	0.0123	992	0.0748	0.0305	0.0158	940	0.0759	0.0699	0.0148	641	0.1471	0.0429	0.0171
1984	1120	0.0682	0.0488	0.0113	1107	0.0802	0.0501	0.0110	1091	0.0769	0.1344	0.0128	960	0.1521	0.1480	0.0160
1985	1077	0.0709	0.0140	0.0090	1063	0.0865	0.0157	0.0111	1052	0.0769	0.0568	0.0139	1007	0.1297	0.0721	0.0100
1986	1030	0.0716	0.0277	0.0097	1018	0.0884	0.0399	0.0119	1006	0.0769	0.0742	0.0127	981	0.1257	0.0672	0.0115
1987	947	0.0711	0.0270	0.0104	931	0.0846	0.0585	0.0135	925	0.0742	0.0791	0.0128	914	0.1242	0.0693	0.0107
1988	1271	0.0663	-0.0095	0.0105	1171	0.0795	0.0551	0.0128	1092	0.0698	0.0563	0.0120	858	0.1174	0.0918	0.0118
1989	1336	0.0620	0.0127	0.0094	1301	0.0724	0.0263	0.0107	1279	0.0669	0.0458	0.0113	1217	0.1152	0.0604	0.0114
1990	1375	0.0609	0.0220	0.0096	1346	0.0701	0.0202	0.0111	1319	0.0645	0.0348	0.0116	1257	0.1127	0.0378	0.0109
1991	1426	0.0595	0.0119	0.0116	1392	0.0692	0.0151	0.0120	1361	0.0662	0.0340	0.0110	1320	0.1157	0.0267	0.0099
1992	1487	0.0573	0.0088	0.0087	1448	0.0654	0.0301	0.0106	1422	0.0657	0.0718	0.0116	1360	0.1199	0.0463	0.0106
1993	1629	0.0517	0.0088	0.0083	1577	0.0610	0.0408	0.0100	1519	0.0628	0.0737	0.0104	1438	0.1221	0.0711	0.0097
1994	1771	0.0491	0.0358	0.0078	1721	0.0588	0.0567	0.0089	1681	0.0604	0.0762	0.0089	1602	0.1255	0.0675	0.0087
1995	1879	0.0480	0.0425	0.0073	1814	0.0570	0.0818	0.0087	1787	0.0591	0.1230	0.0089	1714	0.1247	0.1009	0.0081
1996	1915	0.0471	0.0232	0.0074	1880	0.0562	0.0434	0.0080	1840	0.0599	0.0720	0.0084	1776	0.1224	0.0621	0.0081
1997	1922	0.0452	0.0354	0.0077	1888	0.0547	0.0460	0.0083	1852	0.0583	0.0831	0.0086	1804	0.1197	0.0741	0.0079
1998	1899	0.0431	0.0177	0.0078	1854	0.0539	0.0501	0.0090	1825	0.0589	0.0856	0.0092	1763	0.1188	0.0670	0.0083
1999	1880	0.0434	0.0026	0.0078	1835	0.0566	0.0014	0.0089	1807	0.0616	0.0381	0.0091	1748	0.1230	0.0125	0.0094
2000	1819	0.0448	0.0129	0.0078	1774	0.0577	0.0341	0.0092	1747	0.0629	0.0787	0.0096	1695	0.1262	0.0737	0.0092
2001	1817	0.0446	0.0077	0.0074	1773	0.0578	0.0027	0.0090	1737	0.0637	0.0442	0.0102	1679	0.1310	0.0378	0.0095
2002	1784	0.0447	0.0074	0.0091	1742	0.0587	-0.0303	0.0103	1711	0.0695	-0.0131	0.0122	1664	0.1421	-0.0675	0.0106

TABLE 2 : Returns on Alternative Strategies.

This table has four panels. Panel A reports results for a simple corporate innovation (CI) strategy, where the CI of a firm is measured using growth rates in the input and output variables over the past two quarters. The holding period for the portfolios is six months. Panel B reports results on the popular 6-month/ 6-month price momentum strategy. Panels C and D reports respectively results for the standardized unexpected earning (SUE) strategy, and the cumulative abnormal equity returns (ABR) strategy. SUE and ABR are measures of earnings surprises and are computed following the methodology outlined in Chan, Jegadeesh and Lakonishok (1996). The holding period for these last two strategies is six months also. For all strategies, Portfolio P1 contains the stocks that score the lowest on the ranking variable, whereas Portfolio P10 contains the stocks that score the highest on the ranking variable. The period for which returns are computed is from January 1977 to December 2003. Portfolio characteristics such as CI, size, and BM are averages of the characteristics of the portfolios each time they are rebalanced (i.e., at formation dates). Size denotes the average market capitalization of the portfolio, and it is measured in millions of dollars. Beta is the market beta of the portfolio returns, computed over the whole time period. T-values for the mean returns appear in parentheses. The column labeled Volatility denotes the firm-specific average volatility of each portfolio. Firm-specific volatilities are computed following the methodology outlined in Campbell, Lettau, Malkiel, and Xu (2001). They are reported annualized and in percentage terms. GPM growth is the average 2-quarter growth of the GPM of each stock in the portfolio. Constant, Capital and Labor denote the average coefficient estimates from the regressions ran to compute the CI's of the firms in each portfolio.

Panel A: Current Two-Quarter Corporate Innovation/6-Month Returns

	Returns	CI	2-qtr GPM Growth	constant	Capital	Labor	Volatility	SUE	ln(Size)	BM	Beta
P 1	0.0100	-0.6142	-0.5861	0.0071	0.8201	0.1829	14.1717	-1.0161	6.8781	1.1644	0.9257
	(3.43)										
P 2	0.0127	-0.1842	-0.1732	0.0453	0.0955	0.1941	11.9040	-0.4776	7.3192	1.0261	0.8787
	(4.88)										
P 3	0.0124	-0.0789	-0.0742	0.0528	-0.0183	0.1932	10.9232	-0.3094	7.4868	0.9774	0.9030
	(4.78)										
P 4	0.0125	-0.0185	-0.0151	0.0547	0.0023	0.1645	10.0196	-0.1706	7.6208	0.9358	0.8735
	(5.01)										
P 5	0.0146	0.0256	0.0252	0.0584	-0.0267	0.1836	9.3466	0.0656	7.7709	0.9147	0.8950
	(5.78)										
P 6	0.0152	0.0644	0.0638	0.0626	-0.0623	0.1544	9.2885	0.1598	7.7780	0.8663	0.9102
	(5.94)										
P 7	0.0158	0.1070	0.0998	0.0691	-0.1552	0.1625	9.6310	-0.5250	7.8412	0.8338	0.9151
	(6.20)										
P 8	0.0168	0.1654	0.1516	0.0748	-0.2043	0.1724	10.2686	0.3118	7.7180	0.8786	0.9659
	(6.19)										
P 9	0.0174	0.2626	0.2428	0.0837	-0.3625	0.1561	11.0494	0.3427	7.4980	0.8974	1.0177
	(6.06)										
P 10	0.0176	0.6475	0.5996	0.1059	-0.8760	0.0412	12.0362	0.4147	7.1302	1.0038	0.9522
	(6.26)										
P 10 - 1	0.0076										0.0588
	(6.14)										

Panel B: Past 6-Month Returns/6-Month Returns

	Returns	CI	2-qtr GPM Growth	constant	Capital	Labor	Volatility	SUE	ln(Size)	BM	Beta
P 1	0.0131	-0.0659	-0.0844	0.0613	-0.0705	0.1258	0.0027	-0.9817	6.5494	1.3796	1.1414
	(3.23)										
P 2	0.0127	-0.0010	-0.0082	0.0612	-0.0961	0.1415	0.0011	-0.7625	7.1797	1.1067	0.9575
	(4.33)										
P 3	0.0135	0.0174	0.0132	0.0581	-0.0631	0.1533	0.0008	-0.8147	7.4337	1.0353	0.8747
	(5.22)										
P 4	0.0131	0.0241	0.0192	0.0580	-0.0778	0.1682	0.0007	-0.1609	7.6131	0.9579	0.8361
	(5.41)										
P 5	0.0142	0.0379	0.0363	0.0581	-0.0728	0.1582	0.0006	-0.0173	7.6564	0.9329	0.8191
	(6.04)										
P 6	0.0148	0.0502	0.0470	0.0588	-0.0778	0.1579	0.0006	0.0777	7.7152	0.9044	0.8290
	(6.29)										
P 7	0.0141	0.0553	0.0522	0.0585	-0.0353	0.1707	0.0006	0.1458	7.7892	0.8916	0.8464
	(5.95)										
P 8	0.0151	0.0641	0.0614	0.0612	-0.0404	0.1728	0.0006	0.3158	7.8295	0.8264	0.8726
	(6.17)										
P 9	0.0158	0.0799	0.0777	0.0665	-0.1205	0.1812	0.0008	0.4202	7.7780	0.7861	0.9305
	(6.02)										
P 10	0.0188	0.1241	0.1278	0.0731	-0.1446	0.1687	0.0015	0.5705	7.3160	0.6849	1.1296
	(5.53)										
P 10 - 1	0.0057										-0.0089
	(1.89)										

