The Market Reaction to the Strategic Use of Interest Rate Swaps ¤

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Abstract

In this paper, we find that the previously documented relation between term structure and swap usage intensifies when firms are engaging in earnings management. In response, we investigate the market's response to earnings generated from changes in current swap usage. In general, we find that firms experience significantly negative market reactions when using swaps in steep term structure environments to meet expectations. Upon closer inspection we find that firms that meet expectations and use income decreasing swaps arrangements are responsible for the majority of the apparent penalty. Firms that swap floating for fixed rates—pay more interest expense today and less in the future—receive a significantly larger market premium then those firms that swap fixed for floating—pay less interest expense today and more in the future. Our results indicate that even though swaps are arranged as zero NPV transactions, there are specific structures that affect firm value in predictable ways. Overall, the market appears to appropriately identify and price the strategic use of swaps to hedge cash flow risk versus meeting market expectations.

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I. Introduction

The use of interest rate swaps, currency swaps and interest rate options have increased $195.487 trillion in notional principal (1,103.5%) between 1995 and 2005, most of this being interest rate swaps.[1,2] Average daily trade volume of interest rate swaps topped $900 billion in 2006. In the International Swaps and Derivatives Association's survey of the 500 largest companies in the world in 2003, they report that 92% of the companies that use derivatives (85% of the total sample) utilized interest rate swaps to manage interest rate risk. A recent *Wall Street Journal* article cited the use of derivatives for hedging risk, adding leverage and minimizing taxes (Raghaven 2007). It is clear from the survey results, the language contained in SFAS # 133 *Accounting for Derivatives Instruments and Hedging Activities*, as well as the expectation of investors that interest rate swaps are to be used to manage risk.[3] Then why does it appear that they are being used to manage earnings?

As an example, at the end of Wal-Mart's 2001 fiscal year, during which the yield curve was inverted on average (specifically, the average 1-year Treasury yield was higher than the average 10-year Treasury yield by 9.5 basis points making floating rates higher then fixed rates), Wal-Mart had swapped only 3.9% of its debt from a fixed to a floating interest rate exposure, resulting in an overall floating debt exposure of 18.7%. During the 2002 fiscal year, the average Treasury yield spread (the 10-year Treasury yield minus the 1-year Treasury yield) had risen to 1.75%, making floating rates significantly lower than fixed rates. Wal-Mart commensurately increased its pay-floating interest rate swaps to 17.3% of its debt, bringing 25.3% of its debt to a

[1] An interest rate swap is an agreement to exchange or "swap" a series of future periodic interest payments (Trombley 2003 and Whaley 2006). The only cash that changes hands is the net of a fixed rate against a floating rate as applied to the notional principal amount. In general interest rate swaps are used to manage interest rate risk.
[2] http://www.isda.org/statistics/recent.html
[3] SFAS 133 has been replaced with SFAS 155 Accounting for Certain Hybrid Financial Instruments—an amendment of FASB Statements No. 133 and 140 which is effective for fiscal years beginning after September 15, 2006. The adoption of SFAS 155 does not affect the arguments, assumptions, or results presented herein.

floating exposure. The Treasury yield spread rose even further during the 2003 fiscal year, to an average of 2.59%. Wal-Mart again increased its pay-floating interest rate swaps to 32.6% of total debt, resulting in 40.8% of its debt with a floating exposure. At the culmination of these swap activities, Wal-Mart noted in its 2003 annual report that "interest costs on debt and capital leases … as a percentage of net sales [decreased] 0.17% when compared to fiscal 2002." In fact, its interest expense fell by $269 million (18.5%) even though its total debt increased by $3.5 billion (16.1%). Their resulting earnings exceeded their consensus analyst earnings per share forecast by three cents in 2003.[4]

Consistent with the steep yield curve of 2003, by the end of Wal-Mart's 2005 fiscal year, short-term interest rates had risen considerably. This higher interest rate environment led Wal-Mart to issue an earnings warning stating that it "expects interest expenses to raise as much as $500 million this year, due in part to higher interest rates . . . that could hurt earnings by eight cents a share" (Wall Street Journal, Feb. 22, 2006). In effect Wal-Mart chose to drastically reduce their interest expense from 2002 to 2003 by swapping to floating when they could have locked in low fixed rates and avoided the anticipated increase in floating rates that materialized in 2005. This strategy resulted in a near term gain in 2002 at the expense of future earnings in 2005. What did Wal-Mart gain from boosting earnings in 2002 and lowering them in 2005? This is the fundamental question that we explore in this paper. Specifically, we examine the use of interest rate swaps as a short term earnings management device and provide some evidence on how the market responds to the use of interest rate swaps to manage reported earnings.

Faulkender (2005) documented a significant relation between interest rate swap usage and the overall mix of fixed and floating debt to the slope of the yield curve (term structure) at

[4] On a per share basis, the $269 million decline in interest expense amounts to savings of six cents per share. Also, had Wal-Mart not adjusted its swap usage during their 2002 fiscal year, they would have missed their consensus analyst earnings forecast for that year by one penny.

the time the firm raises debt. This finding is a generalization of the Wal-Mart example described above. Given the prevailing term structure, Wal-Mart was able to increase their earnings by altering their mix of fixed and floating rates. Clearly this phenomenon is ripe for exploitation by managers with significant debt who are in need of additional earnings. Much of the research on earnings management has concerned itself with the effectiveness of window dressing tactics—accrual manipulation—to increase earnings. However, there are other ways to use the flexibility in generally accepted accounting principles (GAAP) to achieve earnings targets. The extant literature has examined several of these costly mechanisms (Zang 2005) including cutting R&D expenditures (Wang and D'Souza 2006, Roychowdhury 1996, Bushee 1998, Dechow and Sloan 1991, and Baber et al. 1991) and repurchasing stock (Hribar, Jenkins and Johnson 2006, Bens et al. 2002 and 2003). These earnings management choices differ from accrual manipulation in that they require cash outflows that lead to increases in earnings per share which will not unwind over time.

We argue that using interest rate swaps to manage current earnings around benchmarks is another such mechanism.[5] Because swaps alter the net payment and recognition of interest expense over the life of the swap, they can be a costly mechanism to manipulate current earnings. The unanswered questions we examine are whether swap usage is systematically being used as an earnings management device and does the market appear to treat increases in earnings generated from swap agreements the same as it treats increases in normal operating earnings? First we document the frequency of swap usage in a sample of large, publicly traded firms over the period 1993-2003. Next we examine the effect that a high earnings management environment has on the previously documented relation between swap usage and term structure. Third, we quantify the average change in year one earnings per share (EPS) when a firm alters its

[5] Song (2005) makes a similar argument related to the use of interest rate swaps by banks.

swap usage. Fourth we demonstrate that firms appear to alter their use of interest rate swaps based upon the slope of the yield curve in ways that are consistent with earnings management. We then investigate the market's response to the magnitude and direction of changes in earnings that are due to swap usage. Lastly, we attempt to quantify differences in the market's response to swap induced earnings as a function of swap usage.

We find that a substantial portion of the firms in our full sample use interest rate swaps (29%). In fact, among the sub sample of firms that had swaps on their books at any time during out ten year sample period, interest rate swaps are on the books of 53% of the firm years. Looking at how swap usage changes over time, we find that managers are more likely to use swaps (and ultimately have more floating rate debt) to move interest expense into the future when their earnings are closer to the consensus analyst earnings forecast and when current swap usage allows them to meet market expectations. We document that interest rate swap timing appears to be a partial substitute for discretionary accruals, which are arguably the typical means by which earnings management occurs and that swap usage varies more with the term structure among those firms that more frequently walked down their analyst earnings forecast over the sample period.

On average, the market responds differently to the portion of earnings surprise that is attributed to new swap usage relative to operating earnings. Moreover, the market applies a significantly negative coefficient—earnings torpedo (Skinner and Sloan 2002)—to the earnings surprise coming from a swap, particularly when the firm meets or beats market expectations in the same period in which they altered their swap usage. The implication of these results is that the market is not only able to see through the manipulation of earnings using interest rate swaps, but actually assesses a penalty to the surprise component of firms that use interest rate swaps to

meet or beat expectations. In a follow up analysis we decompose swap usage into those swaps that decrease EPS—swapping from floating to fixed—and those that increase EPS—swapping from fixed to floating. We find that the market levies a premium on firms that swap from floating to fix. The response coefficient assigned to firms that swap from fixed to floating is not significantly different from zero. We interpret these results as evidence that the market is able to distinguish between interest rate swaps that appear to be used for managing risk (floating to fixed) versus those that seem to be used for managing earnings (fixed to floating).

The remainder of the paper proceeds as follows. Section 2 provides background information and develops our swap usage hypotheses. Our research design is detailed in section 3. Section 4 reviews our sample selection process and descriptive statistics pertaining to the sample. Section 5 reports and discusses the results of our empirical tests. Concluding remarks are provided in section 6.

II. Background and Hypotheses - Empirical Motivation

2.1 Interest Rate Swaps[6]

An interest rate swap is a contractual relation between two parties that requires an exchange of payments; though it is usually resolved with a net cash settlement. The payments are determined by a fixed-rate and a floating-rate which is tied to an index that tracks short term rates—treasury notes, commercial paper, the prime rate, or a cost of funds index. There are six elements to an interest rate swap transaction: the fixed rate; the floating rate index; the frequency of the floating rate index adjustment; the frequency of payment; the term; and the notional amount or dollar basis upon which the floating and fixed rates are applied. If a particular swap is designated as a fair value hedge—fix to float—the changes in the value of the swap and corresponding debt will be recognized in current earnings and offset one another. If the swap is

[6] See Appendix A for the definition of key terms.

designated as a cash flow hedge—float to fix—the gains/losses generated by valuing the swap at fair market will be recognized in other comprehensive income which does not affect current earnings. However, the change in interest expense which reflects the net cash settlement each period will have a predictable affect on current earnings and cash from operations. Prior to SFAS 133 interest rate swaps were generally not recorded on the balance sheet.

Consider the following example which has been simplified for clarity (See Appendix B). ABC Corp. borrows $10 million (notional amount) from CC Bank with a fixed-rate of 6%. ABC Corp. enters into an interest rate swap with SS Bank to effectively transform the fixed-rate debt into floating-rate debt. Assume that ABC Corp. agrees to pay SS Bank LIBOR and receive 5% in return (where the notional amount of the swap is equal to the principal amount of the loan). By entering into this agreement, ABC Corp. has locked in net interest payments at a floating rate of LIBOR + 1% as shown below:

6% fixed payment made on debt
- 5% fixed swap payment received
+ [LIBOR] floating swap payment made
= [LIBOR] + 1% floating payment made

Net settlement on this swap arrangement for ABC Corp. will be [5% - LIBOR]. ABC Corp. will pay SS bank the difference when LIBOR is less than 5% whereas SS bank will pay ABC Corp. the difference if LIBOR exceeds 5%. Note that the fixed payment received on the swap is lower than the interest rate on the bank loan, generating interest payments for ABC of LIBOR + 1%. The additional one percent may be thought of as the compensation the bank receives associated with the credit risk of the original loan.

