An Analysis of Insiders' Use of
Prepaid Variable Forward Transactions

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Abstract: This study examines firm performance surrounding insiders' Prepaid Variable Forward (PVF) transactions to infer insiders' information when they enter these off-market contracts. PVFs are unique because they allow insiders to hedge downside risk, share performance gains, and obtain immediate large-sum cash payments for investment or consumption. On average, PVF transactions cover 30% of a sample insider's firm-specific wealth ($22 million), which is substantially larger than a typical open-market sale. PVFs systematically follow strong firm performance and precede degraded stock and earnings performance. PVFs also precede periods of negative abnormal returns relative to potential alternative investments. The documented association between PVFs and performance declines does not appear to result from the market's response to transaction disclosure, participant self-selection, or general price reversals. Thus, evidence suggests that insiders use PVFs to transfer wealth to outside investments in anticipation of performance declines.

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1. Introduction

This study examines firm performance and volatility before and after corporate insiders' initiation of prepaid variable forward (PVF) contracts to infer the nature of insiders' information when they enter this unconventional transaction. PVF contracts have several characteristics that make them unique and interesting. Specifically, they are transacted privately, they are very large in magnitude, and they eliminate insiders' firm-specific downside risk while allowing insiders to retain some upside potential. They also provide insiders with immediate cash and any tax liability generated by the transaction is deferred until settlement.

By documenting the firm's performance and volatility surrounding PVF transactions, this study enables shareholders, boards, and regulators to better understand insiders' motives behind entering the transaction, which may have governance, incentive, and tax policy implications.[1] In addition, this study contributes to the academic literature regarding the manner in which insiders incorporate private information in their transactions. While prior research documents the market implications of insiders' open-market sales and purchases, there is little evidence related to insiders' off-market transactions.[2]

Unlike their open-market counterparts, off-market transactions often have complicated features that make it difficult to discern insiders' motive. PVF contracts are particularly

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[1] Smith and Eisinger [2004] report that the SEC is investigating insiders' use of derivative contracts and whether some insiders failed to report entering these transactions. The Internal Revenue Service is also currently wrestling with the appropriate tax treatment for PVF contracts, noting the difficulty in assessing whether PVF contracts constitute sales transactions (see IRS Revenue Ruling 2003-7).

[2] Off-market transactions are those transactions that occur directly with a known private party as opposed to through a public or open-market exchange. Examples of off-market transactions include hedge arrangements with investment banks, gifts, and transfers to trusts. Bettis et al. [2001] examine zero-cost collars which are transacted between insiders and investment banks.

enigmatic because they provide insiders with the opportunity to share potential gains

from stock price increases and, at the same time, eliminate the insiders' downside risk.[3]

The retention of limited share appreciation suggests that insiders may retain modest

optimism regarding future firm performance, while the elimination of downside risk

suggests that the transaction may reflect negative information regarding future

performance. PVF contracts also generate a payoff function similar to zero-cost collars

(where insiders sell a call option and purchase a put option) which prior research shows

are associated with increases in firm future volatility (Bettis, Bizjak, and Lemmon

[2001]). As a result, PVF transactions may similarly indicate increased uncertainty

regarding future firm performance.

Evidence indicates that insiders contract a substantial amount of firm-specific wealth

within PVF transactions. On average, insiders contract nearly 30% of their firm-specific

holdings within a single PVF transaction and collect upfront lump-sum cash payments of

approximately $22 million. The average magnitude of a single PVF transaction is over

50 times larger than an average open-market sale transaction initiated by the same

insiders within the year preceding the PVF transactions. Therefore, PVF contracts

provide insiders the opportunity to immediately liquidate a substantial proportion of firm-

specific holdings in a manner that may be less understood, less visible, and less

susceptible to litigation than open-market sales.[4]

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[3] See Appendix A for specific details regarding PVF contract structure.
[4] PVF transaction details are delineated in Form 4 footnotes (See one example in Appendix B). There is wide variation in the transaction codes and keywords used to disclose these transactions. Brush [2003] suggests that some insiders intentionally report PVF transactions ambiguously to prevent insider trade data collection agencies from recognizing the transaction as a sale, making the transactions less transparent. The possibility that PVF transactions are subject to lower legal liability is discussed below.

Evidence suggests that insiders use PVFs to divest firm-specific wealth in anticipation of firm performance declines, as opposed to hedging firm-specific wealth from anticipated volatility increases. Specifically, there is no evidence of an increase in firm-specific volatility subsequent to contract initiation. However, PVF transactions follow an average 250-trading-day raw firm return of 19.2% and precede an average 120-trading-day raw firm return of 4.2%. PVF transactions are also associated with an average decline in excess returns relative to (1) a sample matched on size and industry, (2) the industry average, (3) the CRSP equally weighted index, and (4) the CRSP value weighted index. Specifically, PVF transactions follow average 250-trading-day excess returns of 16.1%, 12.6%, 18.2%, and 43.3% and precede average 120-trading-day excess returns of −4.3%, −12.5%, −7.1%, and 2.1% relative to these respective benchmarks.[5] These results directly contrast those of Bettis et al. (2001) regarding zero-cost collars. Therefore, despite the similarity of their payoff distributions, insiders appear to use PVF transactions to achieve different objectives than for zero-cost collars.

PVF transactions are also associated with a significant decline in abnormal returns computed using a Fama-French monthly four-factor estimation model (Carhart [1997]). For the full sample of PVF-participants, the estimated monthly abnormal return declines nearly 5%, from a statistically positive 4.2% during a fifty-four month period preceding contract initiation to a negative but statistically insignificant −0.5% for the six months that follow contract initiation. When estimated solely for executive officers who initiate PVF contracts, the monthly abnormal return is a statistically significant negative −1.1%

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[5] The excess returns following contract initiation relative to the industry average and the CRSP equally-weighted index are statistically significant at conventional levels.

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for the six-month period that follows contract initiation. These results are not sensitive to excluding insiders with relatively large stock ownership or excluding insiders who are approaching retirement age.

Collectively, the evidence suggests that PVF transactions follow periods when firms' stock returns outperform alternative investments and precede periods when firms' returns flatten allowing alternative investments to outperform. The contract, therefore, appears to reflect insiders' opportunity to divest and transfer wealth from the firm to better performing alternative investments.

Further analyses do not support the notion that PVF contract initiation reflects an uninformed investor's expectation that past abnormal returns will reverse. Specifically, the decline in post-PVF-initiation performance is significantly greater for PVF-participant firms than it is for other firms that exhibit a similar raw return run-up preceding PVF initiation dates. Therefore, the association between PVF initiation and subsequent firm performance declines does not appear to simply reflect a reversal of prior performance gains.

Further analysis also suggests that the observed PVF-associated performance decline is not driven by the market's response to transaction disclosure. Specifically, for the majority of expected returns benchmarks, evidence does not show statistically negative stock returns surrounding the disclosure of PVF contract transactions.[6] In addition, negative stock returns persist after PVF disclosure and PVF contract initiation appears associated with future declines in earnings growth. This suggests that at least some of the

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[6] PVF contract initiation disclosure occurs via SEC Form 4 filings, which occurs two days after the transaction date for the bulk of our sample period.

observed decline in returns performance is reflective of a change in fundamental firm performance.

Finally, evidence suggests that PVF contract initiation is more informative regarding future firm performance than insiders' own open market sales transactions. In contrast to PVF transactions, there is no statistically significant evidence that participating PVF insiders' open market sales transactions are associated with pending firm performance declines. Thus, the documented PVF- returns association does not appear to be driven by participants' self-selection.[7]

The study proceeds as follows. Section 2 provides a brief summary of prior research regarding the informativeness of insiders' trade signals, background on PVF contract structure, and expectations for empirical analyses. Section 3 discusses sample selection and provides descriptive statistics for the sample of PVF contracts. Section 4 presents and discusses empirical results. Finally, Section 5 summarizes the analyses, highlights analysis limitations, and presents suggestions for future research.

2. Background and Expectations

There is little documented evidence regarding the market implications of insiders' off-market diversification transactions. Prior research has primarily addressed the implications or informativeness of insiders' open-market transactions which are perceived to be directionally unambiguous signals (i.e., purchases reflect "bullish" sentiment and sales reflect "bearish" sentiment). There is general empirical support that insiders' open-market purchases are associated with pending positive performance (e.g.,

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[7] It is possible that those who self-select to participate in PVF contracts are inherently better at predicting or affecting future firm performance than others. If so, then one would expect that all self-selected insiders' transactions would systematically be associated with future firm performance.

Lakonishok and Lee [2001]).   There is also some evidence that insiders' open-market

sales are associated with pending negative performance (e.g., Jaffe [1974], Finnerty

[1976], Givoly and Palmon [1985], and Seyhun [1986]), however, this evidence is not

conclusive, as Elliott, Morse and Richardson [1984], Lakonishok and Lee [2001], and

Jenter [2005], do not find that insiders' sales are associated with future negative returns.[8]

   Unlike open-market transactions, PVF transaction signals are ambiguous because of

the contract's complex structure and how the contract provides value relative to other

instruments available to fulfill insiders' liquidity needs. It is possible that insiders initiate

PVFs when they are simply uncertain about future performance, when they expect to

observe negative future performance, or when they expect to observe modest positive

future performance, as noted below.