Panel C: Standardized Unexpected Earning/6-Month Returns

	Returns	CI	2-qtr GPM Growth	constant	Capital	Labor	Volatility	SUE	ln(Size)	BM	Beta
P 1	0.0101	-0.0959	-0.1071	0.0617	-0.1019	0.1209	11.7158	-5.0173	7.5816	1.0244	0.9212
	(3.71)										
P 2	0.0114	-0.0333	-0.0471	0.0607	-0.0718	0.1740	11.4374	-1.3461	7.6422	1.0224	0.9202
	(4.29)										
P 3	0.0118	-0.0017	-0.0139	0.0579	-0.0512	0.1686	11.6265	-0.6955	7.4863	0.9982	0.9455
	(4.31)										
P 4	0.0125	0.0094	0.0013	0.0560	-0.0888	0.1879	11.5143	-0.2853	7.4340	1.0331	0.9208
	(4.66)										
P 5	0.0133	0.0372	0.0278	0.0595	-0.0759	0.1326	11.0959	-0.0133	7.3752	0.9900	0.9186
	(5.07)										
P 6	0.0146	0.0550	0.0487	0.0602	-0.0696	0.1465	10.6875	0.2060	7.6218	0.9262	0.9263
	(5.55)										
P 7	0.0162	0.0752	0.0757	0.0607	-0.0549	0.1428	10.2146	0.4513	7.7890	0.8937	0.9027
	(6.27)										
P 8	0.0170	0.0848	0.0900	0.0607	-0.0785	0.1664	10.4211	0.7972	7.5175	0.8683	0.9118
	(6.64)										
P 9	0.0184	0.1166	0.1186	0.0653	-0.0994	0.1879	10.6699	1.3836	7.3759	0.9140	0.9320
	(6.93)										
P 10	0.0196	0.1374	0.1469	0.0686	-0.1011	0.1676	10.0956	3.2446	7.5432	0.8317	0.9372
	(6.93)										
P 10 - 1	0.0095										0.0160
	(8.30)										

Panel D: Cumulative Abnormal Stock Returns/6-Month Returns

	Returns	CI	2-qtr GPM Growth	constant	Capital	Labor	Volatility	SUE	ln(Size)	BM	Beta
P 1	0.0118	-0.0265	-0.0388	0.0648	-0.1449	0.2018	15.7053	-0.7066	7.1647	1.0534	1.1304
	(3.45)										
P 2	0.0130	0.0110	0.0044	0.0595	-0.0286	0.1451	10.4187	-0.4140	7.4970	0.9643	0.9546
	(4.77)										
P 3	0.0129	0.0206	0.0141	0.0612	-0.0771	0.1451	8.8817	-0.2368	7.5968	0.9393	0.8833
	(5.09)										
P 4	0.0133	0.0286	0.0256	0.0579	-0.0529	0.1543	8.3903	-0.0681	7.6138	0.9401	0.8355
	(5.62)										
P 5	0.0141	0.0367	0.0310	0.0596	-0.1192	0.2033	8.4611	-0.8049	7.6682	0.9212	0.8253
	(6.02)										
P 6	0.0140	0.0413	0.0411	0.0589	-0.0596	0.1340	8.5711	0.0367	7.6296	0.9259	0.8234
	(5.88)										
P 7	0.0144	0.0546	0.0508	0.0603	-0.0854	0.1340	8.8782	0.1483	7.7861	0.9044	0.8583
	(5.92)										
P 8	0.0149	0.0528	0.0489	0.0635	-0.0593	0.1508	9.1672	0.1792	7.7828	0.8611	0.9265
	(5.72)										
P 9	0.0163	0.0741	0.0721	0.0637	-0.0721	0.1508	10.5973	0.2919	7.6387	0.9014	0.9795
	(5.83)										
P 10	0.0202	0.1033	0.1050	0.0697	-0.1092	0.0928	17.0240	0.4345	7.0796	0.9328	1.1075
	(6.20)										
P 10 - 1	0.0084										-0.0229
	(7.18)										

TABLE 3 : Average monthly returns of portfolios formed on double sorting

This table contains three sets of panels. Panel A reports results from double sorts of stocks on CI and past six month returns. Panel B contains results from double sorts on CI and SUE, whereas Panel C reports results from double sorts on CI and ABR. Returns are from January 1977 to December 2003.

Panel A1: Returns of Portfolios Sorted First on Current two-quarter Corporate Innovation and then on Standardized Unexpected Earning (SUE).

		Standardized Unexpected Earning					
		P1	**P2**	**P3**	**P4**	**P5**	**P5 - P1**
Current Two-Quarter Corporate Innovation	**P1 (low)**	0.0066	0.0090	0.0103	0.0131	0.0148	0.0081
		(2.08)	(3.04)	(3.46)	(4.83)	(5.45)	(5.13)
	P 2	0.0099	0.0108	0.0108	0.0131	0.0160	0.0061
		(3.57)	(4.01)	(4.14)	(5.19)	(6.01)	(5.20)
	P 3	0.0133	0.0131	0.0137	0.0144	0.0177	0.0044
		(5.02)	(4.75)	(5.45)	(5.58)	(6.72)	(4.21)
	P 4	0.0124	0.0139	0.0154	0.0183	0.0194	0.0070
		(4.55)	(5.01)	(5.73)	(6.77)	(7.01)	(6.02)
	P 5 (high)	0.0113	0.0134	0.0175	0.0197	0.0213	0.0100
		(3.98)	(4.40)	(5.90)	(6.74)	(7.08)	(6.96)
	P 5 - P1	0.0047	0.0044	0.0073	0.0066	0.0065	
		(2.96)	(3.22)	(4.48)	(4.48)	(4.38)	

Panel A2: Returns of Portfolios Sorted First on Standardized Unexpected Earning (SUE) and then on Current two-quarter Corporate Innovation.

		Current Two-Quarter Corporate Innovation					
		P1	**P2**	**P3**	**P4**	**P5**	**P5 - P1**
Standardized Unexpected Earning	**P1 (low)**	0.0065	0.0080	0.0111	0.0130	0.0120	0.0055
		(2.04)	(2.82)	(4.03)	(4.91)	(4.35)	(3.21)
	P 2	0.0097	0.0112	0.0124	0.0120	0.0131	0.0034
		(3.24)	(4.16)	(4.45)	(4.33)	(4.37)	(2.43)
	P 3	0.0112	0.0112	0.0135	0.0134	0.0162	0.0050
		(4.09)	(4.39)	(5.35)	(4.93)	(5.31)	(3.61)
	P 4	0.0145	0.0141	0.0145	0.0182	0.0185	0.0040
		(5.64)	(5.42)	(5.72)	(6.62)	(6.32)	(3.00)
	P 5 (high)	0.0170	0.0165	0.0184	0.0204	0.0207	0.0037
		(6.29)	(6.52)	(6.81)	(7.18)	(7.07)	(2.83)
	P 5 - P1	0.0105	0.0085	0.0074	0.0074	0.0087	
		(6.43)	(6.22)	(5.74)	(5.81)	(6.35)	

Panel B1: Returns of Portfolios Sorted First on Current two-quarter Corporate Innovation and then on Cumulative Abnormal Stock Return (ABR).