If interest payments are made annually and LIBOR of 3% applies to the first interest payment, ABC Corp. would receive 2% in the net settlement of the swap. As LIBOR increases/declines, the fair market value of the original bond declines/increases; while the value

of the swap for the debt holder increases/declines.[7] The swap can be entered into at any time, meaning that managers will know the effect that the swap arrangement will have on net income in the first period—the difference between the fixed and floating interest rates—at the inception of the swap. Additionally, the better able the manager is in anticipating changes in the index, the less uncertainty she will have regarding the effect that the swap will have on net income beyond the first period. In this example, the firm has contracted to pay a flat 6% on the debt through maturity. The swap requires a payment of LIBOR in exchange for 5% fixed. In period 1, the firm has replaced the 6% interest expense it would have incurred on the debt without the swap with a net 4%—which is a savings of $200,000. Anytime the interest rate yield curve is upward sloping, managers with fixed–rate debt can increase their net income by a predictable amount in year 1 by swapping to a floating-rate contract.

The scenario presented above is depicted in Figure 1, which assumes that the yield curve has a positive slope—upward slopping. The fixed rate of 6% is constant over the life of the debt instrument while the floating-rate—LIBOR—is expected to increase over that same time period. This transaction creates additional risk since short-term rates fluctuate and because the savings will only be generated while the short term rate stays low. In this example, if interest rate realizations are consistent with those implied by the forward curve, higher interest costs will be realized after period 5 when the floating rate exceeds the fixed rate. At this point, the interest expense would be larger than what it would have been had the swap agreement not been entered into. Under the expectations hypothesis of interest rates, the upward sloping forward curve suggests that the market believes that interest rates will rise over the life of the swap. On average, swap transactions are structured as zero value changing arrangements at inception;

[7] However, under current GAAP, bonds with fixed interest rates that are not associated with derivatives are initially recorded at the present value of its related cash flows—with a bond premium or discount which is amortized over the life of the bond—rather than marked to market.

when effectively designed, they will merely shift interest payments and expenses through time—manage earnings.

Simply stated, firms that swap interest payments are engaging in a transaction that changes the structure of the interest payments but that should not create or destroy value. Since the interest rate swap market appears to be a reasonably efficient market, the transaction itself should not increase firm value, since the counterparty would otherwise not enter into the contract. So it is true that when the term structure is steep, firms that swap fixed for floating will experience lower interest expense in the early periods and expect higher interest expense in the later periods relative to the interest expense they would have incurred had they not entered into the swap agreement, as we saw with the earlier Wal-Mart example. However, because this is an expected result, we believe that the market should differentially price unexpected earnings that are derived from swapping activities relative to earnings that are generated in the normal course of business.[8]

2.2 Why use interest rate swaps?

There are a variety of reasons why firms like ABC Corp. might prefer to pay a floating rate instead of the negotiated fixed rate, they include:

1. ABC estimates that their operating cash flows are positively correlated with the level of interest rates, making floating the exposure that would minimize residual cash flow variability.

2. ABC believes that long term interest rates are falling and swapping to a floating rate would allow them to take advantage of this opportunity, i.e. they are betting on the movements in interest rates.

3. ABC is attempting to reduce current period interest expense.

Faulkender (2005) examines the choice of interest rate exposure and usage of interest rate swaps among firms in the chemical sector and does not find evidence of the type of operating

[8] See Appendix B for a detail discussion of the financial reporting effects of fair value and cash flow hedge.

cash flow and liability exposure matching expressed in (1). Instead, he documents that firms' interest exposure choice is primarily driven by the shape of the term structure—steepness of the yield curve. This finding is expanded upon in Chernenko and Faulkender (2007) who show that sensitivity to the term structure is greater for firms where managerial compensation is closely tied to firm stock performance.

Arguably, there is a menu of choices available to firms when they are trying to increase reported earnings per share (Healey and Wahlen 1999 and Fields, Lys and Vincent 2001)—accrual manipulation (Dechow, Sloan & Sweeney 1995), stock repurchases (Hribar, Jenkins, and Johnson 2006, Bens et al. 2002 and 2003), and expense reduction (Wang and D'Souza 2006, Roychowdhury 1996, Bushee 1998, Dechow and Sloan 1991, and Baber et al. 1991). The use of interest rate swaps to increase reported earnings is more similar to the use of stock repurchases and expense reduction than to accrual manipulation. These three methods of increasing reported earnings are real decisions which have real cash flow effects beyond the payment of taxes. Each method requires managers to anticipate the need for additional earnings early enough in the period for the mechanism to be effective. In the event that the act generates more earnings then are required managers may use accruals to minimize the surprise. Because of the effect of interest rate swaps on net income, they are most similar to expense reduction. Many of the expense categories available to firms for reduction are value creating in the sense that reducing them would actually reduce the value of the firm. Temporary reductions in headcount, advertising and marketing costs, research and development costs and others have a predictable impact on both bottom line earnings and the value of the firm. Their reduction would lead to higher current earnings. However, when fewer dollars are spent on advertising and marketing

for example, the demand of the product or service will be negatively affected, thus reducing the value of the firm.

The reduction in interest expense through a swap differs significantly from these other expenses. First, it is virtually costless to enter into a swap agreement (reference). Second, manipulation of earnings through interest expense is less visible. Disentangling the cause of the reduced interest expense requires understanding the complex debt structure of the firm. By comparison, reductions in SG&A type expenses are easily discerned and the explanation is clear. Third, swap arrangements are structured to be zero sum games. The deals are arranged such that expected risk-adjusted total interest expense under the swap will be the same as it would have been had the swap agreement not been made. It is clear from the nature of reducing other expense categories that the value lost in one period may or may not be recouped. Another unique feature of interest rate swaps is that their effectiveness in managing earnings is limited to times when the yield curve is steeply sloped. When long-term interest rates greatly exceed short-term rates, there is a significant difference between fixed and floating rates. On the other hand, when the yield curve is flat, fixed and floating rates will generate the same interest expense in the current period, rendering the usage of an interest rate swap to manage earnings that period ineffective. Thus, managing earnings via swaps likely destroys less value than these other mechanisms but is only occasionally an option that firms will have available. Moreover, the reduction of an expense typically results in an increase in cash on hand. In the current derivatives market it is not uncommon for swap dealers to require collateral from swap parties equal to the mark-to-market value of the contract (Johannes and Sundaresean 2007). Firms with a floating position generally only receive the earnings and not the cash flow benefit because cash and US Treasuries are the most common forms of collateral in the US.

2.3 Earnings management and interest rate swaps

There have been some studies in the literature that have examined the effects of derivative disclosures, specifically for samples of banks. Venkatachalam (1996) examined the value relevance of banks derivative disclosures and more recently, Ahmed et al. (2006) examined the issue of recognition versus disclosure in the context of SFAS 133. Wong (2000) examined whether disclosures of foreign exchange derivatives, as required by SFAS 119 are associated with the information used by investors to assess the sensitivity of equity returns to currency fluctuations. Barton (2005) documented that firms trade off the use of derivatives and accrual manipulations to smooth earnings. Song (2005) also examines the use of interest rate swaps to manage earnings in the banking sector. He finds that banks enter into swap arrangements to increase (decrease) earnings when they would have otherwise missed (exceeded) their target. In a follow up analysis, he finds no evidence that banks enter into offsetting swap arrangements in subsequent periods to offset the interest rate risk taken on by the initial swap arrangement.

The unanswered questions in the literature are whether non-financial firms are similarly using interest rate swaps as an earnings management device and how effective is the use of interest rate swaps in meeting expectations? In an attempt to provide additional information about the management of earnings using interest rate swaps, we investigate the interest rate swap activity of a broad set of non-financial firms.[9] We begin by examining the sensitivity of swap usage to the term structure in periods where earnings management is likely to be occurring. This is a reasonable place to start because we would like to show that swap usage is driven not only

[9] Financial firms often are engaging in brokering swap arrangements between parties where they will swap fix for float with company A and swap the reversed arrangement with company B. Because of this tendency, their swap arrangements can be more complex than those engaged in by non financial firms. In an effort to better understand the swap activity of the mean firms we exclude financial firms from our analysis.

by the prevailing term structure, but by factors that proxy for the likelihood that earnings are being managed. This leads to our first hypothesis (stated in the alternate):

H_1: The sensitivity of swap usage to the term structure will be greater for firms in periods during which they are most likely to be managing earnings.

If firms are moving their interest expense across time in an attempt to manage earnings, this would be achieved by increasing the use of floating rate swaps when the term structure is particularly steep. We use a variety of measures to represent the likelihood of earnings management and elaborate on these in the next section.

Rather than swapping, firms could issue more floating rate debt and less fixed-rate debt to achieve the same outcome. Swaps are merely one way of changing a firm's interest expense exposure. If firms are changing their swap usage because the underlying debt structure of the firm has changed, then we need to ensure that our results are robust to examining where firm's interest rate exposure ends up after accounting for both the underlying debt and any interest rate swaps. This leads to our second hypothesis (stated in the alternate):

H_2: The sensitivity of a firm's ending interest rate exposure to the term structure will be greater for firms in periods during which they are most likely to be managing earnings.

This hypothesis is very similar to hypothesis 1 with the difference being that earnings management via interest expense is not solely achieved by interest rate swaps, but by any mechanism affecting the firm's final interest rate exposure. However, swaps are the device that are most likely to be used for this purpose because it is solely focused on the interest rate exposure of the firm's debt. Whereas altering the firm's underlying debt contract also potentially changes its source, maturity, credit spread, and covenants, making it a less attractive vehicle for this form of manipulation.

We then examine the market's response to these actions. Prior research has shown that investors discount earnings surprise components that are likely to be managed (Defond and Park 2001). If markets are efficient, they should be able to distinguish between the portion of earnings that arise from a company's main line(s) of business and those generated from one-time financial transactions, such as interest rate swap usage when the term structure is steep. On the other hand, perhaps managers are successfully fooling the market with these transactions, since we otherwise should not see managers engaging in such transactions to meet earnings forecasts if they perceive no benefit to doing so. This leads to our next hypothesis (stated in the alternate):

H_3: The market prices the swap induced component of earnings surprise lower than the component generated from normal operations.