2.1 PVF structure

   PVF transactions provide the insider an immediate discounted cash payment at

contract initiation in exchange for a pledge to deliver a number of shares, or the cash

equivalent to the shares, to an investment bank at settlement.[9] This immediate payment

suggests that insiders initiate PVFs to satisfy cash liquidity needs for consumption or

investment. The contract is structured so that insiders are protected from price declines

(the "floor" is typically set at the transaction date share price) and are able to keep all

firm stock price increases up to but not exceeding a pre-specified gain share cap, which

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[8] Lakonishok and Lee [2001] attribute, in part, the lack of association between sales and future returns
declines to pooling of diversification with informed trades. Insiders' fear of litigation may also explain this
lack of association. The magnitude of insiders' sales are associated with the probability that an insider
(Jagolinzer [2004]) or a firm (Johnson, Nelson, and Pritchard [2006]) will be named as a defendant in a
10b5 class action suit. *Freeman v. Decio*, 584 F 2d 186, 197 n.44 (7th Cir. 1978) also suggests that the
magnitude of an insider's trade and its proximity to a negative news event are substantive in establishing
scienter for insider trading cases (see Beneish, Press, and Vargus [2004] for a more detailed discussion).
[9] The sample average discount is 16.1% of transaction-date market value.

on average is about 30% above the transaction date market price.

The presence of the cap and floor limits the downside risk and upside potential of the return distribution associated with the contract (see Figure A). In other words, PVFs protect insiders from general firm-specific volatility in a manner similar to the zero-cost collars examined by Bettis et al. [2001].   In fact, Figure A shows that the shapes of the payoff distributions for PVF contracts and zero-cost collars are identical. Given the similarity of the return distributions, insiders may view PVF contracts as an alternative hedging instrument to a zero-cost collar and enter into a PVF in anticipation of increases in volatility.

The PVF's downside protection also allows insiders to lock in the current value of their shares prior to price declines, similar to outright stock sales. Therefore, insiders may consider PVFs to be surrogate stock sales. If this is the case, insiders may initiate PVFs when they consider the stock to be overpriced, i.e., in anticipation of pending price declines.[10]

The likelihood that insiders initiate PVFs prior to anticipated price declines is tempered by the fact that insiders also retain share appreciation up to the cap. Thus, an insider may initiate a PVF contract if the insider believes that share price will increase at a modest

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[10] Selling before price declines is usually risky because of legal concerns. PVF transactions, however, may be subject to lower overall legal risk relative to open market sales because (i) shareholders do not directly counter PVF transactions, and because (ii) there is no precedent case law guidance regarding insiders' PVF use. A shareholders' plaintiff attorney suggested, in conversation, that it is not possible for shareholders to pursue pure insider-trading suits against insiders who enter PVF transactions because shareholders do not counter these transactions (the investment bank does, instead). He also stated that shareholders can cite PVF transactions as *scienter* support for "misleading statement" suits against insiders. However, he stated that the lack of precedent regarding insiders' PVF use places some doubt on whether courts will consider PVF use as evidence of *scienter*. Rule 10b5-1 can provide some legal protection for insiders' transactions (including PVFs), however, the Rule does not prevent shareholders from initiating lawsuits that cite transactions that execute within the Rule. Even in the context of Rule 10b5-1, then, it is possible that PVF transactions have lower overall legal risk relative to open market sales.

rate.[11] In this case, the insider might view the contract as a surrogate loan, where the insider uses the shares as security to obtain the cash needed to fund an alternative investment and the cash discount serves as prepaid interest on the loan.

2.2 Comparative Analysis

An insider has other instruments available to fulfill cash liquidity needs, such as a collateralized loan or an open market sale. To better understand the decision to initiate PVFs, Appendix C summarizes a simulation that compares the expected utility from a PVF contract to that from three funding alternatives: (i) selling a portion of firm equity holdings on the open market, (ii) selling a portion of existing market portfolio holdings on the open market, or (iii) initiating and then repaying a loan. For each combination of expected firm and market returns, Table C shows the funding alternative that provides the highest expected utility. Table C indicates that, with relatively high firm uncertainty, insiders can yield greater relative expected utility from PVFs when the firm return is expected to underperform the market. PVF contracts can also be favored if the firm returns match, or even modestly outperform the market, as long as expected returns remain below the negotiated PVF gain-share cap. The first case occurs because the insider can utilize the PVF as a surrogate sale transaction. The latter two cases occur because the insider receives the benefit of the hedging (risk reduction) from the PVF and is able to retain price appreciation up to the cap. Hence, it is not clear, *ex ante*, whether PVF transactions reflect insiders' expectations for pending firm underperformance or

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[11] The notion that PVF insiders could be *ex ante* optimistic is anecdotally supported by Wayne Garrison, Chairman of J. B. Hunt Transport Services, Inc., who disclosed that he was "bullish in the prospects of the company" and that he entered his October 31, 2003 PVF transaction to retain "a significant amount of upside potential in the underlying shares."

modest overperformance or whether they simply reflect insiders' general uncertainty about pending performance.

3. *Sample Selection and Descriptive Statistics*

To identify a sample of PVF contracts, we perform a global keyword search of Form 4 and 5 filings from the SEC Electronic Data Gathering, Analysis, and Retrieval (EDGAR) database through the search template provided by www.10kwizard.com.[12] PVF contracts typically appear in Table II of Form 4, where insiders provide information regarding their derivative positions. Specific terms relating to the PVF contract are typically disclosed in a footnote below Table II (see Appendix B for a disclosure example). We identify a total of 203 contracts initiated between August 8, 1996 and June 30, 2004.

Because some insiders enter multiple contracts on the same day, we have 187 distinct insider-contract observations. On occasion, multiple insiders within the same firm initiate PVF contracts on the same day. As a result, our final sample consists of 174 firm-date observations, which represent 100 individual firms.

Table 1 (Panel A) shows the distribution of PVF contracts over the sample period. There appears to be an increase in the number of reported transactions over time, consistent with either an increase in the availability and use of the PVF contract or with the increased incidence of electronic filing.[13] [14]

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[12] Search keywords include: Forward near(7) Contract; Forward near(7) Sale; Forward near(7) Purchase; Forward near(7) Agreement; Variable near(7) Forward; VPF; Pre near(2) Paid near(7) Sale; Put near(7) Sale; Settlement near(7) Date.

[13] The SEC adopted a final rule on May 7, 2003 that requires electronic filing of Forms 3, 4, and 5, for reports filed on or after June 30, 2003.

[14] The timing of many of our sample PVFs coincides with the adoption of Rule 10b5-1 (October 2000). Therefore, it is possible that PVFs are associated with or manifest from insiders' use of Rule 10b5-1 plans. To assess this, we try to determine the proportion of our PVF sample that is associated with Rule 10b5-1. Specifically, we analyze 60,000 Form 4 footnotes that designate 10b5-1 transactions between 2003 and

Table 1 (Panel B) documents the characteristics of the PVF contracts. The mean (median) contract duration is 2.86 (2.54) years. The floor price tends to be very close to the current market value at the date of the contract and at the mean (median) the cap price is 33% (28%) above the current market value. This means that, on average, the insider is fully protected against price declines and is able to retain gains associated with price appreciation of approximately 30%. The median spread between the cap and the floor of 28% suggests that the number of shares that will be transferred to settle the contract (assuming that the insider chooses to distribute shares) will be between 78% (i.e., $1 \div 1.28$) and 100% of the contracted amount.

Data also indicate that the prepaid cash from the PVF contract tends to be substantial, with a mean (median) payment of $22,175,000 ($4,217,000). This corresponds to a mean (median) discount of 16.1% (14.4%) from the current market value of the shares. A single contract covers a substantial number of shares, with a mean (median) of approximately 1,380,000 (305,000) shares, corresponding to a mean (median) percentage of 29.3% (21.1%) of an insider's personal holdings. To provide some relative sense of magnitude, this average cash payment is over 50 times greater than the average cash payment received by PVF-participants from an average single open-market sale transacted within the year that precedes PVF initiation. In fact, on average, our sample PVF-participants must cumulate their prior 36 months' worth of open market sales proceeds to net the equivalent value of the cash received from their single PVF transaction. PVF contracts, therefore, appear to allow insiders to immediately hedge or

2005 (when Form 4 footnotes become keyword searchable). We find that only eleven PVF transactions are denoted as 10b5-1 compliant. Our results are not sensitive to excluding these eleven transactions from our analyses.

effectively divest a very large proportion of their holdings through a single transaction.

Table 1 (Panel B) shows that contract duration and the Cap-to-Floor spread appear rather "boilerplate". Most contracts last 2 or 3 years and typical contract spreads are 20%, 30%, or 50%. The correlations in Panel B show that the most pronounced correlation amongst contract parameters is the positive association between the Cap-to-Floor spread and the cash discount. This strong relationship suggests there is a tradeoff between the insider's desire to potentially keep higher firm-specific gains and the insider's desire to obtain cash from the broker on the initiation date. The duration of the contracts also appears positively related to both the Cap-to-Floor spread and to the value of shares pledged. Overall, the descriptive evidence suggests that insiders are able to choose from a small menu of interrelated parameters when establishing their PVF positions.

Table 2 (Panel A) documents the sample industry composition relative to the general Compustat population. Although the industry representations appear to be fairly comparable, the sample firms have a higher concentration of firms from the transportation, communications, and retail trade sectors, and fewer firms from the financial and services industries. Table 2 (Panel B) provides a comparison of the financial characteristics at sample firms to the Compustat population. Sample firms tend to be larger than the average Compustat firm. This is not surprising since investment banks cater PVF contracts to insiders of firms with highly liquid securities. Sample firms also tend to be high growth firms with lower degrees of financial leverage.