Current Two-Quarter Corporate Innovation

Cumulative Abnormal Stock Return	P1	P2	P3	P4	P5	P5 - P1
P1 (low)	0.0105	0.0101	0.0110	0.0115	0.0126	0.0021
	(2.81)	(3.70)	(4.31)	(4.69)	(3.99)	(1.29)
P 2	0.0102	0.0114	0.0112	0.0130	0.0155	0.0053
	(3.38)	(4.47)	(4.65)	(5.13)	(5.20)	(4.18)
P 3	0.0131	0.0131	0.0138	0.0136	0.0169	0.0038
	(4.36)	(5.30)	(5.58)	(5.48)	(5.81)	(3.18)
P 4	0.0141	0.0144	0.0156	0.0171	0.0186	0.0045
	(4.61)	(5.76)	(6.19)	(6.44)	(5.90)	(3.58)
P 5 (high)	0.0132	0.0140	0.0153	0.0173	0.0208	0.0077
	(3.97)	(5.26)	(5.84)	(5.86)	(6.26)	(5.00)
P 5 - P1	0.0027	0.0039	0.0044	0.0057	0.0083	
	(1.48)	(3.02)	(3.51)	(4.17)	(5.28)	

Panel B2: Returns of Portfolios Sorted First on Cumulative Abnormal Stock Return (ABR) and then on Current two-quarter Corporate Innovation.

Cumulative Abnormal Stock Return

Current Two-Quarter Corporate Innovation	P1	P2	P3	P4	P5	P5 - P1
P1 (low)	0.0101	0.0109	0.0116	0.0137	0.0132	0.0031
	(2.85)	(3.44)	(3.94)	(4.41)	(3.97)	(1.80)
P 2	0.0096	0.0115	0.0128	0.0145	0.0135	0.0039
	(3.75)	(4.57)	(5.14)	(5.71)	(5.11)	(3.46)
P 3	0.0114	0.0112	0.0132	0.0155	0.0156	0.0042
	(4.56)	(4.72)	(5.51)	(6.41)	(6.01)	(3.47)
P 4	0.0122	0.0132	0.0137	0.0160	0.0150	0.0028
	(4.63)	(5.22)	(5.32)	(6.16)	(5.45)	(2.30)
P 5 (high)	0.0136	0.0162	0.0175	0.0204	0.0205	0.0069
	(4.16)	(5.41)	(5.82)	(6.26)	(6.21)	(4.51)
P 5 - P1	0.0035	0.0053	0.0058	0.0068	0.0073	
	(2.35)	(3.75)	(4.31)	(5.00)	(4.82)	

Panel C1: Returns of Portfolios Sorted First on Current two-quarter Corporate Innovation and then on Past 6-month Returns.

Current Two-Quarter Corporate Innovation

6 Month Past Returns	P1	P2	P3	P4	P5	P5 - P1
P1 (low)	0.0110	0.0088	0.0107	0.0112	0.0121	0.0011
	(2.43)	(3.14)	(4.37)	(4.78)	(4.22)	(0.33)
P 2	0.0126	0.0117	0.0122	0.0115	0.0124	-0.0002
	(3.65)	(4.56)	(5.14)	(4.89)	(4.40)	(-0.08)
P 3	0.0142	0.0138	0.0148	0.0141	0.0151	0.0009
	(4.39)	(5.52)	(6.11)	(5.72)	(5.38)	(0.41)
P 4	0.0137	0.0151	0.0154	0.0164	0.0187	0.0050
	(4.17)	(5.88)	(6.26)	(6.51)	(5.95)	(2.19)
P 5 (high)	0.0145	0.0157	0.0152	0.0172	0.0213	0.0068
	(4.15)	(5.85)	(5.95)	(6.31)	(5.76)	(2.55)
P 5 – P1	0.0035	0.0069	0.0044	0.0060	0.0092	
	(1.63)	(5.67)	(4.24)	(5.37)	(5.61)	

Panel C2: Returns of Portfolios Sorted First on Past 6-month Returns and then on Current two-quarter Corporate Innovation.

6 Month Past Returns

Current Two-Quarter Corporate Innovation	P1	P2	P3	P4	P5	P5 - P1
P1 (low)	0.0093	0.0124	0.0134	0.0128	0.0149	0.0055
	(2.25)	(3.56)	(3.91)	(3.73)	(4.18)	(2.91)
P 2	0.0093	0.0113	0.0136	0.0143	0.0151	0.0058
	(3.63)	(4.58)	(5.36)	(5.44)	(5.58)	(6.17)
P 3	0.0115	0.0125	0.0143	0.0154	0.0155	0.0041
	(4.91)	(5.27)	(5.91)	(6.23)	(6.19)	(4.75)
P 4	0.0110	0.0125	0.0141	0.0161	0.0159	0.0049
	(4.69)	(5.15)	(5.71)	(6.45)	(6.11)	(5.40)
P 5 (high)	0.0125	0.0138	0.0179	0.0191	0.0208	0.0083
	(4.08)	(4.75)	(6.12)	(5.87)	(6.03)	(6.14)
P 5 - P1	0.0031	0.0014	0.0045	0.0063	0.0059	
	(1.02)	(0.55)	(1.84)	(2.56)	(2.35)	

TABLE 4 : Portfolios formed on the basis of CI measured over the past 1 quarter

Corporate innovation (CI) is measured using growth rates for the input and output variables over the past 1 quarter. Returns span the period from January 1976 to December 2002. Portfolio P1 denotes the portfolio that contains the stocks with the lowest current CI, while portfolio P10 contains the stocks with the highest current CI. The row labeled "beta" refers to the market beta of the portfolio computed using the whole time-series of the portfolio. Portfolio characteristics such as CI, GPM growth, average regression coefficients of the CI regression, volatility, SUE, size, and BM are computed at the portfolio formation date. T-values for the mean returns appear in parentheses. Size denotes the average market capitalization of the portfolio, and it is measured in millions of dollars. The turnover of each portfolio refers to the proportion of firms that exits the portfolio from one quarter to another.

	P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P 10	P 10 - 1
3 Month Holding Period											
Returns	0.00985	0.01281	0.01395	0.01410	0.01430	0.01579	0.01601	0.01589	0.01785	0.01677	0.00692
	(3.37)	(4.77)	(5.18)	(5.31)	(5.51)	(6.04)	(6.04)	(5.78)	(6.52)	(6.05)	(5.20)
Beta	0.92	0.92	0.93	0.92	0.92	0.93	0.94	0.96	0.96	0.92	0.00
6 Month Holding Period											
Returns	0.00966	0.01353	0.01374	0.01355	0.01411	0.01555	0.01618	0.01599	0.01689	0.01631	0.00666
	(3.37)	(5.12)	(5.24)	(5.25)	(5.57)	(6.07)	(6.20)	(5.86)	(6.20)	(5.95)	(6.69)
Beta	0.92	0.91	0.91	0.91	0.90	0.91	0.94	0.97	0.96	0.91	-0.01
9 Month Holding Period											
Returns	0.01027	0.01355	0.01376	0.01360	0.01402	0.01544	0.01566	0.01565	0.01608	0.01616	0.00590
	(3.68)	(5.16)	(5.35)	(5.33)	(5.63)	(6.12)	(6.00)	(5.80)	(5.90)	(5.95)	(7.21)
Beta	0.91	0.91	0.90	0.91	0.89	0.90	0.94	0.96	0.97	0.91	0.01
12 Month Holding Period											
Returns	0.01131	0.01389	0.01412	0.01369	0.01396	0.01531	0.01509	0.01503	0.01545	0.01558	0.00427
	(4.13)	(5.35)	(5.54)	(5.41)	(5.66)	(6.12)	(5.83)	(5.59)	(5.70)	(5.82)	(6.32)
Beta	0.90	0.90	0.89	0.90	0.88	0.90	0.93	0.96	0.96	0.91	0.01
Portfolio Characteristics											
1-qtr CI	-0.5378	-0.1682	-0.0762	-0.0263	0.0077	0.0385	0.0728	0.1193	0.2021	0.5389	
1-qtr GPM Growth	-0.5264	-0.1661	-0.0722	-0.0258	0.0058	0.0390	0.0710	0.1154	0.1935	0.5207	
Constant	0.0080	0.0260	0.0276	0.0294	0.0311	0.0318	0.0348	0.0368	0.0385	0.0470	
Capital	0.4099	-0.0388	-0.0265	0.0098	-0.0395	0.0176	-0.0671	-0.1377	-0.2160	-0.5802	
Labor	-0.0039	0.0938	0.1025	0.0780	0.1095	0.1085	0.1040	0.1066	0.1309	0.0049	
Volatility	13.9630	11.8985	11.1114	10.2880	9.5201	9.3346	10.0166	10.5581	11.2176	12.5677	
SUE	-1.6628	-0.4264	-0.2494	-0.1027	0.0640	0.1821	0.2120	0.2569	0.2592	0.3005	
ln(Size)	6.9737	7.2684	7.4902	7.7223	7.7908	7.7650	7.7824	7.6438	7.4831	7.0187	
BM	1.1469	1.0048	0.9533	0.9016	0.8972	0.8506	0.8616	0.8721	0.9209	1.0374	
Turnover	0.8747	0.9260	0.9135	0.8941	0.8569	0.8680	0.8877	0.9111	0.9146	0.8888	

TABLE 5 : Portfolios formed on the basis of CI measured over the past 2 quarters

Corporate innovation (CI) is measured using growth rates for the input and output variables over the past 2 quarters. Returns span the period from January 1976 to December 2002. Portfolio P1 denotes the portfolio that contains the stocks with the lowest current CI, while portfolio P10 contains the stocks with the highest current CI. The row labeled “beta” refers to the market beta of the portfolio computed using the whole time-series of the portfolio. Portfolio characteristics such as CI, GPM growth, average regression coefficients of the CI regression, volatility, SUE, size, and BM are computed at the portfolio formation date. T-values for the mean returns appear in parentheses. Size denotes the average market capitalization of the portfolio, and it is measured in millions of dollars. The turnover of each portfolio refers to the proportion of firms that exits the portfolio from one quarter to another.