An efficient market will distinguish between normal operating earnings and the transient benefit from the swap transaction and will therefore capitalize the effect of earnings coming from interest expense reduction with a lower multiple than it will operating earnings. Therefore, when we estimate the market's response to a firm making its earnings forecast, positive surprises in earnings will be favorably received but the marginal benefit of an increase in earnings will be muted when that benefit comes from an interest rate swap. In addition, an efficient market will recognize that reductions in interest expense today will likely be offset by higher interest costs in the future since the firm has swapped to floating-rate debt. Because the decrease in interest costs come from a steep term structure (the greater the difference between long-term and short-term interest rates, the greater the reduction in current interest expense), when short-term interest rates rise in the future, as they will do on average, interest costs will rise. Therefore, the response to higher earnings today should be partially offset by the expectation of higher interest costs—lower earnings—in the future.

Evidence indicating that investors recognize and discount the swap component of the earnings surprise would raise questions about the effectiveness of swap usage as a useful earnings management device. Some managers may believe that investors are fixated on reported earnings and will fail to detect the role of swaps in achieving the expected level of EPS. Because swap usage is disclosed in the notes to the financial statements and not reported in a prominent place on the face of the financials or in other required disclosures (8-Ks), the possibility that their use will go undetected seems plausible. However, it may be the case that managers tolerate the discounting of earnings related to the swap activity in an effort to avoid a potentially large negative stock price response, or "earnings torpedo" that would be incurred if they miss their earnings expectation (e.g. Skinner and Sloan 2002 and Hribar, Jenkins and Johnson 2006).

Our hypothesis is that equity markets are efficient and will see through the portion of earnings arising from reductions in interest expense coming from interest rate swap usage. When it sees that a firm would have missed its earnings forecast were it not for the unanticipated change in interest expense, the market will realize that earnings as a whole are not as robust as they appear. The firm's announced earnings will not be received as favorably as the same earnings for an otherwise equivalent firm that did not need to adjust their interest rate swap usage to make their forecast (Hribar, Jenkins and Johnson 2006). While we do not necessarily hypothesize that the announcement effect should be equivalent to that for a firm that actually missed its consensus forecast, we would expect the announcement reaction to be lower than it is for firms that make their earnings forecast with earnings from normal operations. This intuition generates our fourth hypothesis (stated in the alternate):

H_4: The market's response to the component of unexpected earnings from the swap is particularly negative when those earnings enable the firm to meet its consensus earnings forecast.

Not all interest rate swap transactions increase earnings today. If firms swap to a fixed rate exposure in a steep term structure environment, they are actually increasing their current interest expense and reducing current earnings. These firms are least likely to be managing current earnings and are most likely to be hedging. After all, they are incurring lower earnings today to reduce the variability of their future interest payments as well as possibly reducing future interest costs (especially if the term structure is steep, in which case the expectations hypothesis forecasts higher floating rates in the future). Therefore, it makes sense to separate out the firms that are swapping to fix from those swapping to floating to test the symmetry of the market's pricing of the associated interest costs. If the market believes that hedging creates value, then we expect the market to respond favorably to transactions that are likely to be for hedging reasons, as opposed to earnings management. This gives rise to our final hypothesis (stated in the alternate):

H_5: The market responds more favorably to the component of unexpected earnings generated by the interest rate swap when the swap is more likely being used for hedging rather than for earnings management.

III. Research Design

3.1 Swap usage as a function of earnings management and the term structure

Our approach to address hypotheses 1 and 2 is to interact our proxies for earnings management with the yield curve, and determine which factors alter firms' sensitivities to the term structure. We use four different proxies for earnings management:

1. The proximity of actual EPS to consensus analyst forecast (dummy variable).
2. Firms that would have missed their forecast if their swap usage in the current year had been equal to that of the previous fiscal year (dummy variable).
3. The level of discretionary accruals.
4. The intensity with which the firm walks down analysts' forecasts.

Specifically, for the subset of firms that use interest rate swaps at least once during the sample period, we estimate the following:

$$\begin{aligned}(\text{Net Floating Swaps / Debt})_{it} = \alpha_i + \beta_1*(\text{Yield Spread}) + \beta_2*(\text{Yield Spread})*(I) \\ + \beta_3*(I) + \gamma*(\text{Control Variables}) + \varepsilon_{it}\end{aligned} \quad (1)$$

where I is one of the four measures of earnings management listed above.[10] If the coefficient corresponding to the interaction term (β_2) is positive and statistically significant, then the magnitude of that coefficient represents the *incremental* increase in the firm's swap usage sensitivity to the term structure, above and beyond the sensitivity estimated for the average non earnings management firm year, as captured by β_1. With regard to the discretionary accrual and walk-down measures, finding a negative coefficient on the interaction term may provide some evidence that these techniques and swap usage are substitutes.

The tests described above are repeated using the entire sample and examining the percentage of debt that ends up floating after the incorporation of swaps, as done in equation (1), to test hypothesis 2 which will illustrate that the results are robust to this alternative measure of the interest rate exposure choice of firms. Firms may choose not to use interest rate swaps because they are not timing the interest rate market, because they are unable to access the interest rate swap market, or because they are able to arrive at their optimal interest rate exposure without the use of interest rate swaps. Since we are unable to determine why they do not use

[10] As indicated by the α_i term, all of the tests are conducted with firm fixed effects. While the results do not vary significantly when the dependent variable is the percentage of debt that is swapped to floating, the results differ across OLS and firm fixed effects specifications for the percentage of debt that ends up with a floating rate exposure. The major difference in these specifications is that the firm fixed effects regressions allow firms to have different average floating rate exposures and essentially test for how different variables affect deviations from that average firm level. Specifically, there are factors that we have not controlled for that yield different default interest rate exposures that are not completely unwound in the swaps market. If these factors – such as the mix of debt coming from different sources or the preferred interest rate exposure for hedging purposes – vary across firms but are relatively constant during the sample period for the specific firm, such differences would generate additional noise that would bias us against finding any sensitivity to interest rates in an OLS specification. For further discussion of the interpretations of various panel specifications for this data, see Chernenko and Faulkender (2007).

swaps, it is important to verify that our results also hold for the broader sample of firms by looking at their final interest rate exposure.

3.2 Earnings Management Proxies

Following numerous papers in the accounting literature (such as Burgshahler and Dichev (1997), Kasznik and McNichols (2002), Bartov, Givoly, and Hayn (2002), and Matsumoto (2002)), we use I/B/E/S data to construct an indicator variable that is set to one when realized earnings per share are equal to, or higher by no more than one cent, the mean of the final earnings forecast of the fiscal year, and to zero otherwise. The idea is that firms that barely made their earnings forecast are the firms that would most likely have benefited from reducing their interest expense via swaps. We then repeat this construction using a five-cent cutoff since, as we demonstrate in the next section, the impact from swapping debt to a floating exposure may have more than a one cent per share effect, especially when the term structure is rather steep. In addition, recognize that while firms can potentially manage earnings by manipulating their accruals after the end of the fiscal year, interest expense will only be affected by swaps in place *during* the fiscal year. The earlier in the fiscal year that they swap a portion of their debt to floating, the larger incremental impact it will have on earnings. Therefore, firms will not know precisely how far their earnings will be from forecast at the time they consider entering into a swap. However, we believe that firms are likely to know if they are going to miss or make the forecast by a substantial amount, so it is those firms that are close to the forecast that are likely to gain from swapping to floating (or reduce the amount swapped to fixed) as the yield spread increases. For this reason, we use a wider range than that typically examined in the literature.

For our second measure of potential earnings manipulation, we code the variable equal to one if the firm made its earnings forecast that fiscal year but would have missed its forecast if

their swap usage had been equal to the amount used in the previous fiscal year, and zero otherwise.[11] The idea here is that we identify the firms that appear to have benefited from using interest rates swaps to meet their earnings forecast and see if their usage of interest rate swaps has a different sensitivity to interest rates than those firms that would have met/missed their forecast regardless of whether they had changed their use of interest rate swaps. For our floating-rate debt regressions, we construct a similar measure, but use the previous year's floating-rate debt percentage.

As an alternative check of earnings manipulation, we estimate the level of discretionary accruals taken during the corresponding fiscal year. We argue that if firms can achieve their earnings forecast by adopting discretionary accounting accrual adjustments, they may use fewer swaps to time interest rates. Similarly, if the firm is able to improve earnings sufficiently using interest rate swaps, they may need to use discretionary accruals less, or possibly even unwind previous period accruals. Since the swap usage and change in accruals are estimated for the same period, we cannot determine the direction of the causation, merely a contemporaneous correlation. Following previous studies in the accounting literature, we estimate nondiscretionary accruals using a modified version of the Jones (1991) model, as specified by Dechow et al (1995). To improve the statistical reliability of the estimated values, we use data covering the period from 1984 to 2004.

Our final examination of interest rate swap variation for earnings management reasons involves interactions with a measure of the percentage of time that the analyst forecast was

[11] Specifically, we combine the change in swap usage with the average swap yield spread during the year to estimate how much the firm saved in interest rate expense, assuming that swap usage was adjusted at the beginning of the fiscal year (as a robustness check we perform similar calculations assuming that swap usage is adjusted half-way through the fiscal year and one quarter before the end of the fiscal year and get very similar results). We then use marginal tax rates from John Graham (Graham (1996)) and divide by the number of shares outstanding at the end of the fiscal year to get the after-tax effect on earnings per share.

walked down during the sample period. Following Richardson, Teoh, and Wysocki (2004) we define a firm as having walked down their earnings forecast if the realized earnings per share for that fiscal year was below the consensus analyst forecast of the first month of the corresponding fiscal year but above or equal to the consensus analyst forecast of the last month of the fiscal year. So, for a firm whose fiscal year ends in December 2002, we define the firm as having walked down the forecast if the 2002 fiscal year realized annual EPS number is below the consensus analyst forecast in January 2002 but equal to or above the December 2002 consensus forecast. We then take the percentage of fiscal years in the sample period for that firm that are classified as a walk-down to get our measure of the intensity of walking down forecasts.

3.3 Analysis of Market Reaction

Once we establish that interest rate swap usage does appear to vary in ways consistent with earnings management, we move to estimating the market's reaction to this behavior. We begin this section of our empirical tests by replicating a well documented result. The extant literature has found a valuation premium associated with meeting or beating analysts' forecasts (Bartov et al. 2002, Kasznik and McNichols 2002) and that missing the forecast by even a penny can lead to a dramatic loss in firm value—"torpedo effect" (Skinner and Sloan 2002). To examine this relation in our sample we estimate the following model:

$$CAR3 = \beta_0 + \beta_1 SURP + \beta_2 MEET \quad (2)$$

Because we are interested in capturing the response of investors to information released on the earnings announcement date, we accumulate the size adjusted cumulative abnormal return over day -1 through day +1, where 0 corresponds with the earnings announcement date (CAR3). We define the earnings surprise measure (SURP) as the difference between IBES actual EPS and the most recent consensus EPS forecast from IBES. MEET is a dummy variable equal to one when

the forecast error is non-negative and zero otherwise. Based on the extant literature we expect the coefficient on both earnings surprise and meeting expectations will be significantly positive.