Table 2 (Panel C) provides data on the characteristics of insiders who enter into PVF

contracts. Insiders who enter PVF contracts own on average (at the median) 1.60%

(0.58%) of outstanding firm equity. Therefore, even though insiders may divest a large

proportion of their holdings through PVF contracts, the impact relative to the number of

outstanding shares appears small. Table 2 (Panel C) also shows that PVF-participants do

not appear to be dominated by older insiders who may be interested in divestment options

near their retirement. Specifically, sample insiders' average age is 53, with the 75th

percentile equal to 58 years. Finally, Table 2 (Panel C) notes that the PVF transaction

does not appear to be associated with a particular pool of insiders. Specifically, data

shows that PVF contract use is relatively evenly distributed across insider position: CEOs

and board chairman net 35% of the sample; other corporate officers net 20% of the

sample, non-officer directors net 33% of the sample and large outside shareholders net

12% of the sample.

4. Empirical Results

Since we cannot observe insiders' information set when they initiate PVF contracts,

we are left to infer their information from the observed association between contract

initiation and firm performance. For our assessment, we examine the associations

between contract initiation and firm volatility, firm raw returns, firm excess returns

(relative to potential alternative investments), and firm earnings performance.

4.1 Firm Volatility

We first examine whether PVF transactions are associated with changes in firm

volatility to infer whether insiders consider PVFs as volatility hedge instruments. Table 3

(Panel A) provides evidence regarding the realized daily standard deviations of returns

both before and after PVF initiation for PVF sample firms and for a sample of firms matched by size and two-digit industry code. Evidence in Panel A shows a statistically significant decrease in realized daily standard deviation of returns for both sample groups from the *Pre* to *Post* periods. The net relative difference for PVF firms (−0.053) does not statistically support the contention that PVF transactions are associated with increases in realized firm-specific volatility.[15]

Since Panel A reports realized volatility statistics, it may not reflect insiders' *ex ante* expectations regarding anticipated volatility changes. To assess the association between PVF transactions and insiders' *ex ante* volatility expectations, Panel B provides evidence regarding monthly GARCH (1,1) variance of returns estimated both before and after PVF initiation.[16] Specifically, Panel B reports expected monthly variance of returns (i.e., $\hat{\sigma}_t^2$) computed from simultaneously estimating:

$$r_t = \alpha_0 + \varepsilon_t, \text{ and} \tag{1}$$

$$\sigma_t^2 = \gamma_0 + \gamma_1 \varepsilon_{t-1}^2 + \gamma_2 \sigma_{t-1}^2, \tag{2}$$

where $\varepsilon_t \sim N(0, \sigma_t^2)$, r is the firm's return, σ is the unobservable standard deviation of the firm's return, and t is the month. Presumably, if insiders understand the time series properties of their firms' volatility then $\hat{\sigma}_t^2$ should reasonably approximate their volatility expectations.

Consistent with Panel A, Panel B shows that expected volatility decreases from the

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[15] Our inference does not change when we estimate firm-specific return volatility as the volatility of the residuals from the market model (Piotroski and Roulstone [2004]).
[16] Generalized autoregressive conditional heteroskedasticity (GARCH) models provide time-varying conditional forecasts of the variance that factor for serial dependence in volatility. See Greene [2000, p. 801] for a discussion.

Pre to *Post* periods for both the PVF and the matched sample. The negative and

insignificant relative difference for PVF firms (−0.001) does not support the contention

that PVF transactions are associated with expected increases in firm-specific volatility.

This contrasts evidence documented by Bettis et al. [2001] that zero-cost collars are

associated with increases in firm volatility.[17]

4.2 Daily Raw Returns

Our next analysis examines the association between PVF transactions and firm raw

returns to provide evidence regarding whether insiders anticipate performance changes

when they initiate these contracts. Figure 1 plots the cumulative raw returns surrounding

the PVF contract initiation date. The cumulative returns for the sample portfolio appear

to steadily grow during the pre-contract period and then flatten during the post-contract

period. The slope of the cumulative raw returns during the post-contract period appears

to be positive, but lower than the slope prior to the initiation of the contract, suggesting

that insiders initiate PVF contract prior to degrading, though positive, firm raw returns.

Table 4 presents formal tests for a shift in raw returns subsequent to contract

initiation. The average daily return for the 250 days preceding contract initiation is

0.192%, which is equivalent to a 48% annual return. On the other hand, the average daily

raw return during the 60-day period following the contract, of 0.010%, is not statistically

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[17] PVFs might not observe the same volatility association as zero-cost collars because collars are pure hedge transactions (i.e., there are typically no substantive cash payments at contract initiation). Collars can be monetized by combining the transaction with a loan against the underlying shares. However, insiders typically do not opt to monetize the collar arrangement, according to investment bank sources, for two reasons. First, insiders can only monetize 50% of their collar position. Second, collar monetization exposes insiders to variable rate interest payments that typically need to be paid throughout the duration of the open collar position. Terms for PVF monetization are generally more favorable, so insiders with monetization needs are more apt to choose PVF contracts.

significant ($t= 0.31$). The last two columns show that the raw returns subsequent to the initiation of the contract are significantly lower than in the period preceding the contract.[18]

4.3 Daily Excess Returns

Since insiders obtain substantial lump-sum cash payments at PVF contract initiation, we are interested in better understanding the extent to which their potential alternative investments outperform the firm. Therefore, we next examine the association between contract initiation and firm excess returns to provide evidence regarding the potential information insiders possess at contract initiation regarding pending firm performance relative to alternative investments. We specifically compare cumulative returns for the sample firms to cumulative returns to four different benchmarks for the 250-trading-day window prior to and the 120-trading-day window subsequent to the contract.[19] We use multiple benchmarks for two reasons. First, it is not clear which benchmark best reflects the insider's unobservable alternative investment opportunity set. Second, utilizing alternative benchmarks may provide insight into the nature of the information held by the insider at PVF contract initiation; i.e., whether the information relates to the firm, its industry competitors, or to the market as a whole (Seyhun [1988, 1992]).

The first benchmark is the mean cumulative return to a matched sample based on

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[18] The observed *ex post* decline may also be related to a relaxation of firm-specific incentives that result from PVF contract initiation. In other words, since PVF contracts allow insiders to partially unwind their firm-specific positions, insiders may be less inclined to focus effort on maximizing firm performance. We cannot rule out this alternative explanation. However, insiders still typically hold a substantial position of firm-specific wealth. Therefore insiders still bear costs if they fail to focus effort towards maximizing firm performance.

[19] For our primary analyses, we limit our *ex post* window to 120-trading days in order to preserve more recently disclosed sample observations. Since this window is clearly shorter than the average PVF contract duration, we examine the full-duration window on a smaller sub-sample of observations in Section 4.5.

industry and size (consistent with Bettis et al. [2001]). The second benchmark is the

mean cumulative return to all other firms in the same four-digit industry. The third

benchmark is the cumulative return to the CRSP equally weighted index (consistent with

Lakonishok and Lee [2001]), and the fourth benchmark is the cumulative return to the

CRSP value weighted index (consistent with Bettis et al. [2001]).

Figure 2 depicts cumulative excess returns (i.e., the firm return – the benchmark

return summed over daily intervals) around PVF contract initiation. Insiders appear to

initiate PVF contracts around the peak of the excess return distribution with respect to the

matched sample, industry, and equally weighted CRSP portfolio benchmarks. Table 5

(Panel A) presents tests of the means and Table 5 (Panel B) presents tests of medians for

the excess return distributions. Consistent with the graph depicted in Figure 2, both

panels document significantly positive excess returns leading up to the initiation of the

PVF contract ranging from 12.6% (industry index) to 43.6% (CRSP value weighted

index).

Table 5 (Panel A) documents negative excess returns in the post-contract period for

three of the benchmarks ranging from −4.30% (match sample) to −12.53% (industry

average). The excess returns relative to the industry and the equally weighted CRSP

index are statistically significant, although the excess returns for the match sample are

only significant through the +60 period. The results based on the medians of the

abnormal return distributions presented in Table 5 (Panel B) are generally similar and

suggest that the results in Panel A are not driven by a small number of extreme

observations.

The evidence in Figure 2 and Table 5 suggests that PVF transactions tend to occur after periods in which firm returns outperform alternative investment portfolio returns. Collectively, this evidence suggests that insiders tend to initiate PVF contracts when their firms' returns patterns peak, enabling insiders to divest shares in anticipation of subsequent lower performance.[20]

It is possible that the documented association between PVF contract initiation and future returns performance declines is at least partially attributable to the market's response to the disclosure of the transaction. To explore this further, we examine the three-day price response, centered on the Form 4 transaction filing date, to determine whether there is a detectable negative response to disclosure of the PVF transaction.[21] Specifically, we compare the sample firm three-day cumulative raw return to the three-day cumulative raw return for a sample of firms matched by size and industry. The difference in returns, −0.004, is not statistically significant at conventional levels (t= − 0.83), therefore this does not suggest there is a negative market response to the disclosure of PVF contract initiation.[22]

4.4 Monthly Four Factor Returns

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[20] The significantly negative returns relative to the industry index, matched sample, and equally weighted market index also suggest the insider is likely to possess firm- rather than industry- or market-specific information   Inferences regarding insiders' possession of market-specific information at PVF initiation may be confounded, however, by the lack of significant results relative to the value weighted CRSP index.
[21] The SEC requires corporate officers, directors, and beneficial owners to file reports of changes in firm ownership, via Form 4, within two days of the transaction.
[22] Evidence in Table 5 (Panel A) generally confirms this finding. Specifically, the mean cumulative abnormal return for days 0 to + 3, which includes the Form 4 disclosure date, is statistically negative for only one of three selected benchmarks. In addition, documented negative returns persist after the disclosure window, suggesting that overall negative returns do not result exclusively from the market's response to PVF disclosure.

To provide further insight into abnormal returns surrounding PVF transaction dates we use a Fama-French four-factor model to estimate monthly abnormal returns for each firm for a series of up to 67 months that include the contract initiation month. We then test whether the average abnormal return for the pre-contract, event, and post-contract periods, are significantly different from zero.