	P 1	**P 2**	**P 3**	**P 4**	**P 5**	**P 6**	**P 7**	**P 8**	**P 9**	**P 10**	**P 10 - 1**
3 Month Holding Period											
Returns	0.00946	0.01239	0.01249	0.01187	0.01453	0.01555	0.01565	0.01723	0.01867	0.01827	0.00881
	(3.17)	(4.62)	(4.70)	(4.59)	(5.65)	(5.95)	(6.08)	(6.33)	(6.46)	(6.45)	(5.90)
Beta	0.94	0.89	0.91	0.89	0.91	0.92	0.92	0.96	1.02	0.95	0.01
6 Month Holding Period											
Returns	0.00999	0.01270	0.01237	0.01252	0.01464	0.01522	0.01579	0.01677	0.01739	0.01757	0.00758
	(3.43)	(4.88)	(4.78)	(5.01)	(5.78)	(5.94)	(6.20)	(6.19)	(6.06)	(6.26)	(6.14)
Beta	0.93	0.88	0.90	0.87	0.90	0.91	0.92	0.97	1.02	0.95	0.03
9 Month Holding Period											
Returns	0.01082	0.01288	0.01290	0.01315	0.01499	0.01493	0.01551	0.01621	0.01641	0.01625	0.00543
	(3.80)	(5.00)	(5.04)	(5.35)	(6.01)	(5.90)	(6.13)	(6.01)	(5.79)	(5.82)	(5.14)
Beta	0.92	0.88	0.89	0.86	0.88	0.90	0.91	0.97	1.01	0.96	0.04
12 Month Holding Period											
Returns	0.01189	0.01324	0.01321	0.01361	0.01479	0.01474	0.01499	0.01569	0.01532	0.01541	0.00352
	(4.24)	(5.16)	(5.23)	(5.59)	(5.99)	(5.91)	(5.95)	(5.85)	(5.47)	(5.56)	(3.69)
Beta	0.91	0.88	0.88	0.86	0.88	0.89	0.91	0.96	1.00	0.95	0.04
Portfolio Characteristics											
2-qtr CI	-0.6142	-0.1842	-0.0789	-0.0185	0.0256	0.0644	0.1070	0.1654	0.2626	0.6475	
2-qtr GPM Growth	-0.5861	-0.1732	-0.0742	-0.0151	0.0252	0.0638	0.0998	0.1516	0.2428	0.5996	
Constant	0.0071	0.0453	0.0528	0.0547	0.0584	0.0626	0.0691	0.0748	0.0837	0.1059	
Capital	0.8201	0.0955	-0.0183	0.0023	-0.0267	-0.0623	-0.1552	-0.2043	-0.3625	-0.8760	
Labor	0.1829	0.1941	0.1932	0.1645	0.1836	0.1544	0.1625	0.1724	0.1561	0.0412	
Volatility	14.1717	11.9040	10.9232	10.0196	9.3466	9.2885	9.6310	10.2686	11.0494	12.0362	
SUE	-1.0161	-0.4776	-0.3094	-0.1706	0.0656	0.1598	-0.5250	0.3118	0.3427	0.4147	
ln(Size)	6.8781	7.3192	7.4868	7.6208	7.7709	7.7780	7.8412	7.7180	7.4980	7.1302	
BM	1.1644	1.0261	0.9774	0.9358	0.9147	0.8663	0.8338	0.8786	0.8974	1.0038	
Turnover	0.7180	0.8433	0.8591	0.8572	0.8507	0.8577	0.8577	0.8609	0.8395	0.7270	

TABLE 6: Portfolios formed on the basis of CI measured over the past 3 quarters

Corporate innovation (CI) is measured using growth rates for the input and output variables over the past 3 quarters. Returns span the period from January 1976 to December 2002. Portfolio P1 denotes the portfolio that contains the stocks with the lowest current CI, while portfolio P10 contains the stocks with the highest current CI. The row labeled "beta" refers to the market beta of the portfolio computed using the whole time-series of the portfolio. Portfolio characteristics such as CI, GPM growth, average regression coefficients of the CI regression, volatility, SUE, size, and BM are computed at the portfolio formation date. T-values for the mean returns appear in parentheses. Size denotes the average market capitalization of the portfolio, and it is measured in millions of dollars. The turnover of each portfolio refers to the proportion of firms that exits the portfolio from one quarter to another.

	P 1	**P 2**	**P 3**	**P 4**	**P 5**	**P 6**	**P 7**	**P 8**	**P 9**	**P 10**	**P 10 - 1**
3 Month Holding Period											
Returns	0.00832	0.01069	0.01266	0.01214	0.01460	0.01557	0.01777	0.01741	0.01851	0.01917	0.01085
	(2.75)	(3.90)	(4.89)	(4.84)	(5.74)	(6.08)	(6.72)	(6.43)	(6.38)	(6.62)	(6.55)
Beta	0.95	0.91	0.89	0.86	0.88	0.89	0.92	0.96	1.02	0.99	0.03
6 Month Holding Period											
Returns	0.00950	0.01164	0.01364	0.01312	0.01454	0.01542	0.01717	0.01644	0.01690	0.01737	0.00787
	(3.21)	(4.34)	(5.32)	(5.28)	(5.87)	(6.20)	(6.63)	(6.11)	(5.96)	(5.99)	(5.41)
Beta	0.94	0.90	0.88	0.86	0.86	0.88	0.91	0.97	1.00	0.99	0.06
9 Month Holding Period											
Returns	0.01022	0.01268	0.01398	0.01385	0.01488	0.01496	0.01620	0.01582	0.01583	0.01570	0.00548
	(3.52)	(4.83)	(5.51)	(5.63)	(6.05)	(6.09)	(6.33)	(5.92)	(5.67)	(5.46)	(4.16)
Beta	0.92	0.89	0.88	0.86	0.86	0.87	0.91	0.96	1.00	0.99	0.07
12 Month Holding Period											
Returns	0.01143	0.01299	0.01419	0.01413	0.01485	0.01452	0.01561	0.01507	0.01540	0.01473	0.00330
	(4.00)	(5.03)	(5.64)	(5.79)	(6.07)	(5.95)	(6.18)	(5.69)	(5.54)	(5.20)	(2.75)
Beta	0.91	0.88	0.87	0.86	0.86	0.87	0.90	0.95	0.99	0.98	0.07
Portfolio Characteristics											
3-qtr CI	-0.6086	-0.1866	-0.0773	-0.0116	0.0386	0.0829	0.1317	0.1967	0.3022	0.6790	
3-qtr GPM Growth	-0.5821	-0.1718	-0.0655	-0.0048	0.0418	0.0834	0.1286	0.1840	0.2752	0.6238	
Constant	0.0246	0.0665	0.0712	0.0747	0.0814	0.0859	0.0902	0.1024	0.1148	0.1420	
Capital	0.4583	0.0059	0.0099	-0.0148	-0.0386	-0.0631	-0.0922	-0.2053	-0.3093	-0.6893	
Labor	0.1182	0.2214	0.2549	0.2460	0.2205	0.2120	0.2429	0.2595	0.2075	0.1832	
Volatility	14.5250	11.7916	10.7304	9.8556	9.2485	9.1942	9.4325	10.2415	10.5308	11.5499	
SUE	-1.0943	-0.5791	-0.3958	-0.1625	0.0432	0.1826	-0.4821	0.3241	0.4006	0.5040	
ln(Size)	6.9283	7.3425	7.4897	7.5359	7.7775	7.7933	7.7696	7.6921	7.6408	7.2595	
BM	1.1828	1.0410	1.0003	0.9424	0.9104	0.8971	0.8961	0.8519	0.8928	0.9466	
Turnover	0.7031	0.8482	0.8664	0.8547	0.8563	0.8509	0.8596	0.8624	0.8409	0.8409	

TABLE 7: Portfolios formed on the basis of CI measured over the past 4 quarters

Corporate innovation (CI) is measured using growth rates for the input and output variables over the past 4 quarters. Returns span the period from January 1976 to December 2002. Portfolio P1 denotes the portfolio that contains the stocks with the lowest current CI, while portfolio P10 contains the stocks with the highest current CI. The row labeled "beta" refers to the market beta of the portfolio computed using the whole time-series of the portfolio. Portfolio characteristics such as CI, GPM growth, average regression coefficients of the CI regression, volatility, SUE, size, and BM are computed at the portfolio formation date. T-values for the mean returns appear in parentheses. Size denotes the average market capitalization of the portfolio, and it is measured in millions of dollars. The turnover of each portfolio refers to the proportion of firms that exits the portfolio from one quarter to another.