Our next model is designed to test hypotheses 3 and 4. In particular we examine whether investors differentially price the swap induced component of the firm's earnings surprise and if the market responds less favorably when firms meet their expectations while using an interest rate swap. We decompose the earnings surprise for swap firms into one component that reflects operating performance and another component that estimates the EPS effect of the swap (SURP_SWAP) to disentangle the two sources of earnings surprise. The swap component is estimated as the difference in IBES actual EPS and EPS if the swap had not occurred. We estimate the difference in earnings by taking the change in the percentage of the firm's debt swapped to floating between the end of the current fiscal year and the previous fiscal year, multiplying this by the amount of debt outstanding at the end of the current fiscal year and by the average difference between the swap rate and LIBOR during the current fiscal year. Essentially, we assume that the market expects the firm's interest rate swap position, as a percent of debt, to be the same as the previous fiscal year. Thus, the change is our estimate of the surprise coming from the new swap transactions. To get the effect on earnings, we multiply this percentage by the amount of the firm's debt and the interest rate differential between long-term and short-term rates. Finally, to get a per share estimate, we divide this gross difference in interest expense by the number of shares outstanding used by IBES to calculate the EPS reported in their database for the corresponding fiscal year.

Using the decomposed earnings surprise, we expand equation (2), continuing to control for the act of meeting or beating market expectations to ensure that our main results are not driven by this well documented finding. We estimate the following model:

$$CAR3 = \beta_0 + \beta_1 SURP + \beta_2 SURP\_SWAP + \beta_3 SWAP + \beta_4 MEET + \beta_5 MEET * SURP\_SWAP \qquad (3)$$

Where, SURP is the total earnings surprise and SURP_SWAP is the portion of the earnings surprise due to the swap activity.[12] By including both SURP and SURP_SWAP in the regression, the response coefficient on the swap component of the earnings surprise is given by $\beta_1 + \beta_2$. The coefficient on SURP_SWAP is the test for hypothesis 3. Finding a significantly negative coefficient on SURP_SWAP (β_2) would indicate that the earnings surprise attributable to the swap is priced lower than the earnings surprise resulting from operating activities. If the β_2 coefficient estimate is zero, then investors do not differentially price the swap component. SWAP is a dummy variable that is equal to one if the firm entered into a new swap arrangement during the fiscal year, and zero otherwise. We interact MEET and SURP_SWAP to determine the incremental market pricing that is assessed when a firm meets or beats market expectations while engaging in an interest rate swap. Consistent with hypothesis 4, we expect β_5 to be significantly negative, indicating that the market responds less favorably to firms who meet or beat market expectations while using an interest rate swap.

We refine equation (3) by introducing a new meet variable, MEET2 which is a dummy variable equal to one when the swapping firm would have missed market expectations had the swap not occurred and is zero otherwise. We expect the coefficients on MEET2 and its interaction with SURP_SWAP to be the same as those predicted for MEET. However, this variable will pick up the market reaction to meeting expectations for newly swapping firms specifically.

Our next test attempts to better understand the asymmetric effect imbedded in equation (3). We augment equation (3) to distinguish between firms that entered into a swap agreement

[12] First we calculate what the EPS would have been had the swap not taken place. The difference between the IBES consensus forecast and this calculation is the measure of the surprise due to swap (SURP_SWAP).

that move their fixed interest rate to floating from those that move their floating interest rate to a fixed rate. We introduce a dummy variable equal to one when firms move to floating (FLOAT), and zero otherwise. We also include an interaction term (FLOAT*SURP_SWAP) to pick up the incremental difference in the earnings surprise component attributable to the swap. We estimate the following equation:

$$CAR3 = \beta_0 + \beta_1 SURP + \beta_2 SURP\_SWAP + \beta_3 SWAP + \beta_4 MEET + \beta_5 MEET * SURP\_SWAP + \beta_6 FLOAT + \beta_7 FLOAT * SURP\_SWAP \quad (4)$$

The regression specifications include control variables that are known to affect the earnings/returns relation. Following Collins and Kothari (1989) we include proxies for risk and growth. Beta proxies for risk and is the decile ranking of market-model beta estimated using rolling 60-month regressions. Following DeFond and Park (2001), we include a proxy for growth which is measured with an indicator variable equal to 1 when the percentage change in book value of equity for the previous year is above the sample median, and zero otherwise. Lastly, we include a control variable for size which equals 1 when the firm is above the median market capitalization for our sample. These three control variables are each interacted with earnings surprise so they act as controls for earnings surprise that is due to risk, growth, and size. The coefficient estimate for beta is predicted to be negative whereas positive coefficient estimates are predicted for growth and size. All non-indicator variables in the above models are deflated by share price at the beginning of the quarter. We control for heteroscedasticity and cross correlation in the data by using robust standard errors where we cluster by year and industry (Wooldridge 2002). The tenor of our results is substantially unchanged when we use ordinary least squares estimation techniques.

IV. Sample and Descriptive Statistics

Sample

We use the sample of non financial firms examined by Chernenko and Faulkender (2007) from Compustat's ExecuComp database covering the period from 1993 to 2003 which has been augmented with hand-collected data on interest rate swap usage by each firm in our sample. The ExecuComp set of firms is ideal for our study since this subset of publicly traded firms are larger in size and therefore will account for most of the dollar volume of interest rate swaps used by non financial firms. The choice of the sample period is governed by the availability of 10-Ks in EDGAR, which are available from 1993 onwards.[13]

This data is merged with IBES summary data for the month of the fiscal year end, i.e. if the fiscal year ends in December, we use the mean analyst forecast data from December. We then compare actual earnings from IBES to the average analyst forecast from IBES to determine if the forecast was met. To estimate the effects of the swap, we estimate the difference in interest expense resulting from a change in the percentage of the firm's debt that has been swapped, as further explained below. Based upon this estimated difference in interest expense, we can determine whether the change in floating rate debt coming from the swap made a difference in the firm meeting its consensus forecast.

Our measure of the interest rate environment is the swap yield spread, defined as the average difference between the 5-year swap rate and 6-month LIBOR over the fiscal year, calculated using data from DataStream. Most floating-rate commercial loans are tied to 6-month LIBOR so to qualify for hedge accounting treatment; their interest rate swap would also have to be tied to 6-month LIBOR. This difference therefore represents the actual difference in interest rates that the firm would face were they to access the swap market for a 5-year interest rate swap.

Descriptive Statistics

[13] For a complete description of how the data was gathered, see Chernenko and Faulkender (2007).

Summary statistics for all of our variables over the entire sample can be found in Table 1. For the mean (median) firm-year in our sample, 41.6% (33.3%) of the outstanding debt has a floating interest rate exposure. The average swap is equivalent to 6.8% of the firm's debt, but since some firms swap to floating while others swap to fixed, a net average of 3.4% of the firm-year's debt is swapped to a fixed interest rate exposure, leaving the average firm-year with 38.3% of their debt floating. While the mean swap amount appears relatively small, observe that the standard deviation of swap usage is 17.8%, indicating that there is a fair amount of variability across firms in the direction and amount of swap usage. Because we are interested in explaining swap usage, many of our specifications will only look at those firms that use interest rate swaps at least once during the sample period. The summary statistics for this subsample appear in panel B of Table 1. Notice that the number of observations is reduced by nearly 45% and that the average size swap has correspondingly increased to 12.3% of the firm's debt. In fact, in untabulated statistics, when we limit our analysis to the 2,999 firm-years in which a swap was used, the average swap corresponds to 25.7% of the outstanding debt. As these statistics suggest, *when* firms use swaps, the magnitude of their usage can be rather large.

Average 1-year Treasury rates over this time period fluctuated widely, ranging from a low of 1.5% to a high of 6.2%. The spread between yields on 5-year swaps and LIBOR averaged 1.1%, ranging from 0.1% to 2.7%. The standard deviation of the spread over this ten-year period was 74 basis points, and therefore in most of the economic interpretations of our findings we will look at one percentage point changes in the yield spread to correspond to just above this one standard deviation movement.

Given the sample statistics on swap usage and the variability of the interest rate environment over the sample period, we can see that interest rate timing can have a significant

effect on earnings in the short-run. As shown in Table 1, the average swap yield spread during the period is 1.1%. Looking at only the subsample of firm-years when a swap was used, the average swap is equivalent to 25.7% of the firm's outstanding debt, which averages just over $1 billion, and has nearly 111 million shares outstanding (figures coming from untabulated results). These figures suggest that the average swap from fixed to floating increases earnings per share (EPS) by 2.5 cents on a pre-tax basis. As another example, for those firm fiscal years ending in 2002, a time period when the yield curve was rather steep (an average spread of 2.5%), the *average* swap position (conditional on having swaps outstanding) at the end of those fiscal years was 28.9% of debt. This level of swap activity corresponds to an EPS difference of 6.5 cents before taxes. The economic impact of this strategy can be significant in the short-run.

Moving on to our variables that proxy for earnings management, we see that there is also a fair amount of variability across firm-year observations. 20.1% (43.6%) of the firm-years correspond to periods where the firm either just met their consensus earnings forecast or beat it by no more than one cent (five cents). Looking at an alternative measure of earnings manipulation, note that 3.3% (5.7%) of the firm-years in the full sample (swap users sub-sample) correspond to periods in which changes in swap activity appear to have enabled the firm to meet its earnings forecast. The change in discretionary accruals in the full sample (swap users sub-sample) represents a 0.6% (0.5%) decline in prior period's total accruals consistent with the notion that discretionary accruals are decreasing on average. On balance, firms participated in walking down the forecast of their earnings 24.4% (24.2%) of the sample period's fiscal years.

V. Results

5.1 Swap Usage Results

Examining hypothesis 1 that firms that meet or just slightly exceed their earnings forecast are more sensitive to movements in the term structure, we find striking results. Given the asymmetric reaction of the market to earnings announcements around forecasted values, the literature suggests that firms reporting at or just above forecast are the ones most likely to have manipulated earnings. When we estimate the incremental sensitivity of swap usage to the term structure for those firms that had earnings per share realizations equal to or up to one cent above the consensus forecast (model 2 of Table 2), we find that these firms are not significantly more sensitive to the interest rate environment than those not coded as close to their forecast. However, when we broaden the set of firms close to forecast by including those beating the consensus forecast by up to five cents (model 3 of Table 2), we estimate a significantly positive coefficient. Firms that miss their consensus forecast or exceed it by more than five cents increase their net use of pay-floating swaps by 2.39% of debt for a one percent increase (100 basis points) in the swap yield spread, whereas those that meet their forecast by five cents or less have an estimated sensitivity to the yield spread of 4.57% (= 2.39 + 2.18), a difference that is statistically significant at better than one percent. Relative to the average swap position of 12.69% of the firm's debt (absolute value) for the observations in this regression, this doubling in the sensitivity of swap usage to the term structure corresponds to a 36.0% (= 4.57% / 12.69%) average change in the use of swaps for a one percent change in the yield spread by firms that are close to the consensus analyst forecast relative to 18.8% for those that are not.