Specifically, we estimate the following four-factor regression:

$$R_{jt} - R_{rft} = \quad \alpha_0 + \alpha_1 * PrePeriod_j + \alpha_2 * EventPeriod_j + \alpha_3 * PostPeriod_j + \qquad (3)$$
$$\alpha_4 * MKT_t + \alpha_5 * SMB_t + \alpha_6 * HML_t + \alpha_7 * UMD_t + \varepsilon_{jt},$$

where
R_j	is the firm's monthly raw return;
R_{rf}	is the monthly risk-free rate of return;
$PrePeriod$	is a dichotomous variable that equals one if the month occurs within the six month period that immediately precedes the PVF contract initiation month and is zero otherwise;
$EventPeriod$	is a dichotomous variable that equals one if the month occurs during the PVF contract initiation month and is zero otherwise;
$PostPeriod$	is a dichotomous variable that equals one if the month occurs within the six month period that immediately follows the PVF contract initiation month and is zero otherwise;
MKT	is the monthly value-weighted market average return in excess of the risk-free interest rate;
SMB	is the monthly size factor mimicking return (Fama-French [1993]);
HML	is the monthly book-to-market factor mimicking return (Fama-French [1993]);
UMD	is the monthly momentum factor mimicking return (Carhart [1997]);[23] and
$j, rf,$ and t	are indices that represent the firm, the risk free asset, and the month, respectively.

We estimate this model using firm j's monthly return over a window from month −60 to month +6.[24] The coefficients for *PrePeriod*, *EventPeriod*, and *PostPeriod* represent the average excess return for that period, relative to the average excess return for the non-

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[23] Monthly market and mimicking factor returns are downloaded from French's website.
[24] Specifically, we require sample firms to have monthly returns for at least seven months prior to the event month to be included in this time-series analysis. We use 173 firm-date observations and on average sample firms have 54 months prior to the event month window.

event period months (−60 to −7), reflected in the intercept. We estimate the model for each PVF event and report the cross-sectional averages and *t*-statistics of the coefficient estimates.[25]

Table 6 presents results for the four-factor model estimation for different samples and definitions of excess returns. For the first column, the dependent variable is the firm's monthly return less the risk-free rate. For the second column, we limit the sample to insiders who serve as executive officers or board chairmen to further assess whether the transaction-to-returns association is stronger for those with the closest access to firm-specific private information. To assess whether the association between PVF initiation and returns declines captures average price reversals that follow large price gains (Debond and Thaler [1985]), the third column defines the dependent variable as the firm's return minus the average return to the decile of firms exhibiting similar raw returns performance during the −60 to −7 month period. Finally, to assess whether PVF participants are innately able to predict or influence returns that follow their equity transactions (which would induce self-selection bias into our primary results), the fourth column includes all PVF participating insiders' open market net sales.

Table 6 shows evidence of a large abnormal price run-up preceding PVF contract initiation consistent with prior results. Specifically, the intercept (reflecting months −60 to −7) is significantly positive for the first two columns in Table 6. Evidence also shows some degradation of performance beginning in the six-month window that immediately precedes contract initiation. Specifically, the coefficient for *PrePeriod* is significantly

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[25] All *t*-statistics are corrected for potential firm-specific cross-sectional correlation using clustered standard errors (Rogers [1993]).

negative in the first two columns, however, the net abnormal return (e.g., 0.042−0.014= 2.8% for column one) during the *PrePeriod* is still statistically positive. The degradation in performance appears to continue during and following the PVF contract initiation month. Although not statistically significant, the coefficients for *EventPeriod* are negative across the first two columns and the coefficients for *PostPeriod* are statistically negative in both of the first two columns.

Collectively, the results in the first two columns of Table 6 support prior evidence that PVF contract initiation is associated with pending declines in returns. At a minimum, it appears that insiders are able to anticipate when their firms will cease to earn excess returns. In addition, there is evidence that PVF contract initiation by executive officers or board chairman anticipates pending negative excess returns. Specifically, column two of Table 6 shows the total excess return for the post-period is −1.1% per month, which is statistically significant ($t=−1.69$).[26]

The third column in Table 6 provides evidence regarding whether the observed association between PVF contract initiation and pending declines in returns performance simply reflects average reversals of prior gains. To investigate this, we first form decile portfolios based on raw returns performance within the −60 to −7 month period. We then identify the decile that best matches the firm's return performance during this period as the performance-matched-decile-portfolio. Finally, we estimate the four-factor regression using the dependent variable as the firm's monthly return minus the average monthly return of the performance-matched-decile-portfolio.

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[26] This returns pattern is similar to that observed in Bartov and Mohanram [2004], who find that large option exercises are associated with a degradation in firm returns and earnings performance.

Column three of Table 6 shows a statistically positive coefficient, 0.016 (t= 1.89), for

the intercept that represents months −60 to −7. This statistically positive difference in

returns during the performance matching period suggests that, within this period, PVF

firms earned a greater factor-adjusted return than firms that exhibited similar raw price

appreciation.[27] Column three of Table 6 also shows that the *PostPeriod* coefficient is

negative (−0.025) and is statistically significant (t= −3.54), suggesting that returns

subsequent to PVF contract initiation are notably worse for PVF firms than for firms that

exhibit similar price run-up patterns in preceding months. This evidence is not consistent

with the alternative explanation that the observed association between PVF contract

initiation and subsequent declines in firm returns performance simply derives from an

average price reversal.

The fourth column in Table 6 provides results for the four-factor model estimation of

returns surrounding the months in which PVF-participating insiders' open market sales

(in volume) exceed open market purchases (i.e., the event period or month 0). The fourth

column in Table 6 shows that, similar to PVF transactions, PVF-participants' open

market sales are preceded by significant price run-ups. However, there does not appear

to be a statistically significant negative association between PVF-participants' open

market sales transactions and future returns performance, which is consistent with

evidence presented by Lakonishok and Lee [2001]. Specifically, the net excess return for

the period that follows open market sales is 0.017 and is statistically positive at

conventional levels (t= 3.67).   This evidence is not consistent with the alternative

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[27] Comparing the 0.016 coefficient with the 0.042 coefficient in the first column (from which there is no performance matching), however, indicates that matching on raw returns accounts for approximately 62% of the abnormal performance observed during the matching window.

explanation that PVF participating insiders are innately able to predict (or influence) future returns with their equity transactions (which would induce self-selection bias to the PVF results).

4.5 Earnings Changes

To provide further insight into the nature of the information held by PVF insiders, we examine earnings changes for the four quarters preceding the initiation of the contract and the eight quarters following the initiation of the contract for 71 PVF contracts for which we have sufficient earnings growth data.   Following Ke, Huddart, and Petroni [2003], we define the change in earnings as the seasonally adjusted change in quarterly earnings and classify a firm as reporting an increase in quarterly earnings if the change in earnings for quarter *t* is greater than the change in earnings for quarter *t*-1. We compare the proportions of firms that report a quarterly earnings increase for the PVF sample and for the matched firms.

Figure 3 depicts the differences in the proportions of PVF sample firms and matched firms reporting an increase in quarterly earnings. Consistent with the positive returns patterns documented before PVF initiation in Figures 1 and 2, Figure 3 shows that the proportion of PVF firms reporting earnings increases exceeds the proportion for the matched firms for the four quarters prior to the initiation of the contract. This pattern persists for two quarters after the initiation of the contract. However, beginning in the third quarter following the initiation of the contract, the proportion of matched firms reporting a quarterly earnings increase exceeds the proportion of PVF contract firms.

This result, combined with the returns results documented in Table 6, is consistent with

prices leading earnings. In other words, it appears that stock returns flatten before the rate of earnings-increases decline for our sample. The results are also consistent with insiders entering into PVF contracts in anticipation of slower earnings growth.

4.6 Ex post settlement

Our inferences regarding the association between PVF transactions and insiders' private information are based on short-term returns following contract initiation. Since the median duration of our PVF contracts is 2.54 years, an alternative approach would be to evaluate returns over the entire length of the contract. In this section we evaluate settlement returns for the 60 contracts for which we have complete data.

We first compare the returns during the entire contract period for our sample to the returns for the matched sample, value weighted index, and equally weighted index. We find that the mean (median) cumulative return for the PVF firms from contract date to settlement date is 9% (3%), which is below the mean (median) cumulative return for the matched sample of 15% (10%) and equally weighted CRSP portfolio of 74% (80%), although only the difference from the equally weighted CRSP portfolio is statistically significant. Overall, the results are similar to the results for the 120-day post-contract period.

We then examine whether insiders appear to have made a net profitable decision by entering into PVF contracts in lieu of holding their position within the firm.[28] For the 30 settled contracts for which we have sufficient data, we evaluate *ex post* relative

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[28] It is important to note that insiders enter into PVF contracts based on their relative expectations for firm and alternative-investment risk and return. *Ex post* realizations may not reflect insiders' *ex ante* expectations and also may not reflect insiders' differential risk preference weighting. Therefore, it is possible that the decision to enter a PVF contract may be optimal, *ex ante*, to insiders, yet still net lower than expected *ex post* realizations. See Appendix C.

performance by assuming that insiders' alternative investments were the equally

weighted or value weighted CRSP index, respectively. For both of these indices, we

compute the *ex post* net return as a percentage of contracted shares, ignoring taxes. We

find that if insiders invested PVF proceeds in the equally weighted portfolio, they earned

a mean (median) return of 36.0% (19.6%) relative to contracted share value at the

initiation date. If insiders invested PVF proceeds in the value-weighted portfolio, they

earned a mean (median) return of −12.2% (−6.7%).[29] The variation in *ex post* returns

from our selected benchmarks shows the difficulty in discerning whether insiders net an

ex post positive PVF return. Insiders' true return depends upon their choice of

(unobservable) alternative investment.