	P 1	**P 2**	**P 3**	**P 4**	**P 5**	**P 6**	**P 7**	**P 8**	**P 9**	**P 10**	**P 10 - 1**
3 Month Holding Period											
Returns	0.00917	0.01143	0.01249	0.01334	0.01421	0.01458	0.01551	0.01798	0.01860	0.01960	0.01043
	(2.84)	(4.31)	(5.01)	(5.49)	(5.73)	(5.78)	(6.14)	(6.72)	(6.31)	(6.01)	(5.72)
Beta	0.96	0.89	0.84	0.84	0.85	0.87	0.88	0.95	1.03	1.10	0.14
6 Month Holding Period											
Returns	0.01031	0.01282	0.01303	0.01418	0.01409	0.01479	0.01468	0.01702	0.01671	0.01748	0.00717
	(3.25)	(4.96)	(5.33)	(5.85)	(5.80)	(5.99)	(5.84)	(6.42)	(5.77)	(5.42)	(4.03)
Beta	0.96	0.87	0.83	0.84	0.84	0.86	0.89	0.95	1.02	1.09	0.13
9 Month Holding Period											
Returns	0.01078	0.01346	0.01374	0.01446	0.01406	0.01468	0.01451	0.01612	0.01573	0.01612	0.00534
	(3.46)	(5.24)	(5.69)	(6.09)	(5.85)	(6.03)	(5.78)	(6.11)	(5.50)	(5.07)	(3.18)
Beta	0.96	0.87	0.83	0.82	0.84	0.85	0.89	0.95	1.02	1.08	0.12
12 Month Holding Period											
Returns	0.01189	0.01384	0.01423	0.01450	0.01406	0.01456	0.01421	0.01544	0.01500	0.01512	0.00322
	(3.87)	(5.48)	(5.93)	(6.18)	(5.91)	(6.00)	(5.68)	(5.92)	(5.31)	(4.82)	(2.08)
Beta	0.95	0.85	0.83	0.81	0.83	0.85	0.89	0.93	1.01	1.07	0.13
Portfolio Characteristics											
4-qtr CI	-0.5188	-0.1329	-0.0385	0.0181	0.0597	0.0974	0.1384	0.1912	0.2796	0.6263	
4-qtr GPM Growth	-0.4742	-0.0962	-0.0180	0.0323	0.0702	0.1010	0.1335	0.1818	0.2488	0.5354	
Constant	0.0298	0.0667	0.0803	0.0869	0.0943	0.1063	0.1135	0.1204	0.1411	0.1806	
Capital	0.1744	0.1211	0.0712	0.0272	0.0163	-0.0392	-0.0861	-0.1506	-0.2765	-0.5139	
Labor	0.2429	0.2926	0.2857	0.3188	0.2696	0.2679	0.2903	0.2790	0.3098	0.2430	
Volatility	15.1233	11.6513	10.4999	9.3587	8.8589	8.8359	9.2709	9.3774	10.4757	11.7760	
SUE	-1.4283	-0.8114	-0.5062	-1.1445	0.0162	0.2574	0.3624	0.5016	0.6905	0.8258	
ln(Size)	7.0136	7.2996	7.4741	7.6208	7.6836	7.7377	7.7453	7.7642	7.7091	7.3436	
BM	1.2280	1.0654	0.9961	0.9643	0.9103	0.8753	0.8698	0.8435	0.8860	0.9648	
Turnover	0.5733	0.7530	0.7975	0.8048	0.8012	0.8228	0.8000	0.7690	0.7690	0.7270	

TABLE 8 : Correlation coefficients between various zero-investment strategy returns

Panel A: Correlation coefficients between CI and price momentum zero-investment strategies

This panel presents correlation coefficients between various zero-investment corporate innovation (CI) and price momentum strategies. The strategies are labeled based on the formation and holding periods. The letter “Q” stands for quarter, whereas the letter “M” stands for month. For instance, the label 1Q/3M indicates that the portfolio was formed based on the CI over the past one quarter, and held for 3 months. Similarly 3M/9M denotes the momentum zero-investment portfolio formed on the basis of past 3 month returns, and held for 9 months.

		PRICE MOMENTUM ZERO-INVESTMENT PORTFOLIOS															
		3M /3M	3M /6M	3M /9M	3M /12M	6M /3M	6M /6M	6M /9M	6M /12M	9M /3M	9M /6M	9M /9M	9M /12M	12M /3M	12M /6M	12M /9M	12M /12M
CORPORATE INNOVATION ZERO-INVESTMENT PORTFOLIOS	1Q /3M	0.37	0.40	0.40	0.37	0.38	0.40	0.38	0.34	0.39	0.37	0.34	0.31	0.35	0.32	0.29	0.26
	1Q /6M	0.45	0.50	0.51	0.48	0.47	0.50	0.48	0.44	0.49	0.48	0.44	0.40	0.45	0.42	0.37	0.33
	1Q /9M	0.46	0.49	0.52	0.49	0.47	0.50	0.50	0.45	0.50	0.49	0.45	0.40	0.46	0.43	0.38	0.33
	1Q /12M	0.47	0.51	0.54	0.53	0.49	0.52	0.52	0.50	0.51	0.50	0.48	0.44	0.49	0.47	0.44	0.40
	2Q /3M	0.44	0.49	0.50	0.49	0.48	0.50	0.49	0.45	0.49	0.48	0.44	0.39	0.47	0.45	0.40	0.35
	2Q /6M	0.46	0.49	0.53	0.51	0.48	0.52	0.51	0.46	0.52	0.51	0.47	0.41	0.50	0.46	0.41	0.36
	2Q /9M	0.44	0.46	0.51	0.50	0.46	0.50	0.50	0.47	0.50	0.49	0.47	0.42	0.49	0.47	0.43	0.38
	2Q /12M	0.44	0.47	0.52	0.52	0.47	0.51	0.52	0.51	0.52	0.52	0.51	0.47	0.52	0.52	0.49	0.45
	3Q /3M	0.44	0.47	0.53	0.52	0.46	0.51	0.52	0.49	0.52	0.52	0.49	0.45	0.50	0.48	0.45	0.40
	3Q /6M	0.44	0.47	0.52	0.54	0.47	0.52	0.54	0.54	0.53	0.54	0.54	0.51	0.53	0.53	0.51	0.48
	3Q /9M	0.44	0.47	0.53	0.55	0.48	0.53	0.56	0.56	0.54	0.56	0.56	0.53	0.55	0.55	0.54	0.51
	3Q /12M	0.43	0.47	0.52	0.55	0.49	0.54	0.57	0.59	0.54	0.57	0.58	0.57	0.56	0.58	0.58	0.57
	4Q /3M	0.44	0.47	0.53	0.52	0.46	0.51	0.52	0.49	0.52	0.52	0.49	0.45	0.50	0.48	0.45	0.40
	4Q /6M	0.44	0.47	0.52	0.54	0.47	0.52	0.54	0.54	0.53	0.54	0.54	0.51	0.53	0.53	0.51	0.48
	4Q /9M	0.44	0.47	0.53	0.55	0.48	0.53	0.56	0.56	0.54	0.56	0.56	0.53	0.55	0.55	0.54	0.51
	4Q /12M	0.43	0.47	0.52	0.55	0.49	0.54	0.57	0.59	0.54	0.57	0.58	0.57	0.56	0.58	0.58	0.57

Panel B: Correlation matrix of various CI-based zero-investment strategies

This table presents the correlation coefficients among various zero-investment corporate innovation (CI) portfolios. The portfolios are labeled based on the formation and holding periods. For instance, the label 1Q/3M indicates that the portfolios were formed based on the CI over the past one quarter, and held for 3 months. Similarly 3Q/9M denotes the portfolios formed on the basis of CI measured over the past 3 quarters, and held for 9 months.