These results are consistent with our hypothesis that firms are more likely to use interest rate swaps when it may help them avoid missing analyst earnings forecasts. The difference in the results for the varying cutoffs is consistent with our discussion above that the economic effect on earnings per share of using interest rate swaps can exceed one cent per share. Also,

recall that firms have to commit to a swap decision *before* they know the earnings realization (unlike accrual manipulation) and that the earlier in the fiscal year when they engage in the swap, the bigger the effect on earnings will be. As a result, being close need not be limited to being within one cent per share. Under either interpretation, when the range was too narrow, firms that may have still benefited from interest rate swaps in making their forecast were categorized as not potentially benefiting, leading to the insignificant difference. The wider range includes more firms that may potentially benefit (and apparently do), improving the statistical significance of the coefficient.[14]

Looking at the results for one of our alternative measures of earnings relative to analyst forecast, we find that those firms for which interest rate swaps enabled them to meet their forecast have swap usage that is significantly more sensitive (at better than one percent) to movements in the term structure (model 4 of Table 2). Economically, the firms that did not need to adjust their swap usage to meet their earnings forecast increase their use of swaps by 2.85% of their total debt outstanding for a one percent increase in the yield spread. However, for the firm-years in which the change in their use of interest rate swaps allowed the firm to meet their forecast (that they would have missed, absent the change), we observe an increase in the percentage of total debt swapped to floating by 8.25% (= 2.85% + 5.40%) for that same one percent increase in the yield spread.[15] Note also the significant increase in R^2 from 14.6% in the baseline regression (model 1) to 17.1% when our alternative measure of earnings manipulation is

[14] In untabulated robustness checks, we find that the pivot point is at approximately three cents per share, which is just above the 2.5 cents per share effect on EPS of the average swap that we calculated above. At this level, the coefficient in the swaps regression is statistically significant whereas in the floating debt regression (the results of which are discussed in detail below), it is not. At four cents, both are significant. Results are available upon request.

[15] We have also examined this earnings management variable by re-calculating what the benefit would have been from adjusting its position 3 or 6 months before the end of the fiscal year rather than adjusting for the entire fiscal year. The results when using these alternative measures are very similar to our current results.

included.[16] Such an increase in statistical power is consistent with our hypothesis that timing the swap market to meet current period earnings forecasts is a strong determinant of the variation in interest rate swap usage across firms.

Moving away from analyst forecasts momentarily, we also examine the relationship between market timing in the interest rate swap market and discretionary accruals. If firms can manipulate earnings using discretionary accruals, they have less incentive to try to meet their short-term earnings target by altering the interest rate exposure of their debt. The results, contained in column 5, are consistent with this argument and suggest that firms with higher discretionary accruals have significantly lower swap usage than those firms that are reducing their use of discretionary accruals. Economically, firms that use interest rate swaps and have the sample mean level of discretionary accruals (-0.5% of the firm's assets at the end of the previous fiscal year) increase their use of interest rate swaps by 3.35% for a one percent increase in the yield spread. This compares to firm-years in which reported earnings were managed upwards by 7.8% of the previous year's book assets (a one standard deviation increase in discretionary accruals), for which we estimate an increase in their swap usage by only 2.27% for the same one percent increase in the yield spread.[17] We caution that while this specification assumes that swap usage is a function of the level of discretionary accruals, it is likely that the choices are made simultaneously or that the causation goes in the opposite direction (that greater swap usage reduces the need to increase discretionary accruals). Still, the findings appear consistent with

[16] When the baseline regression is estimated on the same set of observations as the regression of column 5 of Table 4, the R^2 is 14.7%.

[17] Recall that for our continuous variables with which we generate interaction terms, we standardize the variable to represent the number of standard deviations it is away from the variable's mean value for the entire sample. The coefficient estimates for the interaction terms thereby represent the difference in interest rate sensitivity of swap usage for a one standard deviation move in the corresponding variable.

firms viewing these two actions as substitutes for each other and as additional confirmation that short-term earnings considerations are affecting corporate derivatives policy.

Our final measure of potential earnings management that may compliment swap timing is the walking down of earnings forecasts. When we interact the percentage of firm-years in the sample period with the term structure (model 6), we again find that swap usage sensitivity is significantly different for firms that frequently walk down their forecast relative to those that do not. The statistically positive coefficient suggests that a firm that walked down its forecast every year in our sample period, its swap usage is twice as sensitive to changes in the slope of the yield curve as firms that did not walk down their forecast at all. These results are consistent with the argument that firms more likely to be guiding analysts are also more likely to be using interest rate swaps to alter their short-term earnings in steep term structure environments.

5.2 Floating Rate Debt Levels

While interest rate swaps are the primary mechanism by which firms would alter the interest rate exposure of their debt contracts, firms could also be changing the underlying debt of the firm based upon timing concerns. Therefore, we also need to demonstrate that our results hold for the interest rate exposure that firms end up with, accounting for the underlying debt and their use of swaps. The results from repeating our tests on the final interest rate exposure of the firm can be found in Table 3.

With one exception, the results found when examining the final interest rate exposure are nearly identical to what was found when we just looked at swap usage. Firms that make their consensus earnings forecast by no more than five cents, that made their forecast but would have missed absent the change in their floating debt position, and that use fewer discretionary accruals that fiscal year all have floating rate debt levels that are significantly more sensitive to the term

structure of interest rates. While the coefficient corresponding to the frequency of walking down the forecast remains positive in this specification, its magnitude has dropped and it is no longer statistically significant.

5.3 Market Reaction to Swap Usage

Model 1 in Table 4, Panel A reports the results of the replication detailed in equation (2) with control variables. These results serve to benchmark the relation between the market reaction to earnings surprises and to meeting or beating market expectations. Consistent with the literature, we find a significantly positive coefficient on the surprise (SURP). In addition the coefficient on the meet or beat variable (MEET) is also positive and significant at the 1% level with a magnitude of 0.025. This suggests that, in our sample, firms that meet or beat analysts' forecasts of earnings enjoy a premium of 2.5%. The magnitude of the premium is consistent with prior studies in the area (Bartov et al. 2002 and Dopuch et al. 2005).

Table 4, Panel A also reports the results from estimating equation (3). The second and third columns report the results of reduced forms of the equation. In the results presented for Model 2 we find that the act of undertaking a swap does not seem to matter as the coefficient on SWAP is insignificant. In Model 3, we include the variable SURP_SWAP to isolate the effect of the portion of the earnings surprise attributable to the swap. We find that the coefficient on this variable is negative and significant indicating that the market is differentially pricing the swap induced component of the earnings surprise, consistent with hypothesis 3. An F-test (not reported) further reveals that the swap induced component is not only priced differently, but actually is priced with a significantly negative multiple relative to earnings surprise from operations ($\beta_1+\beta_3$). In column four we report the results of the full model under the heading Model 4. The coefficient on the interaction term MEET*SURP_SWAP is negative and

significant. This suggests that the market penalizes firms that meet or beat analysts' forecasts when participating in an earnings improving interest rate swap. These results provide evidence in support of hypothesis 4, in that the market response is less favorable to firms that meet or beat analysts' forecasts when using an interest rate swap to help meet the forecast. Taken together, the results from Models 3 and 4 provide evidence consistent with the market assessing a large negative stock price response, or "earnings torpedo" to firms that would have missed their analysts' forecast had they not engaged in an interest rate swap (e.g. Skinner and Sloan 2002).

In a follow up analysis we replicate the analysis in Panel A of Table 4 but replace the MEET variable with MEET2. The estimated equations are reported in Panel B of Table 4. The results related to earnings surprise, earnings surprise from the swap, meeting expectations solely due to the swap activities, and the control variables are qualitatively unchanged relative to Panel A across the different specifications. These results continue to support hypothesis 3. However the SWAP dummy variable is significantly negative and the interaction between MEET2 and SURP_SWAP is not significant. This lack of significance on the interaction term is contrary to hypothesis 4.[18] The positive coefficient on MEET2 indicates that the act of meeting expectations is rewarded by the market irrespective of how this occurs—through normal operating earnings or swap usage. When the results from Panel A are coupled with the results in Panel B, they suggest that the market discounts earnings surprise resulting from swapping activity when firms meet expectations.[19] However it appears that after controlling for MEET2, swapping firms are penalized for engaging in a swap as well as for the earnings surprised derived from the swap.

[18] The insignificance of the interaction term is likely due to a lack of power. The MEET2 variable turns on for approximately 10% of the sample and the variation in the interaction term us greater in the sub sample than in the remaining portion of the sample. These two characteristics of the subsample support the notion that there is a lack of power. The only way to address this issue is to increase the size of the subsample significantly.

[19] In untabulated results model 4 is estimated with the MEET and MEET2 variables and their respective interactions. Both MEET and MEET2 are significantly positive, but only the MEET interaction is significantly negative while the MEET2 interaction is not significantly different from zero. The SWAP variable in this analysis is also zero.

It is conceivable that the market response may not be symmetric for firms that enter into swap agreements to move from a fixed-rate to a floating-rate relative to a firm that moved from a floating-rate to a fixed-rate. This is because the current period income statement effects of the two are very different. A firm that moves to a fixed-rate would have higher interest costs in the current period as well as a fixed level of interest expense and payments going forward, reducing the interest rate risk of the debt. A firm that moves to a floating-rate, on the other hand would be able to benefit from a lower interest expense and payment in the current period, but would face higher interest costs and payments in future periods. These conjectures assume an upward sloping yield curve, which exists over the sample period under examination when measured as the difference between the 5-year swap rate and LIBOR.

Table 5 reports the results from estimating equation (4) which tests our fifth hypothesis. The results suggest that the market is able to distinguish between the differing effects of moving from a fixed-rate to a floating-rate and vice versa. A firm that swaps from a floating-rate to a fixed-rate—the firm is moving to a higher interest rate in the current period—would have greater interest expense and lower earnings; thus its earnings surprise component attributable to the swap (SURP_SWAP) would be negative. Therefore, all of the coefficients that relate to firms that moved from floating to fixed should be multiplied by a negative 1 (-1) in order to garner a correct interpretation of the intended relationship. The coefficient on SURP_SWAP, (β_2=-7.32) should be interpreted as the market responding positively when a firm moves from a floating-rate to a fixed-rate—increase in interest expense and a decrease in earnings. In addition, the market adds a premium to the portion of earnings surprise from swap usage when expectations are at least met for firms that move to a fixed-rate (β_5= -4.58) in spite of the decrease in earnings. Overall, the F-test reveals that there is a significantly positive market premium assessed to the

swap induced earnings surprise when expectations are met ($\beta_1 + \beta_2 + \beta_5$). Hence, firms that swapped to a fixed-rate and also at least meet analysts' forecasts have higher cumulative abnormal returns than firms that do not. The implication of this result is that the market rewards firms that use interest rate swaps to manage risk in spite of the fact that it adversely affects their current period earnings.