Since we cannot observe insiders' alternative investment choice to definitively

determine whether PVF initiation is *ex post* beneficial, we compute the annualized return

required from an alternative investment to make an insider indifferent between pledging

the shares in a PVF contract return and holding the shares. Using the 30 observed *ex post*

realizations, and ignoring taxes, we find the mean (median) annualized break-even return

(not tabulated) is 9.7% (8.2%). Although there is a substantial amount of variation (the

inter-quartile range is 54.6%), it appears that, at the median, the insider's alternative

investment would have to earn above an 8.2% annualized return to improve his position

by entering into a PVF contract.

5. Summary, Limitations, and Future Research

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[29] Regarding cash vs. share-settlement, we find that all of the PVF transactions for which we can observe the settlement choice are settled with shares. This evidence is not consistent with insiders utilizing the transaction as a collateralized loan.

This study examines firm performance surrounding corporate insiders' initiation of prepaid variable forward contracts to infer insiders' information when they enter these off-market equity transactions. PVF contracts are inherently interesting because they allow insiders to share in future performance gains, hedge downside performance risk, and obtain a substantive immediate cash payment to allow for external investment. Collectively, these features make the insiders' motive behind the transaction *ex ante* ambiguous.

Evidence suggests that PVF contract initiation systematically follows periods of strong relative performance and precedes periods of both returns and earnings performance declines. The association between PVF contract initiation and returns performance declines does not appear to result from the market's response to transaction disclosure, participant self-selection, or returns reversals that follow unusually high returns. Collectively, it appears that insiders utilize PVF contracts to transfer substantive firm-specific wealth to alternative investments prior to firm performance declines.

Because we can only observe the *ex post* settlement realizations for a small subset of our observations, our inferences are limited to the degree to which shorter post-transaction returns reflect longer term performance. Future research may better discern the true *ex post* wealth realized at settlement by insiders who enter PVF contracts since many of our more recent sample contracts will have settled. Our inferences regarding insiders' net realized wealth at PVF settlement are also limited since we cannot observe the return to insiders' true alternative investment choices. Future research might try to obtain proprietary data (perhaps through survey) regarding the true set of alternative

investments in which PVF-participants choose to invest their lump-sum cash.

Smith and Eisinger [2004] report that some insiders may have chosen to enter PVF contracts yet not report these transactions to the SEC. If this is the case, then it is possible that our results are biased from disclosure self-selection. To this extent, it is possible that our results reflect the lower-bound of the association between PVF contract initiation and future performance declines.[30]

The fact that PVF contracts allow insiders to unwind firm-specific risk for a large proportion of their portfolio raises some interesting questions regarding incentives and corporate governance. Future research might explore, for example, why some firms allow and other firms disallow insiders from entering personal hedge transactions. Future research might also explore whether the risk of firm-level project choices is affected by the degree to which insiders hedge their personal portfolios.

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[30] This assumes that those who fail to report PVF initiation to the SEC are more likely than sample participants to enter PVF transactions in anticipation of future negative returns.

APPENDIX A

Prepaid Variable Forward Contract Structure

In a prepaid variable forward contract, the insider pledges to deliver a set number of shares, or a specific dollar amount related to the shares, to an investment bank at a future date. In return, the insider receives a discounted cash payment on the date the contract is initiated. For example, consider a forward contract entered at time t, when the firm's shares have a current price of p_t covering n shares. The insider would pledge to deliver at time $t + u$ either cash or shares, subject to the following formula:

Settlement Price	Cash Payment	or	Shares Surrendered
$p_{t+u} < p_{floor}$	$p_{t+u} \times n$		n
$p_{floor} \leq p_{t+u} \leq p_{cap}$	$p_{floor} \times n$		$(p_{floor} \div p_{t+u}) \times n$
$p_{t+u} \geq p_{cap}$	$(p_{floor} \times n) + [(p_{t+u} - p_{cap}) \times n]$		$[(p_{floor} \div p_{t+u}) \times n] + [((p_{t+u} - p_{cap}) \div p_{t+u}) \times n]$

The p_{floor}, typically set equal to the stock price at time t, provides the downside protection and allows the insider to lock-in past price appreciation.[32] The p_{cap}, typically set at approximately 30% above current stock price, determines the maximum amount of future share price appreciation that can be captured by the insider.[33] The discount, d, typically set at between 11 and 20% of current stock price, reflects the broker's cost of funds. PVF contracts generally have maturity duration, u, of 2 or 3 years.

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[32] In the PVF contracts we examined, the floor price is typically equal to either the closing price on the day prior to contract initiation, or the average closing price during a three- to ten-day period preceding contract initiation.

[33] The median cap for our sample is 28% above the initial stock price.

Illustrative Example (see Figure A): Assume an insider enters a PVF contract that covers $n = 100$ shares of stock. The current stock price, p_t, is \$10, the contracted discount, d, is 20%, the maturity settlement date, u, is 3 years, the price floor, p_{floor}, is \$10, and the gain share price cap, p_{cap}, is \$12.80. The insiders' alternative investment pays a 10.5% annual yield.

The insider receives an immediate payment of \$800 for entering the PVF contract. This cash sum, invested in the alternative investment at 10.5%, will yield \$1,100 after 3 years.

At settlement, if the stock price falls to \$6 (i.e., below the price floor), the insider delivers to the broker either 100 shares, or \$600 in cash. If the insider delivers the shares, the insider is left with the \$1,100 value of the outside investment. If the insider delivers \$600 in cash, the insider is left with \$500 in cash in the outside investment and 100 shares valued at \$600. If the stock price falls to \$5, the insider will either retain \$1,100 in the outside investment, or \$600 in cash and 100 shares valued at \$500. Therefore, the insider's wealth remains at \$1,100 for any *ex post* price below the floor.
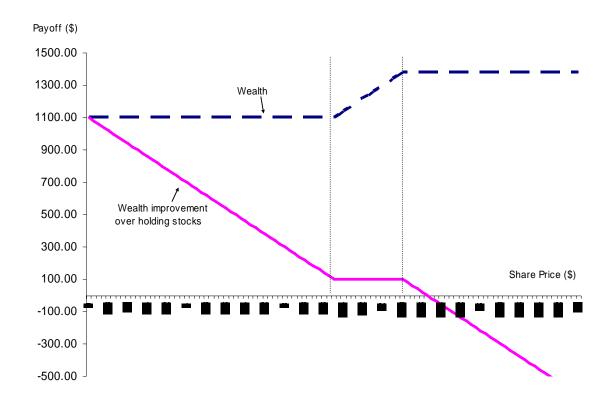
At settlement, if the share price appreciates to \$11 (i.e., between the price floor and the gain share cap), the insider delivers (\$10 / \$11) x 100 = 90.9 shares, and retains 9.1 shares, valued at \$11 per share or \$100. The insider's wealth includes the \$1,100 from the outside investment and \$100 from the retained shares. Similarly, if the stock price increases to \$12.00, the insider delivers (\$10 / \$12) x 100 shares = 83.3 shares and retains 16.7 shares valued at \$12 per share or \$200. In this range the insider's wealth increases linearly with the stock price.

At settlement, if the share price appreciates to \$15 (i.e., above the gain share cap), the insider delivers [(\$10 + \$15 − \$12.80) ÷ \$15] x 100 = 81.33 shares and retains \$18.67

shares, valued at $15 per share or $280. If the stock price is $16, the insider delivers 82.5

shares and retains 17.5 shares, valued at $16 per share or $280. The insider's *ex post*

total wealth in both cases is $1,100 + $280 = $1,380. Thus, $280 is the maximum share

appreciation that the insider retains, consistent with the spread between the price floor

and the gain share cap.

FIGURE A

Pay-off Distribution of a Prepaid Variable Forward Contract

This figure presents the payoff distribution from holding a prepaid variable forward contract (dashed line) and the payoff from a prepaid variable forward contract relative to the payoff from holding the underlying stock, and not entering into a contract (solid line).

Assumptions: Contract covers 100 shares of stock. The current stock price, p_t, is $10, the contracted discount, d, is 20%, the maturity settlement date, u, is 3 years, the price floor, p_{floor}, is $10, and the gain share price cap, p_{cap}, is $12.80.

The insider receives an immediate payment of $800 which is invested in the alternative investment earning a 10.5% annual yield. The net proceeds are $1,100 at the end of three years.

APPENDIX B

PVF Contract Disclosure Example

Fifth Third Bancorp Form 4: September 1, 2004

1. Title of Derivative Security (Instr. 3)	2. Conversion or Exercise Price of Derivative Security	3. Transaction Date (Month/Day/Year)	3A. Deemed Execution Date, if any (Month/Day/Year)	4. Transaction Code (Instr. 8)		5. Number of Derivative Securities Acquired (A) or Disposed of (D) (Instr. 3, 4, and 5)		6. Date Exercisable and Expiration Date (Month/Day/Year)		7. Title and Amount of Underlying Securities (Instr. 3 and 4)		8. Price of Derivative Security (Instr. 5)	9. Number of Derivative Securities Beneficially Owned Following Reported Transaction(s) (Instr. 4)	10. Ownership Form of Derivative Security: Direct (D) or Indirect (I) (Instr. 4)	11. Nature of Indirect Beneficial Ownership (Instr. 4)
				Code	V	(A)	(D)	Date Exercisable	Expiration Date	Title	Amount or Number of Shares				
Contract [4] [5] [6]	[4] [5] [6]	09/01/2004		J[4][5][6]		1 [4] [5] [6]		[4][5][6]	[4][6]	Common Stock	120,000 [4] [5] [6]	[4] [5] [6]	1 [4] [5] [6]	I	by Trust [3]

Explanation of Responses:

1. Transfer of shares to a trust of which the reporting person is the trustee.

2. This transaction is a gift in which the transaction price is not required to be reported.

3. Trust of which the reporting person is the trustee.

4. On September 1, 2004 (the "Trade Date"), the reporting person, through a trust (the "Trust") of which he is the trustee, entered into a variable prepaid forward contract ("VPF Agreement") with an unrelated third party (the "Buyer") relating to 120,000 shares of Common Stock (the "Base Amount"). Under the VPF Agreement, the Trust has agreed to sell the shares in accordance with footnotes 5 and 6 below. The transaction will be settled on September 4, 2007. The LP will receive a prepayment from the Buyer in the amount of $4,727,136 within 3 business days of the Trade Date. Such proceeds are to be used for tax and estate planning purposes.