CORPORATE INNOVATION ZERO-INVESTMENT PORTFOLIOS

CORPORATE INNOVATION ZERO-INVESTMENT PORTFOLIOS

	1Q /3M	1Q /6M	1Q /9M	1Q /12M	2Q /3M	2Q /6M	2Q /9M	2Q /12M	3Q /3M	3Q /6M	3Q /9M	3Q /12M	4Q /3M	4Q /6M	4Q /9M	4Q /12M
1Q /3M	1.00															
1Q /6M	0.78	1.00														
1Q /9M	0.64	0.89	1.00													
1Q /12M	0.55	0.79	0.90	1.00												
2Q /3M	0.69	0.83	0.70	0.61	1.00											
2Q /6M	0.46	0.77	0.83	0.74	0.84	1.00										
2Q /9M	0.38	0.67	0.80	0.82	0.67	0.92	1.00									
2Q /12M	0.39	0.63	0.73	0.82	0.62	0.83	0.95	1.00								
3Q /3M	0.54	0.71	0.78	0.68	0.74	0.84	0.79	0.71	1.00							
3Q /6M	0.31	0.61	0.74	0.76	0.56	0.81	0.88	0.83	0.87	1.00						
3Q /9M	0.30	0.56	0.71	0.77	0.49	0.74	0.87	0.88	0.79	0.96	1.00					
3Q /12M	0.32	0.54	0.64	0.75	0.47	0.67	0.81	0.87	0.72	0.89	0.96	1.00				
4Q /3M	0.31	0.50	0.59	0.62	0.52	0.66	0.69	0.67	0.72	0.78	0.77	0.72	1.00			
4Q /6M	0.22	0.45	0.57	0.62	0.43	0.64	0.70	0.72	0.68	0.80	0.82	0.80	0.94	1.00		
4Q /9M	0.17	0.39	0.52	0.59	0.36	0.58	0.66	0.70	0.62	0.75	0.80	0.81	0.89	0.97	1.00	
4Q /12M	0.17	0.34	0.45	0.52	0.32	0.49	0.58	0.65	0.54	0.67	0.75	0.79	0.82	0.92	0.98	1.00

TABLE 9 : Regressions of Momentum Strategies Returns on CI-Strategies Returns.

The returns are from January 1976 to December 2002. The R-squares are adjusted for degrees of freedom. T-values computed from Newey-West standard errors appear in parentheses below the coefficient estimates.

Panel A: Contemporaneous regression of returns of winners minus losers portfolios on returns of high current Solow residuals minus low current Solow residuals portfolios.

Holding Period	3 Month			6 Month			9 Month			12 Month		
	Constant	SR	R-square	Constant	SR	R-square	Constant	SR	R-square	Constant	SR	R-square
One-Quarter SR, 3-Month Past Returns	-0.01	0.86	0.14	-0.01	1.27	0.25	-0.01	1.42	0.27	0.00	1.38	0.27
	(-1.56)	(2.49)		(-1.67)	(3.70)		(-1.56)	(3.54)		(-1.15)	(5.70)	
Two-Quarter SR, 6-Month Past Returns	-0.01	1.10	0.22	0.00	1.26	0.26	0.00	1.19	0.25	0.00	1.18	0.26
	(-1.24)	(3.69)		(-1.03)	(4.16)		(-0.38)	(5.05)		(-0.11)	(7.17)	
Three-Quarter SR, 9-Month Past Returns	-0.01	1.13	0.27	0.00	1.12	0.29	0.00	1.13	0.31	0.00	1.17	0.33
	(-1.53)	(4.33)		(-0.84)	(6.49)		(-0.62)	(7.24)		(-0.53)	(7.07)	
Four-Quarter SR, 12-Month Past Returns	-0.01	0.99	0.28	0.00	0.92	0.30	0.00	0.87	0.28	0.00	0.90	0.29
	(-1.41)	(5.49)		(-0.83)	(6.22)		(-0.91)	(5.81)		(-0.89)	(5.81)	

Panel B: One month predictive regression of returns of winners minus losers portfolios on returns of high current Solow residuals minus low current Solow residual portfolios.

Holding Period	3 Month			6 Month			9 Month			12 Month		
	Constant	SR	R-square	Constant	SR	R-square	Constant	SR	R-square	Constant	SR	R-square
One-Quarter SR, 3-Month Past Returns	0.00	-0.31	0.02	0.01	-0.32	0.01	0.01	-0.49	0.03	0.01	-0.36	0.02
	(0.63)	(-1.34)		(2.08)	(-1.34)		(3.02)	(-1.87)		(2.94)	(-1.84)	
Two-Quarter SR, 6-Month Past Returns	0.01	-0.29	0.01	0.01	-0.46	0.03	0.01	-0.44	0.03	0.01	-0.34	0.02
	(2.22)	(-1.37)		(3.47)	(-2.32)		(3.40)	(-2.66)		(2.35)	(-2.44)	
Three-Quarter SR, 9-Month Past Returns	0.01	-0.37	0.03	0.01	-0.34	0.02	0.01	-0.21	0.01	0.00	-0.09	0.00
	(2.89)	(-1.79)		(3.31)	(-2.23)		(2.31)	(-1.61)		(1.30)	(-0.73)	
Four-Quarter SR, 12-Month Past Returns	0.01	-0.19	0.01	0.01	-0.11	0.00	0.00	-0.04	0.00	0.00	0.05	0.00
	(2.18)	(-1.14)		(1.78)	(-0.97)		(1.03)	(-0.40)		(0.39)	(0.49)	

TABLE 10 : Duration of the Corporate Innovation Portfolio Deciles

Portfolios are grouped into deciles based on the value of their corporate innovation (CI). Decile 1 contains the firms with the lowest values of corporate innovation and decile 10 contains the firms with the highest values of corporate innovation. Corporate innovation (CI) is measured using growth rates for the input and output variables over either the past 2 quarters or the past 4 quarters. In this table, we report the average dynamics of the firms in the deciles 1 and 10. Specifically, we compute the average number of consecutive quarters that: 1. A firm stays in either decile 1 or decile 10 after it enters decile 1 or decile 10 respectively. 2. It takes a firm to re-enter decile 1 or decile 10 after it exits decile 1 or decile 10 respectively. 3.Iit takes a firm to move from decile 1 to decile 10 and vice versa.

	Average number of consecutive quarters a firm stays in decile 1 after it enters decile 1	Average number of consecutive quarters a firm stays in decile 10 after it enters decile 10	Average number of consecutive quarters it takes a firm to re-enter decile 1 after it exits decile 1	Average number of consecutive quarters it takes a firm to re-enter decile 10 after it exits decile 10	Average number of consecutive quarters it takes a firm to move from decile 1 to decile 10	Average number of consecutive quarters it takes a firm to move from decile 10 to decile 1
Two-Quarter CI	1.45	1.44	6.31	6.42	3.34	3.99

TABLE 11 : Regression Analysis on the Relation between CI and Momentum

Panel A reports the alphas from regressions of the 6-month/6-month momentum deciles on the factors of the alternative models. T-values appear in parentheses. HLCI is the return on a zero-investment portfolio that is long on high CI stocks (top decile) and short on low CI stocks (bottom decile). The formation period for the portfolio covers the past two quarters, and the holding period is six months. Panel B reports the loadings of the momentum portfolio returns on HLCI, in the context of three alternative specifications. The first one contains only HLCI as an explanatory variable. The second specification includes both the market factor (MKT) and HLCI. Finally, the third specification includes the three Fama-French (1993) factors in addition to HLCI. The column "10-1" in both Panels A and B reports the alphas and betas respectively of the momentum spread (MOM). This is the return on the zero-investment portfolio that goes long on past winners (10) and short on past losers (1). Panel C reports the results from regressions of HLCI on alternative sets of factors. Panel D reports the correlation matrix of the various factors considered.