The results further indicate that the swap induced earnings surprise from firms that swap to floating is treated significantly different from the average firm. However, the market seems to assess a multiple to the swap induced earnings surprise that is not significantly different from zero ($\beta_1 + \beta_2 + \beta_5 + \beta_7$) as measured by the reported F-test. Ex ante one may have predicted that the market multiple assigned to these firms would have been negative, *ceteris paribus,* because these firms would have missed market expectations had they not engaged in the swap. However, because these firms are able to meet market expectations, they have avoided the anticipated negative price reactions. Therefore the benefit to engaging in a fixed for floating interest rate swap is not to increase stock price per say, but to insulate stock price from the "torpedo effect" (Skinner and Sloan 2002). Thus it appears that the market's maintained hypothesis that firms will at least meet expectations is met and therefore no price adjustment is warranted.

The results reported in Table 5 provide additional evidence of the market's ability to disentangle the underlying economics of interest rate swaps. More importantly the results reported here demonstrate the difficulty in assuming symmetry when evaluating economic events. As it relates to this paper, stopping at the results reported in Table 4 would have only described a portion of the phenomena under investigation. By delineating the income increasing—fixed to floating—and income decreasing—floating to fixed—swap arrangements

we are able to document an unexpected market reactions in each sides of the distribution which allow us to better describe the effect under examination.

5.4 Additional Tests

5.4.1 Swap Usage

It is likely that the market can anticipate the usage of swaps by firms that have historically used them. In an effort to investigate this notion, we augment equation (4) to control for the propensity of a firm to use swaps. We propose three separate measures. First, we include the percentage of years during the sample period that the firm used interest rate swaps (USE_PERC). Second, we use the standard deviation of swaps as a percentage of the firm's debt over the sample period (USE_STD). Third, we add a dummy variable equal to one if the firm used a swap at least once during the sample period and zero otherwise (USE). While none of our proxies for swap usage are significant, the reported results (Table 6) indicate that all the finding previously discussed in Tables 4 and 5 hold without exception. Given relatively short life of interest rate swaps, it likely that the proxies that we use for firms' propensity to use interest rate swaps are poor. The research on this theoretical construct is sparse and we are unable to develop more useful measures.

5.4.2 Change in the level of swap activity

All of our analyses thus far in the paper focus on the market's response to new swap usage. This approach assumes that the market expects the percentage of debt swapped from one year to the next to remain unchanged. While we conjecture that this is the market's expectation we do not have any empirical evidence to support this. Thus in an attempt to ensure that we are not biasing the results presented herein, we rerun our analysis using the change in the level of

swap activity for the firm. All of the results previously reported are duplicated when using this alternative specification.

VI. Conclusion

Existing literature has shown us that firms' swap usage is positively associated with the term structure. In this paper, we empirically examine how this relation is affected by the likelihood that a firm is managing earnings, since this would be a reason for this positive association. We find that the sensitivity of term structure to swap usage increases on average for firms with EPS that are close to market expectations and for firms that would have missed expectations without changing their swap usage. We also documented that firms tend to have more income decreasing discretionary accruals in periods when their swap usage increases with the term structure, indicating that these two forms of managing earnings may act as substitutes. Lastly, we document that firms that strategically use interest rate swaps are associated with being more likely to walk down analysts forecasts. Taken together these results provide some evidence that the sensitivity of swap usage and term structure is intensified by the likelihood that a firm is managing earnings.

After establishing the relation between swap usage and the likelihood of earnings management, we examine the market's response to the use of interest rate swaps as an earnings management device by non-financial firms. In particular, we analyze the market's pricing of the component of earnings surprise that is generated from current period swap activity versus that derived from normal operations. We find that the market assesses a significantly smaller and in fact negative coefficient to the swap induced component of earnings surprise relative to operating earnings. When swaps are used in a period where a firm meets or exceeds the market's expectations, the market assesses an additional penalty. Collectively, it appears that earnings

derived from the use of interest rate swaps are significantly downgraded by the market and that this response is accentuated when firms use swaps while meeting expectations.

In a follow up analysis we examine the different market reactions to swapping fixed-rate for floating-rate and vice-versa. We find that the market assesses a premium to the earnings surprise of firms that swap from floating-rate to fixed-rate—increases to current interest expense. This premium is accentuated when the firm is able to meet market expectations in spite of the increased interest expense caused by the swap. The market does not appear to price unexpected earnings of firms that swap from fixed-rate to floating-rate—decrease current interest expense. While there is not a premium for these firms as traditionally defined, these firms appear to avoid the well documented negative price effect that accompanies the missing of market expectations (Skinner and Sloan 2002). These results support the notion that the market is able to discern at least some of the short and long term effect of interest rate swaps on reported earnings and cash flows in a manner that is consistent with the expectations hypothesis of interest rates. Specifically the market appears to be able to identify and reasonably price swap activity that is intended for hedging purposes versus that which is used for meeting market expectations.

The adoption and implementation of SFAS 133 was instrumental in removing some of the stigma attached to derivatives as a result of widely publicized corporate losses in the 1990s (e.g. Orange County, Baring Bank and Proctor & Gamble). The recording of derivatives in the accounts of firms and additional required disclosures provided users of financial statements with the information necessary to evaluate the potential effect on firm value that creative financing arrangements, such as derivatives, may have. This increase in transparent reporting also allowed the market to more accurately impound risk management decisions into stock price on a timely basis. However, like other financial reporting regulations that have flexibility, unintended

consequences have arisen. The analyses presented in this paper documents one circumstance where managers may use a financial reporting regulation—derivatives receiving hedge accounting treatment—to achieve an objective—meeting market expectations—that was not the intent of the standard. While it is difficult to conceive of all the misuses of a particular regulation prior to its implementation, it is important for researcher and practitioners alike to take note of and to report on such unintended consequences as they arise. Such reporting better equips users of financial statements to effectively evaluate the performance of firms and the decisions of managers. Going forward, academic researchers must continue to consider the unintended consequences of regulations and report on the effect they have on the quality of financial reporting and the value of the firm.

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Appendix A
Definitions of Key Terms

Yield Curve

The relation between interest rates (the cost of borrowing) and the time to maturity of the debt for a given borrower. The yield curve is only known with certainty for a few specific maturity dates—those dates for which there are actual instruments (30 day Treasuries, one year Treasury Bonds, etc.). The remainder of the curve is calculated using interpolation.

The slop of the yield curve depends on the relation between short term rates and long term rates. Generally the curve is upward sloping because instruments with longer maturities have higher yields than those with short maturities. In other words, if short term rates are less then long term rates the yield curve will be upward sloping. In addition, the yield curve may be upward sloping because long term maturities are more risky and require a premium to be attached to them in order for investors to acquire them.

From 1993-2003, our sample period the 5 year SWAP rate was greater than LIBOR—short term rates were less them long term rates—except for 5 months in 2000. Therefore, on average the yield curve over our sample period was upward sloping

Yield Spread

The difference in the fixed and floating interest rates. These rates are reported on a monthly basis and represent the average next settlement rate of interest rate swaps.

Market Expectation Hypothesis

The expectation hypothesis states that yield to maturity (YTM) on a long term instrument are equal to the geometric mean of the yield on a series of short term instruments.

$$(1+YTM_N)^N = \prod_{i=1}^{N} E\left[1+YTM_i\right]$$

Risk Adjusted Market Expectation Hypothesis

Instruments with long maturities are more susceptible to catastrophic events. Therefore firms require a risk premium (difference between the bond interest rates and the risk free rate—credit spread) to compensate them for this potential downturn.

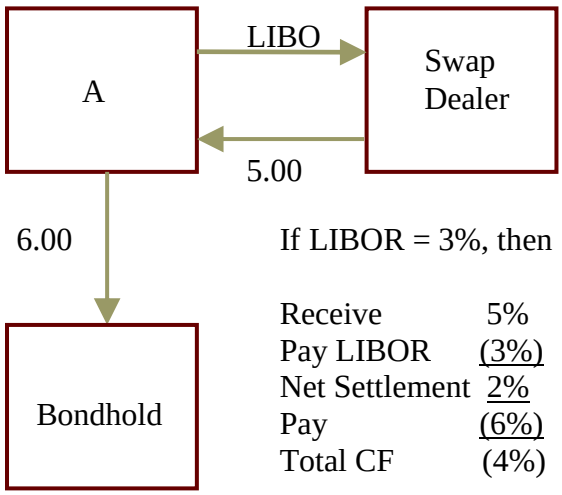
$$(1+YTM_N - RP)^N = \prod_{i=1}^{N} E\left[1+YTM_i\right]$$

Appendix B
Accounting for Fair Value and Cash Flow Hedges per SFAS 133

Example from section 2 of the paper (Fair Value Hedge):
ABC Corp. borrows $10 million (notional amount) from CC Bank with a fixed-rate of 6%. ABC Corp. enters into an interest rate swap with SS Bank to effectively transform the fixed-rate debt into floating-rate debt. Assume that ABC Corp. agrees to pay SS Bank LIBOR and receive 5% in return (where the notional amount of the swap is equal to the principal amount of the loan). By entering into this agreement, ABC Corp. has locked in net interest payments at a floating rate of LIBOR + 1% as shown below:

6% fixed payment made on debt
- 5% fixed swap payment received
+ [LIBOR] floating swap payment made
= [LIBOR] + 1% floating payment made

Net settlement on this swap arrangement for ABC Corp. will be [5% - LIBOR]. ABC Corp. will pay SS bank the difference when LIBOR is less than 5% whereas SS bank will pay ABC Corp. the difference if LIBOR exceeds 5%. Further assume that interest payments are made annually and that LIBOR of 3% applies to the first interest payment. Thus ABC Corp. would receive 2% in the net settlement of the swap. The following is a pictorial representation of the debt contract and swap arrangement:



Beginning of Period 1

Cash	10,000,000	
Debt		10,000,000

Borrowed Debt at 6% for 10 years.