5. On the settlement date, the Trust, unless it has elected cash settlement as described in the following sentence, will deliver to an affiliate of Buyer a number of shares of Common Stock equal to the product of (A) the Base Amount and (B) the Settlement Ratio, rounded down to the nearest whole number, and cash in an amount equal to the value of any fractional share not delivered as a result of such rounding. In lieu of delivering shares, the Trust may elect cash settlement. The Settlement Ratio is determined as outlined in footnote 6 below.

6. If the "Settlement Price" (a market-based price determined under the terms of the VPF Agreement) is less than the Upside Limit but greater than the Hedged Value, the Settlement Ratio shall be a ratio equal to the Hedged Value divided by the Settlement Price; (ii) if the Settlement Price is equal to or greater than the Upside Limit, the Settlement Ratio shall be a ratio equal to the sum of the Hedged Value divided by the Settlement Price and a fraction the numerator of which is equal to the difference between the Settlement Price and the Upside Limit and the denominator of which is equal to the Settlement Price, and (iii) if the Settlement Price is equal to or less the Hedged Value, the Settlement Ratio shall be one (1). This transaction has an Upside Limit of $63.6598 and a Hedged Value of $48.9691.

APPENDIX C

Expected Utility of Total Wealth Simulation

To better understand when insiders might choose to enter PVF transactions in lieu of alternative transactions like open market sales, we simulate insiders' net after-tax wealth outcomes based on insiders' transaction choice and their expectations for relative future performance. For the simulation, we assume that insiders use PVF transactions to provide cash to fulfill an immediate liquidity need. Other alternatives to fulfill this need include initiating a loan, selling firm equity on the open market, or selling some externally held investments.

We first compute the insider's after-tax total wealth and then compute the insider's utility of total wealth for each of the menu alternatives. Specifically, we compute the insider's after-tax wealth from the PVF option, $W_{T(P)}$, from a sale of firm equity on the open market, $W_{T(F)}$, from the sale of market portfolio equity on the open market, $W_{T(M)}$, and from initiating and then repaying the proceeds of a loan, $W_{T(L)}$. We then compute the insider's utility, $U(W_{T(Choice)})$, from each of these choices as follows:

$$W_{T(P)} = W_f \times R_{fT} + W_m \times R_{mT} + l \times R_{aT} - $$
$$\{[l / (1-d)] \times min (R_{fT}, 1 + max (0, R_{fT} - R_g))\} - $$
$$\{(1/R_{fT}) \times min (R_{fT}, 1 + max (0, R_{fT} - R_g))\} \times $$
$$\{[R_{fT} + 1 - b - min (R_{fT}, 1 + max (0, R_{fT} - R_g))] \times [l / (1-d)] \times x_{ltcg}\}, \qquad (P.1)$$

$$W_{T(F)} = \{(W_f - l - [l \times x_{ltcg} \times (1-b)]\} \times R_{fT} + W_m \times R_{mT} + l \times R_{aT} - zc, \qquad (F.1)$$

$$W_{T(M)} = \{W_m - l - [l \times x_{ltcg} \times (1-b)]\} \times R_{mT} + W_f \times R_{fT} + l \times R_{aT}, \qquad (M.1)$$

$$W_{T(L)} = W_m \times R_{mT} + W_f \times R_{fT} + l \times R_{aT} - l \times R_{LT}, \text{ and} \qquad (L.1)$$

$$U(W_{T(Choice)}) = [1 / (1 - \varepsilon) \times W_{T(Choice)}^{(1-\varepsilon)}], \qquad (U.1)$$

where

W_f is the insider's initial firm wealth which we set equal to $100,000,000,
W_m is the insider's initial market portfolio wealth which we set equal to $50,000,000,
l is the insider's after-tax exogenous liquidity shock need, which we set equal to
$25,000,000,
R_{fT} is the compounded firm return from initiation to time T, which we compute as a
random draw from a distribution $\sim$ Normal $(E(R_f), 0.40)$,
R_{mT} is the compounded market return from initiation to time T, which we compute as a
random draw from a distribution $\sim$ Normal $(E(R_m), 0.10)$,
R_{LT} is the compounded loan rate for borrowed funds from initiation to time T, which we
set equal to 1.27,
R_{aT} is the compounded alternative investment return (where l is invested) from initiation
to time T,
d is the cash discount of current market value retained by the broker at PVF initiation
which we set equal to 0.20,
R_g is the gain share cap in the PVF contract which we set equal to 1.30,
x_{ltcg} is the long term capital gains tax rate which we set equal to 0.15,
b is the insider's tax basis per $1 of initial firm or market portfolio wealth, which we set
equal to 0.50,
z is the insider's probability of litigation if he immediate sells firm holdings on the open
market, which we set equal to $0.15 + 0.5 \times max\ (0, 1 - R_{fT})$,[34]
zc is the insider's litigation costs $= z \times (\ l + (\ l \times x_{ltcg} \times (\ 1 - b\ ))$,[35]
T is the settlement date in years, which we set equal to 3, and
ε is the insider's risk aversion parameter, which we set equal to 2.

Table C charts the highest utility choice based on the insider's expectations for

compounded firm and market returns. To generate this chart, 25,000 random

observations are drawn for the expected compounded firm and market returns. Each

random draw assumes a normal distribution with mean equal to the x- or y-axis

increment (i.e., 0.70 through 1.30 for the firm). The insider's alternative investment

return, R_{aT}, is set equal to 1.00 to reflect immediate consumption. The insider's

expected total wealth and utility are computed for each random draw. When all random

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[34] We assume the insider's litigation probability is increasing in firm losses (Jagolinzer [2004]; Rogers
and Stocken [2005]; Johnson et al. [2006]).
[35] We assume the insider's expected litigation costs are increasing in the magnitude of the sales
transaction in the market. This is indirectly supported by Johnson et al. [2006], who find that firms'
litigation risk is increasing in the magnitude of insiders' abnormal sales volume.
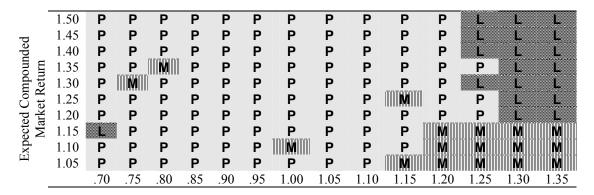
draws are completed, the mean utility is computed for each choice at each x- and y- axis

increment intersection. The mean utilities are then compared across choices and the

choice with the highest mean utility is reported.[36]

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[36] Whether the PVF transaction is preferred relative to an open-market sale of the firm portfolio is
sensitive to the litigation cost function imposed in the simulation. When litigation costs are reduced to a
nominal amount, an open-market sale is, not surprisingly, strictly preferred to the PVF. While we cannot
directly observe the true open-market-sales-related litigation costs inherent in our data, revealed
preference for PVF transactions suggests that these (or other related) costs are material enough to warrant
avoiding open-market sales of similar magnitude.

TABLE C

Simulation of Utility from Expected Total Wealth

Immediate Liquidity Needs: Alternative Yielding Greatest Utility ($\sigma_f = 0.40$; $\sigma_m = 0.10$)

Expected Compounded Market Return	.70	.75	.80	.85	.90	.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35
1.50	P	P	P	P	P	P	P	P	P	P	P	L	L	L
1.45	P	P	P	P	P	P	P	P	P	P	P	L	L	L
1.40	P	P	P	P	P	P	P	P	P	P	P	L	L	L
1.35	P	P	M	P	P	P	P	P	P	P	P	P	L	L
1.30	P	M	P	P	P	P	P	P	P	P	P	L	L	L
1.25	P	P	P	P	P	P	P	P	P	M	P	P	L	L
1.20	P	P	P	P	P	P	P	P	P	P	P	P	L	L
1.15	L	P	P	P	P	P	P	P	P	P	M	M	M	M
1.10	P	P	P	P	P	P	M	P	P	P	M	M	M	M
1.05	P	P	P	P	P	P	P	P	P	M	M	M	M	M

Expected Compounded Firm Return

Optimal diversification method based on simulation of insiders' utility of ending wealth, $U(W_{T(Choice)}) = [1 / (1 - \varepsilon) * W_T^{(1-\varepsilon)}]$

Alternative Liquidity Options:
P = PVF
L = loan
F = immediate sale of firm holdings
M = sale of market portfolio holdings