Panel A: Alphas of momentum deciles

Deciles	1	2	3	4	5	6	7	8	9	10	MOM (10-1)
CAPM alpha	0.0015	0.0021	0.0033	0.0032	0.0043	0.0049	0.0041	0.0049	0.0054	0.0072	0.0058
	(0.54)	(1.11)	(2.09)	(2.08)	(3.06)	(3.51)	(3.14)	(3.78)	(3.91)	(3.70)	(2.26)
Fama-French alpha	-0.0008	-0.0004	0.0003	0.0001	0.0013	0.0017	0.0010	0.0020	0.0028	0.0057	0.0066
	(-0.34)	(-0.23)	(0.30)	(0.15)	(1.46)	(2.05)	(1.45)	(2.69)	(3.44)	(4.77)	(2.24)
Fama-French+HLCI alpha	0.0068	0.0030	0.0022	0.0011	0.0018	0.0015	0.0004	0.0011	0.0013	0.0041	-0.0027
	(1.78)	(1.46)	(1.55)	(0.93)	(1.67)	(1.62)	(0.53)	(1.38)	(1.51)	(3.31)	(-0.68)

Panel B: Betas of momentum deciles w.r.t to HLCI

Factors\Deciles	1	2	3	4	5	6	7	8	9	10	MOM (10-1)
HLCI	-0.9326	-0.3508	-0.1519	-0.0320	0.0352	0.1293	0.1885	0.2259	0.3197	0.3242	1.2568
	(-2.03)	(-1.40)	(-0.79)	(-0.19)	(0.23)	(0.86)	(1.24)	(1.43)	(1.81)	(1.41)	(4.16)
MKT+HLCI	-1.0635	-0.4593	-0.2505	-0.1260	-0.0566	0.0366	0.0941	0.1286	0.2162	0.1984	1.2619
	(-2.94)	(-2.86)	(-2.43)	(-1.63)	(-0.93)	(0.63)	(1.75)	(2.32)	(3.25)	(2.09)	(4.16)
Fama-French+HLCI	-1.0496	-0.4577	-0.2562	-0.1339	-0.0661	0.0269	0.0852	0.1232	0.2186	0.2237	1.2732
	(-3.23)	(-3.03)	(-2.51)	(-1.66)	(-0.98)	(0.42)	(1.94)	(3.25)	(5.19)	(4.13)	(4.00)

Panel C: Regressions of HLCI on alternative sets of factors

	alpha	Market beta	SMB beta	HML beta	MOM beta
CAPM	0.0074	0.0265			
	(6.85)	(0.81)			
Fama-French	0.0073	0.0373	-0.0089	0.0276	
	(5.96)	(0.92)	(-0.21)	(0.39)	
Fama-French+MOM	0.0049	0.0483	-0.0432	0.0631	0.2205
	(3.31)	(1.33)	(-0.91)	(0.93)	(3.18)

Panel D: Correlation matrix of factors

	MKT	SMB	HML	HLCI	MOM
MKT	1.0000				
SMB	0.2148	1.0000			
HML	-0.4873	-0.3565	1.0000		
HLCI	0.0545	-0.0109	0.0071	1.0000	
MOM	0.0317	0.1518	-0.1380	0.4037	1.0000

TABLE 12: Current Two-Quarter Gross Profit Margin Growth/6-Month Returns

This table is constructed along the lines of Table 2, but instead of the ranking variable being CI, it is GPM. All other comments apply.

	Returns	CI	2-qtr GPM Growth	constant	Capital	Labor	Volatility	SUE	ln(Size)	BM	Beta
P 1	0.0092	-0.5560	-0.6450	0.0385	0.0966	0.1207	14.1755	-1.0385	6.8484	1.1674	0.9313
	(3.15)										
P 2	0.0125	-0.1609	-0.1959	0.0565	-0.1181	0.1824	12.0321	-0.5100	7.3061	1.0381	0.8990
	(4.71)										
P 3	0.0118	-0.0661	-0.0854	0.0586	-0.1252	0.1751	11.0221	-0.3681	7.5470	0.9962	0.8980
	(4.58)										
P 4	0.0125	-0.0136	-0.0222	0.0589	-0.0711	0.1882	9.9656	-0.1580	7.6573	0.9162	0.8739
	(5.02)										
P 5	0.0142	0.0287	0.0231	0.0606	-0.0717	0.1655	9.4868	0.0357	7.7099	0.8935	0.8844
	(5.63)										
P 6	0.0155	0.0630	0.0620	0.0625	-0.0697	0.1608	9.2116	0.2121	7.8238	0.8779	0.9006
	(6.09)										
P 7	0.0161	0.1008	0.1046	0.0671	-0.0908	0.1427	9.6222	-0.4962	7.8095	0.8492	0.9228
	(6.26)										
P 8	0.0176	0.1534	0.1636	0.0696	-0.1267	0.1770	10.1714	0.3113	7.7227	0.8371	0.9690
	(6.48)										
P 9	0.0172	0.2415	0.2623	0.0729	-0.1727	0.1700	10.9668	0.3710	7.4778	0.9161	1.0166
	(6.00)										
P 10	0.0181	0.5869	0.6657	0.0696	-0.0525	0.1197	11.9720	0.4399	7.1240	1.0111	0.9417
	(6.47)										
P 10 - 1	0.0088										0.0104
	(6.87)										

TABLE 13: Double Sorts on Gross Profit Margin, and Alternative Variables.

This table is constructed along the lines of Table 3. The only difference is that now one of the ranking variables is always GPM, instead of CI as in Table 3. All other comments apply.

Panel A1: Returns of Portfolios Sorted First on Current two-quarter Corporate Innovation and then on Past two-quarter Gross Profit Margin (GPM) growth.

Current Two-Quarter Corporate Innovation	**Two-Quarter GPM Growth**					
	P1	**P2**	**P3**	**P4**	**P5**	**P5 - P1**
P1 (low)	0.0070	0.0105	0.0107	0.0117	0.0135	0.0065
	(2.17)	(3.45)	(3.71)	(4.37)	(5.09)	(3.86)
P 2	0.0109	0.0118	0.0120	0.0125	0.0135	0.0025
	(4.01)	(4.41)	(4.56)	(4.84)	(5.09)	(2.20)
P 3	0.0134	0.0129	0.0140	0.0152	0.0166	0.0032
	(5.05)	(4.98)	(5.50)	(5.89)	(5.97)	(2.63)
P 4	0.0144	0.0149	0.0174	0.0174	0.0156	0.0012
	(5.38)	(5.67)	(6.58)	(6.13)	(5.43)	(1.06)
P 5 (high)	0.0148	0.0174	0.0172	0.0173	0.0167	0.0019
	(5.02)	(5.90)	(5.96)	(5.72)	(5.71)	(1.42)
P 5 – P1	0.0078	0.0069	0.0065	0.0056	0.0032	
	(4.70)	(4.16)	(4.48)	(4.11)	(2.23)	

Panel A2: Returns of Portfolios Sorted First on Past two-quarter Gross Profit Margin (GPM) growth and then on Current two-quarter Corporate Innovation.

Two-Quarter GPM Growth	**Current Two-Quarter Corporate Innovation**					
	P1	**P2**	**P3**	**P4**	**P5**	**P5 - P1**
P1 (low)	0.0071	0.0103	0.0111	0.0108	0.0121	0.0050
	(2.24)	(3.40)	(3.92)	(4.05)	(4.28)	(3.30)
P 2	0.0113	0.0115	0.0121	0.0129	0.0114	0.0000
	(4.38)	(4.31)	(4.60)	(4.92)	(4.26)	(0.03)
P 3	0.0140	0.0138	0.0135	0.0147	0.0157	0.0017
	(5.33)	(5.35)	(5.23)	(5.77)	(5.90)	(1.55)
P 4	0.0160	0.0149	0.0165	0.0173	0.0171	0.0011
	(5.97)	(5.52)	(6.21)	(6.30)	(5.94)	(0.96)
P 5 (high)	0.0159	0.0169	0.0177	0.0171	0.0165	0.0006
	(5.48)	(5.69)	(6.19)	(5.74)	(5.62)	(0.49)
P 5 - P1	0.0088	0.0067	0.0065	0.0062	0.0044	
	(4.98)	(4.29)	(4.57)	(4.83)	(2.86)	

Panel B1: Returns of Portfolios Sorted First on Current two-quarter Gross Profit Margin (GPM) growth and then on Standardized Unexpected Earning (SUE).