End of Period 1

Interest Expense	600,000	
Cash		600,000

Payment of interest expense on debt

Cash	200,000	
Interest Expense		200,000

Net settlement of the swap

Swap	1,575,000	
Loss on Debt	1, 575,000	
Gain on Swap		1, 575,000
Debt		1, 575,000

Change in value of the swap and the debt ($175,000*9 periods remaining)

Example (Cash Flow Hedge):

Using the same facts offered above, consider a 10,000,000 loan with a LIBOR+1 floating rate attached. ABC enters into a swap agreement where they agree to pay 6% and receive LIBOR +0.5%. LIBOR again equals 3% for the first period.

Beginning of Period 1

Cash	10,000,000	
Debt		10,000,000

Borrowed Debt at 6% for 10 years.

End of Period 1

Interest Expense	400,000	
Cash		400,000

Payment of interest expense on debt

Interest Expense	250,000	
Cash		250,000

Net settlement of the swap

AOCI[20]	1,125,000	
Swap		1,125,000

Change in value of the swap ($125,000*9 periods remaining)

[20] Accumulated Other Comprehensive Income (AOCI) in an equity account. The estimated fair value of the swap asst or liability is adjusted using AOCI which allows these unrealized gains and losses to bypass the income statement.

Figure 1: Change in Interest Rates

The following figure depicts the relative interest rates for a company that has entered into a fixed for floating interest rate swap on a 10 year bond with a fixed interest rate of 6% and LIBOR where LIBOR is 3% with a slope that is increasing at a decreasing rate. Depicted future interest rates are estimated from an upward sloping yield curve under that assumption that the expectations hypothesis of interest rates holds.

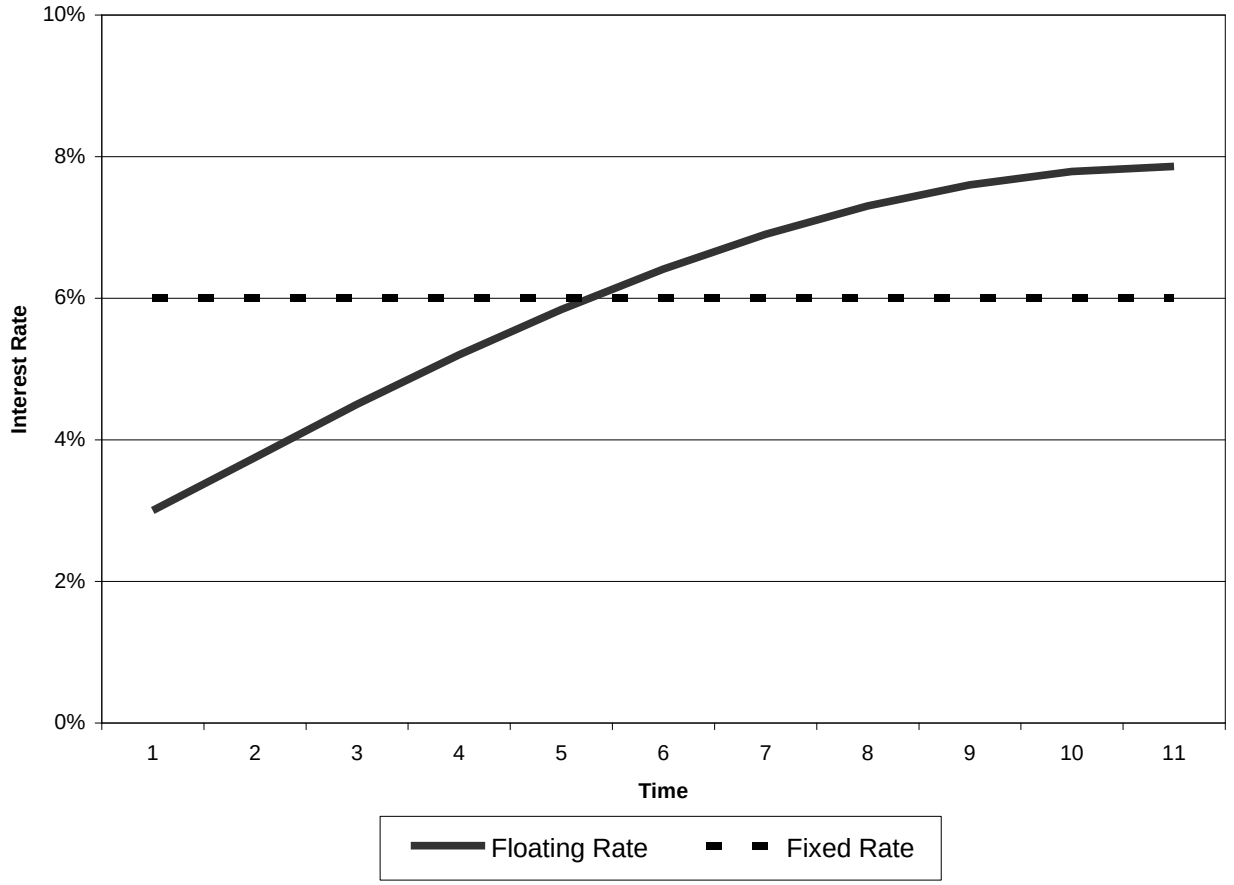


Table 1. Descriptive Statistics

The full sample consists of 1,854 firms in the ExecuComp database over the period June 1993 -May 2003 that have positive amounts of debt at some point during the sample period. The swap subsample consists of firms that report using interest rate swaps at some point during the sample period. Initial/ (final) floating debt percentage is the percentage of outstanding debt that has floating interest rate exposure before/ (after) accounting for interest rate swaps. Percentage swapped to floating is the percentage of outstanding debt that is swapped to a floating interest rate. Long-term debt percentage is the percentage of outstanding debt that has more than five years to maturity. Swap yield spread is the average spread between the 5-year swap rate and 6-month LIBOR during the fiscal year. Swap spread is the average difference between the 5-year swap rate and the 5-year Treasury bond during the fiscal year. Credit spread is the average difference between Moody's Baa and Aaa rated debt during the fiscal year. Economy-wide floating debt percentage is the ratio of commercial paper and bank loan liabilities to the sum of commercial paper, bank loan, and corporate bond liabilities of nonfarm, non financial corporate businesses, as reported in table L.102 of the Flow of Funds Accounts of the United States published by the Federal Reserve Board. EPS close to forecast (1(5) cents) is a binary variable set to 1 when realized earnings per share are equal to or are up to 1(5) cents above the final mean earnings forecast, and to 0 otherwise. EPS close to forecast (swaps (debt) is a binary variable set to 1 when a firm met its final mean earnings forecast using current values of swap usage (floating debt percentage) but would have missed its final mean earnings forecast using lagged values of swap usage (floating debt percentage), and to 0 otherwise. Discretionary accruals measure the amount of earnings management. They are calculated using a modified version of the Jones (1991) model (see for instance Dechow et al (1995)) and are scaled by lagged total assets. Earnings forecast walk down is a binary variable set to 1 when a firm met its final mean earnings forecast but would have missed its initial mean earnings forecast, and to 0 otherwise.

Panel A: Full Sample

Variable		Mean	Median	Standard Deviation	Min.	Max
Initial floating debt percentage	11,261	0.416	0.333	0.351	0.000	1.000
Percentage swapped to floating	11,261	−0.034	0.000	0.178	−1.000	1.000
Absolute value of the percentage swapped to floating	11,261	0.068	0.000	0.168	0.000	1.000
Final floating debt percentage	11,261	0.383	0.308	0.333	0.000	1.000
Long-term debt percentage	11,261	0.474	0.495	0.345	0.000	1.000
1-year Treasury yield	11,261	4.876	5.310	1.219	1.548	6.248
Swap yield spread	11,261	1.117	0.829	0.742	0.139	2.695
Swap spread	11,261	0.499	0.484	0.225	0.217	0.946
Credit spread	11,261	0.765	0.689	0.190	0.587	1.313
Economy-wide floating debt percentage	11,261	0.327	0.343	0.041	0.206	0.363
Ln(Sales)	11,261	6.955	6.917	1.448	−3.058	12.410
Leverage	11,261	0.185	0.159	0.140	0.000	0.853
Debt or CP rating	11,261	0.555	1.000	0.497	0.000	1.000
EPS close to forecast (1 cent)	9,311	0.201	0.000	0.401	0.000	1.000
EPS close to forecast (5 cent)	9,311	0.436	0.000	0.496	0.000	1.000
EPS close to forecast (swaps)	7,689	0.033	0.000	0.178	0.000	1.000
EPS close to forecast (debt)	7,689	0.054	0.000	0.226	0.000	1.000
Discretionary accruals	10,737	-0.006	-0.003	0.082	-2.389	2.159
Earnings forecast walkdown	9,426	0.244	0.000	0.429	0.000	1.000

Table 1. Descriptive Statistics, continued

Panel B: Swap Users Subsample

Variable		Mean	Median	Standard Deviation	Min.	Max
Initial floating debt percentage	6,269	0.426	0.355	0.326	0.000	1.000
Percentage swapped to floating	6,269	−0.061	0.000	0.235	−1.000	1.000
ABS % swapped to floating	6,269	0.123	0.000	0.210	0.000	1.000
Final floating debt percentage	6,269	0.368	0.316	0.290	0.000	1.000
Long-term debt percentage	6,269	0.493	0.511	0.320	0.000	1.000
1-year Treasury yield	6,269	4.854	5.310	1.229	1.548	6.248
Swap yield spread	6,269	1.132	0.829	0.749	0.139	2.695
Swap spread	6,269	0.499	0.495	0.225	0.217	0.946
Credit spread	6,269	0.767	0.689	0.192	0.587	1.313
Economy-wide floating debt %	6,269	0.327	0.343	0.041	0.206	0.363
Ln(Sales)	6,269	7.418	7.360	1.346	1.398	12.410

This table reports pairwise correlation coefficients between various earnings management variables. EPS close to forecast (1(5) cents) is a binary variable set to 1 when realized earnings per share are equal to or are up to 1(5) cents above the final mean earnings forecast, and to 0 otherwise. EPS close to forecast (swaps) is a binary variable set to 1 when a firm met its final mean earnings forecast using current values of swap usage but would have missed its final mean earnings forecast using lagged values of swap usage, and to 0 otherwise. Discretionary accruals measure the amount of earnings management. They are calculated using a modified version of the Jones (1991) model (see for instance Dechow et al (1995)) and are scaled by lagged total assets. Earnings forecast walk down is a binary variable set to 1 when a firm met its final mean earnings forecast but would have missed its initial mean earnings forecast, and to 0 otherwise.