Parameters used in the simulation:
R_{fT} is the compounded firm return from initiation to time T, a random draw from a distribution ~ Normal (E(R_f), 0.40)
R_{mT} is the compounded market return from initiation to time T, a random draw from a distribution ~ Normal (E(R_m), 0.10)
R_{LT} is the compounded loan rate for borrowed funds from initiation to time T = 1.27
R_{aT} is the compound alternative investment return from initiation to time T = 1.00
W_f is the insider's initial firm wealth = \$100,000,000
W_m is the insider's initial market portfolio wealth = \$50,000,000
l is the insider's after-tax liquidity shock needs = \$25,000,000
p is the proportion of initial firm wealth pledged within the PVF = (l / (1– d)) / W_f = 0.3125
d is the cash discount of current market value retained by the broker at PVF initiation = 0.20
R_g is the gain share cap in the PVF contract = 1.30
x_{ltcg} is the long term capital gains tax rate = 0.15
b is the insider's basis per \$1 of initial firm or market portfolio wealth = 0.50
z is the insider's probability of litigation if immediate sale of firm holdings = 0.15 + 0.5 * max (0, 1 – R_{fT})
zc is the insider's litigation costs = z * (l + (l * x_{ltcg} * (1 – b))
T is the settlement date in years = 3
ε is the insider's risk aversion parameter = 2

Total Wealth Computations:

PVF: $W_{T(P)} = W_f \times R_{fT} + W_m \times R_{mT} + l \times R_{mT} -$
$\{p \times W_f \times min (R_{fT}, 1 + max (0, R_{fT} - R_g))\} -$
$\{(1/R_{fT}) \times min (R_{fT}, 1 + max (0, R_{fT} - R_g))\} \times$
$\{R_{fT} + 1 - b - min (R_{fT}, 1 + max (0, R_{fT} - R_g))\} \times p \times W_f \times x_{ltcg}.$ $\hspace{2cm}$ (P.1)

Immediate Firm Sales: $W_{T(F)} = \{W_f - l - [l \times x_{ltcg} \times (1 - b)]\} \times R_{fT} + W_m \times R_{mT} + l \times R_{aT} - zc$ $\hspace{1cm}$ (F.1)

Immediate Market Portfolio Sales: $W_{T(M)} = \{W_m - l - [l \times x_{ltcg} \times (1 - b)]\} \times R_{mT} + W_f \times R_{fT} + l \times R_{aT}$ $\hspace{0.5cm}$ (M.1)

Loan: $W_{T(L)} = W_m \times R_{mT} + W_f \times R_{fT} + l \times R_{aT} - l \times R_{LT}$ $\hspace{3cm}$ (L.1)

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TABLE 1
PVF Contract Descriptive Statistics

Panel A: Observations by Year

Year	Frequency	Percentage
Prior to 2000	2	1.0%
2000	5	2.4%
2001	25	12.3%
2002	42	20.7%
2003	72	35.5%
First half of 2004	57	28.1%
Total	203	100.0%

Panel B: Contract Parameters

Summary Statistics

	Mean	Median	Std. Dev.
Duration (years)	2.86	2.54	1.69
Floor to Price Ratio	0.98	1.00	0.07
Cap to Price Ratio	1.33	1.28	0.20
Cap to Floor Ratio	1.36	1.28	0.23
Cash received ($ thousands)	22,175	4,217	88,313
Cash discount	16.1%	14.4%	0.08%
Shares covered (thousands)	1,380	305	4,921
Ownership covered	29.3%	21.1%	25.5%

Pearson Correlation (two tailed p-value)

	Duration	Cap to Price	Cash discount	Log (Value Pledged)
Duration	1.000			
Cap to Price	0.249 (0.01)	1.000		
Cash discount	0.108 (0.24)	0.677 (0.00)	1.000	
Log (Value Pledged)	0.252 (0.01)	-0.004 (0.97)	0.075 (0.42)	1.000

TABLE 1– Continued

Panel B – Continued
Frequency of Duration and Spread

Duration (years)	Frequency (%)	Cap to Floor Ratio	Frequency (%)
< 1.0	2.11	< 1.20	1.47
1.0	8.46	1.20	41.91
1.1	0.53	1.21	1.47
1.2	0.53	1.23	0.74
1.3	1.06	1.25	2.21
1.4	1.59	1.26	2.21
1.5	2.65	1.30	13.97
1.7	1.59	1.33	0.74
1.8	1.06	1.35	2.94
1.9	1.06	1.40	4.41
2.0	24.34	1.41	0.74
2.1	1.59	1.44	0.74
2.2	0.53	1.49	0.74
2.3	1.59	1.50	7.35
2.4	0.53	1.51	2.21
2.5	1.06	1.53	0.74
2.6	0.53	1.54	1.47
3.0	28.04	1.62	1.47
3.1	0.53	1.63	0.74
3.2	0.53	1.65	0.74
3.4	1.59	1.67	0.74
3.5	0.53	1.72	1.47
4.0	1.59	1.78	0.74
5.0	11.11	1.79	0.74
5.2	1.59	1.87	1.47
7.3	1.06	1.94	0.74
8.7	1.06	1.95	0.74
10.0	1.06	2.00	3.68
>10.0	0.53	> 2.00	0.74

This table presents descriptive statistics for 203 Prepaid Variable Forward contracts identified by a keyword search of SEC Form 4 filings between August 1996 and June 2004. **Duration** is the length between contract initiation date and settlement date. **Cap** is the PVF contract share gain price cap. **Floor** is the PVF contract floor price. **Price** is the closing market price one day prior to contract initiation. **Cash discount** is difference between price and prepaid cash per share, as a percentage of price. **Shares covered** is the underlying number of shares contracted in the PVF. **Ownership covered** is the shares covered divided by PVF insider's shareholdings, which is collected from the most recent proxy statement preceding PVF contract date. **Value Pledged** is Price times the number of shares pledged in the PVF contract.

TABLE 2

Sample Firm Characteristics

Panel A: Industry Distribution – Proportion of Total Sample

	Sample	Compustat
Agriculture, Forestry (01 – 09)	0.78	0.38
Mining (10 – 14)	2.33	4.21
Construction (15 – 17)	0.78	0.98
Manufacturing (20 – 39)	34.88	37.00
Transportation, Communications (40 – 48)	13.18	5.56
Utilities (49)	3.88	2.55
Wholesale Trade (50 – 51)	0	3.06
Retail Trade (52 – 59)	12.4	5.27
Financial (60 – 69)	15.5	21.03
Services (70 – 88)	16.28	19.17
Other	0.00	1.09

Panel B: Financial Characteristics: mean (median) at end of year preceding PVF initiation

	Sample	Compustat
Book value of total assets	4,238	2,460
	(1,066)	(226)
Market value of equity	4,794	1,556
	(1,393)	(129)
Book leverage	1.71	2.96
	(1.07)	(1.16)
Book to market ratio	0.45	0.82
	(0.39)	(0.58)

Panel C: PVF Transaction Participant Characteristics

Mean Percentage of Firm Shares Owned (before the PVF transaction)	1.60%
Mean Age	53
Percentage serving as CEO/Chairman	35%
Percentage serving as Other corporate officer	20%
Percentage serving as Non-officer director	33%
Percentage serving as Outside 10% Owner	12%

This table presents the characteristics of PVF sample firms. **Book value of total assets** is Compustat Item #6, measured at the end of the previous year. **Market value of equity** is equal to market value (Compustat Item #199*Compustat Item #25), measured at the end of the previous year. **Book leverage** is equal to total liability (Compustat #181) divided by total equity (Compustat #216), both measured at the end of the previous year. **Book to market ratio** is equity to market value divided by book value of equity (Compustat Item #60), both measured at the end of the previous year. **Percentage of Firm Shares Owned** is PVF insider share ownership divided by total number of shares outstanding, which are collected from the most recent proxy statement preceding the PVF contract date. **Age** is insider age collected from proxy statement.

TABLE 3

Returns Volatility Surrounding the Initiation of the PVF Contract

Panel A: Realized Daily Standard Deviation of Returns (%)

Window	Sample Mean	Matched Firm Mean	Sample – Matched (*t*-statistic)
Pre (day −120 to day −1)	3.456	3.538	−0.082 (−0.62)
Post (day +1 to day +120)	3.133	3.267	−0.134 (−0.88)
Post – Pre (*t*-statistic)	−0.323 *** (−3.53)	−0.271 *** (−3.14)	−0.053 (−0.51)

Panel B: Expected Monthly Standard Deviation of Returns Using GARCH (1,1) Estimation (%)

Window	Sample Mean	Matched Firm Mean	Sample – Matched (*t*-statistic)
Pre (month −6 to month −1)	0.176	0.171	0.005 (0.44)
Post (month +1 to month +6)	0.170	0.167	0.004 (0.34)
Post – Pre (*t*-statistic)	−0.006 (−1.41)	−0.005 * (−1.83)	−0.001 (−0.30)

Panel A reports the mean and median of realized daily standard deviation of returns (%) for the sample firms and a sample of firms matched by industry (2-digit SIC code) and size.

Panel B reports the mean and median of expected monthly standard deviation of returns (i.e., $\hat{\sigma}_t^2$) using a GARCH (1,1) estimation. For each month t, we simultaneously estimate the following two equations:

(1) $r_t = \alpha_0 + \varepsilon_t$, where $\varepsilon_t \sim N(0, \sigma_t^2)$ and (2) $\sigma_t^2 = \gamma_0 + \gamma_1 \varepsilon_{t-1}^2 + \gamma_2 \sigma_{t-1}^2$

where r is the firm's return, σ_t^2 is the standard deviation of the firm's return, and t is the month.

*, **, and *** indicate statistical significance at two-tailed 10%, 5%, and 1% levels, respectively.