		Standardized Unexpected Earning					
		P1	P2	P3	P4	P5	P5 - P1
Two-Quarter GPM Growth	**P1 (low)**	0.0060	0.0093	0.0096	0.0124	0.0144	0.0084
		(1.88)	(3.13)	(3.20)	(4.46)	(5.35)	(5.59)
	P 2	0.0102	0.0102	0.0114	0.0123	0.0152	0.0050
		(3.69)	(3.85)	(4.32)	(4.81)	(5.76)	(4.21)
	P 3	0.0126	0.0134	0.0139	0.0146	0.0175	0.0049
		(4.79)	(4.89)	(5.53)	(5.71)	(6.65)	(4.35)
	P 4	0.0133	0.0133	0.0158	0.0188	0.0204	0.0070
		(4.83)	(4.83)	(5.86)	(6.80)	(7.47)	(6.40)
	P 5 (high)	0.0120	0.0138	0.0181	0.0197	0.0208	0.0087
		(4.34)	(4.55)	(5.98)	(6.71)	(6.87)	(6.19)
	P 5 – P1	0.0060	0.0045	0.0084	0.0072	0.0064	
		(3.61)	(3.11)	(5.12)	(4.58)	(4.35)	

Panel B2: Returns of Portfolios Sorted First on Standardized Unexpected Earning (SUE) and then on Current two-quarter Gross Profit Margin (GPM) growth.

		Two-Quarter GPM Growth					
		P1	P2	P3	P4	P5	P5 - P1
Standardized Unexpected Earning	**P1 (low)**	0.0054	0.0090	0.0110	0.0126	0.0126	0.0073
		(1.66)	(3.17)	(3.94)	(4.74)	(4.62)	(4.07)
	P 2	0.0093	0.0113	0.0119	0.0128	0.0130	0.0037
		(3.04)	(4.16)	(4.41)	(4.61)	(4.32)	(2.38)
	P 3	0.0111	0.0105	0.0131	0.0144	0.0163	0.0052
		(4.01)	(4.12)	(5.16)	(5.38)	(5.35)	(3.78)
	P 4	0.0145	0.0128	0.0142	0.0192	0.0190	0.0045
		(5.60)	(5.13)	(5.52)	(6.87)	(6.47)	(3.38)
	P 5 (high)	0.0168	0.0160	0.0194	0.0202	0.0205	0.0037
		(6.29)	(6.19)	(7.24)	(7.02)	(7.03)	(2.79)
	P 5 - P1	0.0115	0.0070	0.0084	0.0076	0.0079	
		(6.91)	(4.86)	(6.25)	(6.04)	(5.63)	

Panel C1: Returns of portfolios sorted first on past two-quarter Gross Profit Margin (GPM) growth and then on Cumulative Abnormal Return (ABR).

		Cumulative Abnormal Stock Return					
		P1	**P2**	**P3**	**P4**	**P5**	**P5 - P1**
Two-Quarter GPM Growth	**P1 (low)**	0.0103	0.0091	0.0112	0.0104	0.0125	0.0021
		(2.75)	(3.31)	(4.38)	(4.15)	(3.87)	(1.31)
	P 2	0.0108	0.0111	0.0109	0.0124	0.0144	0.0036
		(3.57)	(4.25)	(4.57)	(5.03)	(4.83)	(2.91)
	P 3	0.0124	0.0137	0.0142	0.0142	0.0170	0.0047
		(4.14)	(5.49)	(5.82)	(5.73)	(5.86)	(3.69)
	P 4	0.0142	0.0139	0.0158	0.0173	0.0199	0.0057
		(4.70)	(5.55)	(6.17)	(6.51)	(6.23)	(4.75)
	P 5 (high)	0.0142	0.0148	0.0144	0.0183	0.0204	0.0062
		(4.23)	(5.65)	(5.48)	(6.27)	(6.11)	(4.15)
	P 5 – P1	0.0039	0.0057	0.0032	0.0079	0.0080	
		(2.00)	(4.31)	(2.41)	(5.75)	(4.67)	

Panel C2: Returns of portfolios sorted first on Cumulative Abnormal Return (ABR) and then on past two-quarter Gross Profit Margin (GPM) growth.

		Two-Quarter GPM Growth					
		P1	**P2**	**P3**	**P4**	**P5**	**P5 - P1**
Cumulative Abnormal Stock Return	**P1 (low)**	0.0099	0.0103	0.0117	0.0141	0.0135	0.0035
		(2.71)	(3.36)	(3.91)	(4.50)	(4.09)	(1.90)
	P 2	0.0094	0.0110	0.0131	0.0139	0.0144	0.0050
		(3.62)	(4.42)	(5.26)	(5.41)	(5.50)	(4.17)
	P 3	0.0111	0.0111	0.0132	0.0155	0.0158	0.0047
		(4.46)	(4.67)	(5.52)	(6.28)	(6.18)	(3.58)
	P 4	0.0112	0.0129	0.0142	0.0161	0.0155	0.0044
		(4.20)	(5.17)	(5.49)	(6.32)	(5.56)	(3.33)
	P 5 (high)	0.0128	0.0150	0.0179	0.0218	0.0204	0.0076
		(3.88)	(4.98)	(5.99)	(6.64)	(6.19)	(4.52)
	P 5 - P1	0.0028	0.0046	0.0062	0.0077	0.0069	
		(1.91)	(3.43)	(4.58)	(5.86)	(4.84)	

TABLE 14: Average monthly returns of 60-month/60-month momentum strategy.

This strategy is equivalent to a 5-year, 5-year contrarian strategy. The returns are from January 1976 to December 2002. Portfolio characteristics such as four-quarter Corporate Innovations (CI) and average annualized firm level volatility (see Campbell, Lettau, Malkiel, and Xu (2001)) are computed for the date of the portfolio formation. The average CI of the portfolios at formation (current) and 1, 2, 3, 4, and 5 after the formation date are reported. T-values appear in parentheses.

60-Month/60-Month Momentum

	Returns	CI(current)	CI (1 year ahead)	CI (2 year ahead)	CI (3 year ahead)	CI (4 year ahead)	CI (5 year ahead)	Volatility
P 1	0.0153	0.0028	0.0477	0.0954	0.0378	0.0611	0.0627	18.1945
	(4.88)							
P 2	0.0145	0.0399	0.0865	0.0475	0.0616	0.0641	0.0779	11.5719
	(5.32)							
P 3	0.0139	0.0618	0.0755	0.0604	0.0595	0.0626	0.0563	9.5539
	(5.71)							
P 4	0.0144	0.0722	0.0702	0.0783	0.0627	0.0518	0.0541	8.5103
	(6.15)							
P 5	0.0139	0.0873	0.0781	0.0824	0.0682	0.0564	0.0567	7.8166
	(6.02)							
P 6	0.0137	0.0772	0.0763	0.0755	0.0696	0.0655	0.0555	7.4203
	(6.02)							
P 7	0.0130	0.0930	0.0768	0.0729	0.0746	0.0532	0.0491	7.3713
	(5.76)							
P 8	0.0127	0.1121	0.0885	0.0774	0.0608	0.0955	0.0471	7.5470
	(5.37)							
P 9	0.0119	0.1186	0.0817	0.0810	0.0744	0.0506	0.0585	8.0319
	(4.72)							
P 10	0.0109	0.1581	0.0957	0.0698	0.0693	0.0565	0.0459	8.9949
	(3.58)							
P 10 - 1	-0.0044							
	(-2.01)							

TABLE 15: Regressions of the Contrarian Spread on Alternative Sets of Factors

This table contains the results from regressions of the contrarian spread (“losers” minus “winners”) on factors implied by alternative asset pricing specifications. The first model considered is the CAPM. The second model is the Fama-French (1993) model. The third specification is one that includes the Fama-French (1993) factors in addition to HLCI. HLCI is a zero-investment portfolio that is long on high CI stocks and short on low CI stocks. The column labeled “alpha” reports the intercept of the regressions. T-values computed using standard errors corrected for heteroskedasticity and serial correlation up to 3 lags are reported in parentheses, below the coefficient estimates.

	alpha	Market beta	SMB beta	HML beta	HLCI beta
CAPM	-0.0058	0.2529			
	(-2.64)	(3.99)			
Fama-French	-0.0016	0.1258	-0.4571	-0.5786	
	(-0.84)	(1.99)	(-4.77)	(-4.90)	
Fama-French+HLCI	-0.0033	0.1173	-0.4550	-0.5849	0.2276
	(-1.79)	(1.86)	(-4.86)	(-5.25)	(2.33)