TABLE 4

Daily Raw Returns Surrounding the Initiation of the PVF Contract

Daily Return Interval	Mean Return (%)	Median Return (%)	Mean Difference (%)	Median Difference (%)
−250 to −1	0.192 ***	0.151 ***	NA	NA
	(9.69)	(10.02)		
−1 to +20	0.014	0.029	−0.178 ***	−0.122 ***
	(0.29)	(0.42)	(−3.29)	(−3.38)
−1 to +40	0.023	0.038	−0.169 ***	−0.113 ***
	(0.66)	(0.86)	(−4.17)	(−3.91)
−1 to +60	0.010	0.043	−0.182 ***	−0.108 ***
	(0.31)	(0.94)	(−4.94)	(−4.36)
−1 to +120	0.043 **	0.084 ***	−0.149 ***	−0.067 ***
	(2.16)	(2.98)	(−5.27)	(−4.15)

This table presents average daily returns for sample firms over the specified return intervals. **Mean Difference** and **Median Difference** columns represent the difference in average daily raw returns for the specified interval less the average daily return for the pre-contract period (−250 to −1).

*, **, and *** indicate statistical significance at two-tailed 10%, 5%, and 1% levels, respectively.

TABLE 5

Abnormal Returns Surrounding the Initiation of the PVF Contract

Panel A: Mean Cumulative Abnormal Returns (%)

Daily Return Interval	Matched Sample	Industry Average	Equally Weighted	Value Weighted
−250 to −1	16.08***	12.56***	18.17***	43.29***
	(3.07)	(3.17)	(4.16)	(9.80)
−120 to −1	5.26*	2.86	5.51***	18.14***
	(1.68)	(1.33)	(2.32)	(7.45)
0 to +3	−0.83	−1.27***	−0.81	−0.45
	(−1.43)	(−2.91)	(−1.62)	(−0.87)
0 to +20	−2.29*	−3.01***	−1.59	0.17
	(−1.71)	(−3.13)	(−1.64)	(0.17)
0 to +40	−3.85**	−5.37***	−3.02**	−0.57
	(−2.24)	(−4.17)	(−2.24)	(−0.43)
0 to +60	−4.39**	−8.27***	−5.33***	−0.30
	(−2.18)	(−5.20)	(−3.23)	(−0.18)
0 to +120	−4.30	−12.53***	−7.12***	2.12
	(−1.60)	(−5.65)	(−3.42)	(0.99)

Panel B: Median Cumulative Abnormal Returns (%)

Daily Return Interval	Matched Sample	Industry Average	Equally Weighted	Value Weighted
−250 to −1	11.79***	6.35***	9.23***	33.21***
	(2.80)	(2.89)	(3.64)	(11.88)
−120 to −1	5.91**	3.33	0.38	14.05***
	(2.22)	(1.28)	(1.64)	(8.70)
0 to +3	−0.21	−1.02***	−1.06*	−0.61
	(−0.90)	(−2.57)	(−1.81)	(−0.82)
0 to +20	−2.56*	−2.69***	−1.14*	0.89
	(−1.88)	(−2.97)	(−1.78)	(0.29)
0 to +40	−4.13**	−6.88***	−3.46**	0.13
	(−2.28)	(−4.58)	(−2.54)	(0.37)
0 to +60	−2.59**	−9.74***	−4.04***	1.07
	(−1.99)	(−5.60)	(−3.15)	(0.32)
0 to +120	−3.48	−11.43***	−5.30***	3.60
	(−1.59)	(−5.92)	(−3.40)	(1.51)

This table presents the mean (Panel A) and the median (Panel B) of the distribution of the sample firm cumulative return minus the cumulative benchmark return. Cumulative returns are defined as the sum of daily return over the specified intervals. The matched sample includes firms matched on size and industry. The industry average return is the mean return for other firms in the same four-digit SIC code as the sample firm. In the equally weighted column the benchmark return is the equally weighted CRSP index, and in the value weighted column the benchmark return is the value weighted CRSP index. Tests of significance are based on two-tailed probabilities against the null that the abnormal return for the period is 0. *, **, and *** indicate statistical significance at two-tailed 10%, 5%, and 1% levels, respectively.

TABLE 6

Monthly Risk-Adjusted Returns Surrounding the Initiation of the PVF Contract

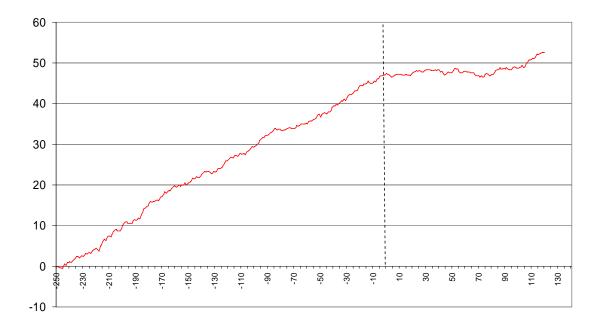| Transaction Type	PVF	PVF	PVF	Open Market Net Sales
Observations	All Insiders	Executive Officers	All Insiders	All Insiders
Dependent Variable	R_{firm} - $R_{riskfree}$	R_{firm} - $R_{riskfree}$	R_{firm} − $R_{perfdecile}$	R_{firm} - $R_{riskfree}$
Intercept (Months −60 to −7)	0.042 *** (3.81)	0.032 *** (4.84)	0.016 * (1.89)	0.030 *** (3.37)
PrePeriod (Months −6 to −1)	−0.014 * (−1.80)	−0.013 * (−2.14)	−0.015 * (−1.91)	0.007 (0.95)
EventPeriod (Month 0)	−0.028 (−1.53)	−0.023 (−1.37)	−0.009 (−0.51)	0.005 (0.46)
PostPeriod (Months +1 to +6)	−0.047 *** (−4.93)	−0.043 *** (−4.37)	−0.025 *** (−3.54)	−0.013 (−1.62)
MKT	1.652 *** (8.66)	1.526 *** (9.53)	0.511 ** (2.52)	1.347 *** (8.60)
SMB	0.426 *** (4.83)	0.472 *** (5.26)	−0.038 (−0.47)	0.530 *** (5.83)
HML	−0.121 (−0.49)	0.203 (1.24)	−0.340 (−1.46)	−0.112 (−0.56)
UMD	−0.112 (−1.38)	−0.012 (−0.14)	−0.065 (−0.91)	0.056 (0.56)
n	173	98	173	306
Intercept + PostPeriod	−0.005 (−1.00)	−0.011 * (−1.69)	−0.009 ** (−2.02)	0.017 *** (3.67)

This table presents the cross-sectional averages and t-statistics of the coefficient estimates from Fama-French Four Factor monthly stock return regressions. R_{firm} is the monthly return for sample firms. $R_{riskfree}$ is the monthly risk-free interest rate. $R_{perfdecile}$ is the monthly return for performance-matched-decile-portfolio. **MKT** is the monthly value-weighted market average return in excess of the risk-free interest rate. **SMB** is the monthly size factor mimicking return (Fama-French [1993]). **HML** is the monthly book-to-market factor mimicking return (Fama-French [1993]). **UMD** is the monthly momentum factor mimicking return (Carhart [1997]).

*, **, and *** indicate statistical significance at two-tailed 10%, 5%, and 1% levels, respectively. *t*-statistics are adjusted for potential firm-specific cross-sectional correlation using clustered standard errors (Rogers [1993]).
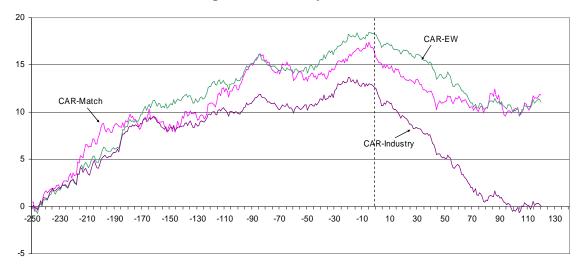
FIGURE 1

Cumulative Raw Returns
Surrounding the Initiation of a PVF Contract

This figure presents the cumulative raw returns for the portfolio of sample firms for the 250 days prior to the initiation of the contract through the 120 days subsequent to the initiation of the prepaid variable forward contract. Cumulative return is defined as the sum of daily returns starting 250 days prior to contraction initiation date.
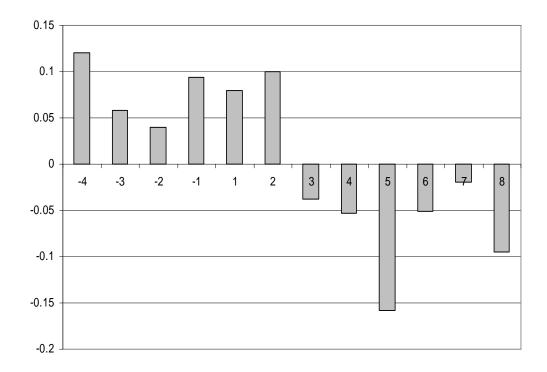
FIGURE 2

Cumulative Abnormal Returns
Surrounding the Initiation of a PVF Contract

This figure presents the cumulative abnormal returns of sample firms for 250 days prior to the initiation of the prepaid variable forward contract to 120 days following the initiation of the contract. Cumulative abnormal return is defined as the sum of firm daily returns minus the sum of benchmark daily returns. The CAR-EW line represents the return of sample firms less the return for the CRSP equally weighted index. The line labeled CAR-Match represents the return of sample firm less the return for the match firm. The line labeled CAR-Industry represents the return of the sample firm less the return for the industry index.

FIGURE 3

*Difference in Proportion of Sample Firms vs. Match Firms
that Report Quarterly Earnings Increases*

This figure presents the proportions of firms that reported an increase in seasonally adjusted quarterly earnings per share for the PVF sample minus the proportion for the matched sample. To calculate the seasonally adjusted earnings per share we subtract earnings per share for the same quarter of the prior year. The quarters in the graph are relative to the initiation of the PVF contract, i.e., quarter 1 is the first earnings release after the initiation of the contract. The results are based on 71 sample and 71 matched firms that have the requisite quarterly EPS data.