Panel C: Correlation Matrix

	EPA (1 cent)	EPA (5 cent)	EPA (swaps)	EPA (debt)	Accruals	Walk Down
EPS close to forecast (1 cent)	1.000					
EPS close to forecast (5 cents)	0.571	1.000				
EPS close to forecast (swaps)	0.265	0.200	1.000			
EPS close to forecast (debt)	0.393	0.262	0.435	1.000		
Discretionary accruals	0.017	0.021	−0.002	0.032	1.000	
Earnings forecast waldown	0.242	0.331	0.108	0.140	-0.0114	1.000

Table 2. The Usage of Interest Rate Swaps When Earnings Management is Likely

This table reports the results of interest rate swap usage regressions. All regressions are estimated using firm fixed effects using the subsample of interest rate swap users, firms that report using interest rate swaps at any point during the sample period. Credit spread is the average difference between Moody's Baa and Aaa rated debt during the fiscal year. Swap yield spread is the average spread between the 5-year swap rate and 6-month LIBOR during the fiscal year. Swap spread is the average difference between the 5-year swap rate and the 5-year Treasury bond during the fiscal year. EPS close to forecast (1(5) cents) is a binary variable set to 1 when realized earnings per share are equal to or are up to 1(5) cents above the final mean earnings forecast, and to 0 otherwise. EPS close to forecast (swaps) is a binary variable set to 1 when a firm met its final mean earnings forecast using current values of swap usage but would have missed its final mean earnings forecast using lagged values of swap usage, and to 0 otherwise. Discretionary accruals measure the amount of earnings management. They are calculated using a modified version of the Jones (1991) model (see for instance Dechow et al (1995)) and are first scaled by lagged total assets and then standardized so that the interaction term coefficient measures the change in the sensitivity of swap usage to yield spread due to one standard deviation change in discretionary accruals. Average earnings walk down is the frequency with which the firm walked down its earnings forecast during the sample period used. White heteroskedasticity-consistent standard errors, adjusted for clustering by company, are reported in parenthesis below the coefficients. *, **, and *** correspond to the coefficients being significant at 10%, 5%, and 1%, respectively

Panel A: Models 1-3

	Model 1	**Model 2**	**Model 3**
Intercept	-0.106	-0.003	0.001
	(0.108)	(0.123)	(0.123)
1-year Treasury yield	0.395	0.560	(0.550)
	(0.500)	(0.552)	
Credit spread	−0.011	−0.725	−1.034
	(2.265)	(2.538)	(2.533)
Swap yield spread	3.382***	3.270***	2.389***
	(0.495)	(0.603)	(0.652)
Swap spread	1.077	−0.295	−0.062
	(1.871)	(2.064)	(2.091)
EPS close to forecast (1 cent)		0.005	
		(0.012)	
EPS close to forecast (1 cent)*Yield spread		−0.079	
		(0.994)	
EPS close to forecast (5 cents)			−0.020**
			(0.009)
EPS close to forecast (5 cents)*Yield spread			2.182***
			(0.758)
Initial floating debt percentage	−0.305***	−0.313***	−0.312***
	(0.020)	(0.023)	(0.023)
Long-term debt percentage	−0.012	−0.037*	−0.037*
	(0.018)	(0.021)	(0.021)
Leverage	0.059**	0.142***	0.143***
	(0.044)	(0.054)	(0.054)
Ln(Sales)	-0.000	-0.009	-0.009
	(0.009)	(0.011)	(0.011)
Debt or CP rating	-0.020	-0.021	-0.021
	(0.015)	(0.017)	(0.017)
Economy-wide floating debt percentage	0.356	0.280	0.304
	(0.222)	(0.243)	(0.243)
N	6,269	5,173	5,173
R-squared	0.146	0.144	0.146

Table 2. The Usage of Interest Rate Swaps When Earnings Management is Likely, continued

Panel B: Models 4-6

	Model 4	Model 5	Model 6
Intercept	-0.087	-0.132	-0.069
	(0.132)	(0.114)	(0.106)
1-year Treasury yield	1.693**	0.279	0.363
	(0.802)	(0.517)	(0.484)
Credit spread	0.047	0.698	−0.370
	(2.503)	(2.364)	(2.283)
Swap yield spread	2.846***	3.349***	2.717***
	(0.535)	(0.512)	(0.650)
Swap spread	−1.429	1.701	1.343
	(2.170)	(1.890)	(1.899)
EPS close to forecast (swaps)	0.036*		
	(0.020)		
EPS close to forecast (swaps)*Yield spread	5.398***		
	(1.333)		
Discretionary accruals		0.022***	
		(0.005)	
Discretionary accruals*Yield spread		−1.076***	
		(0.377)	
Average forecast walk down*Yield spread			3.089*
			(1.630)
Initial floating debt percentage	−0.314***	−0.312***	−0.309***
	(0.020)	(0.020)	(0.020)
Long-term debt percentage	−0.045**	−0.017	−0.020
	(0.023)	(0.019)	(0.018)
Leverage	0.168***	0.077*	0.088**
	(0.060)	(0.046)	(0.045)
Ln(Sales)	-0.002	0.001	-0.005
	(0.012)	(0.010)	(0.009)
Debt or CP rating	-0.022	-0.017	-0.017
	(0.018)	(0.015)	(0.015)
Economy-wide floating debt percentage	0.100	0.419*	0.355
	(0.284)	(0.233)	(0.221)
N	4,412	5,932	6,051
R-squared	0.171	0.154	0.151

Table 3. Swapping to Floating to Beat Benchmark

This table reports the results of floating debt percentage regressions. All regressions are estimated using firm fixed effects using the full sample. Credit spread is the average difference between Moody's Baa and Aaa rated debt during the fiscal year. Swap yield spread is the average spread between the 5-year swap rate and 6-month LIBOR during the fiscal year. Swap spread is the average difference between the 5-year swap rate and the 5-year Treasury bond during the fiscal year. EPS close to forecast (1(5) cents) is a binary variable set to 1 when realized earnings per share are equal to or are up to 1(5) cents above the final mean earnings forecast, and to 0 otherwise. EPS close to forecast (swaps) is a binary variable set to 1 when a firm met its final mean earnings forecast using current values of swap usage but would have missed its final mean earnings forecast using lagged values of swap usage, and to 0 otherwise. Discretionary accruals measure the amount of earnings management. They are calculated using a modified version of the Jones (1991) model (see for instance Dechow et al (1995)) and are first scaled by lagged total assets and then standardized so that the interaction term coefficient measures the change in the sensitivity of swap usage to yield spread due to one standard deviation change in discretionary accruals. Average earnings walk down is the frequency with which the firm walked down its earnings forecast during the sample period used. White heteroskedasticity-consistent standard errors, adjusted for clustering by company, are reported in parenthesis below the coefficients. *, **, and *** correspond to the coefficients being significant at 10%, 5%, and 1%, respectively

Panel A: Estimation of Models 1-3

Variable	Model 1	Model 2	Model 3
Intercept	0.067	0.104	0.109
	(0.102)	(0.123)	(0.123)
1-year Treasury yield	0.301	0.474	0.447
	(0.508)	(0.576)	(0.576)
Credit spread	1.888	0.367	0.263
	(2.324)	(2.515)	(2.617)
Swap yield spread	1.170**	1.391**	0.921
	(0.507)	(0.604)	(0.643)
Swap spread	3.335*	2.135	2.264
	(1.830)	(2.034)	(2.035)
EPS close to forecast (1 cent)		−0.008	
		(0.011)	
EPS close to forecast (1 cent)*Yield spread		0.581	
		(0.864)	
EPS close to forecast (5 cents)			−0.020**
			(0.009)
EPS close to forecast (5 cents)*Yield spread			1.438**
			(0.729)
Long-term debt percentage	−0.202***	−0.219***	−0.219***
	(0.015)	(0.017)	(0.017)
Leverage	0.205***	0.280**	0.276**
	(0.043)	(0.051)	(0.051)
Ln(Sales)	0.015	0.015	0.015
	(0.010)	(0.012)	(0.012)
Debt of CP rating	-0.131***	-0.132***	-0.132***
	(0.017)	(0.019)	(0.019)
Economy-wide floating debt percentage	0.843***	0.780***	0.795***
	(0.204)	(0.232)	(0.232)
N	11,261	9,311	7,311
R-squared	0.094	0.105	0.106

Table 3. Swapping to Floating to Beat Benchmark, continued

Panel A: Estimation of Models 4-6

Variable	Model 4	Model 5	Model 6
1-year Treasury yield	1.009	0.088	0.144
	(0.780)	(0.519)	(0.514)
Credit spread	−0.945	1.288	1.010
	(2.529)	(2.380)	(2.382)
Swap yield spread	1.311**	1.156**	1.104*
	(0.584)	(0.515)	(0.638)
Swap spread	1.394	4.388**	3.954**
	(2.113)	(1.871)	(1.873)
EPS close to forecast (debt)	0.110***		
	(0.011)		
EPS close to forecast (swaps)*Yield spread	1.751**		
	(0.823)		
Discretionary accruals		0.030***	
		(0.006)	
Discretionary accruals*Yield spread		−0.880*	
		(0.488)	
Average forecast walk down*Yield spread			0.631
			(1.645)
Long-term debt percentage	−0.221***	−0.201***	−0.200***
	(0.018)	(0.015)	(0.015)
Leverage	0.341**	0.210**	0.200***
	(0.057)	(0.045)	(0.044)
Ln(Sales)	0.029**	0.019*	0.014
	(0.015)	(0.010)	(0.010)
Debt of CP rating	-0.135***	-0.127***	-0.130***
	(0.021)	(0.017)	(0.017)
Economy-wide floating debt percentage	0.632**	0.880***	0.846***
	(0.269)	(0.210)	(0.208)
N	7,689	10,737	10,747
R-squared	0.131	0.103	0.093

Table 4. Stock market response to meeting EPS forecast due to interest rate swap

The sample is comprised of 5,888 firms. *CAR3* is the size-adjusted cumulative abnormal stock return for days -1 to =1 where 0 corresponds to the annual earnings announcement date. *SUPR* is total unexpected earnings, defined as reported EPS (IBES "actual" EPS) minus the most recent consensus EPS forecast from IBES. *SURP_SWAP* is the change in annual EPS attributable to the swap. *SWAP* is an indicator variable equal to one if the firm engaged in a swap for the year. *SWAP_POS* is an indicator variable equal to one if the swap that the firm engaged in lead to an increase in EPS. *MEET* is an indicator variable equal to one if the firm met or beat earnings expectations for the period. Note that the response coefficient for the swap earnings surprise component is given by the sum of *SURP* and *SURP_SWAP*. All non indicator variables are deflated by beginning year price, P. Robust standard errors are reported parenthetically. White heteroskedasticity-consistent standard errors, adjusted for clustering by company and year, are reported in parenthesis below the coefficients. *, **, and *** correspond to the coefficients being significant at 10%, 5%, and 1%, respectively

$$CAR3 = \beta_0 + \beta_1 SURP + \beta_2 MEET \quad (1)$$

$$CAR3 = \beta_0 + \beta_1 SURP + \beta_2 SURP\_SWAP + \beta_3 SWAP + \beta_4 MEET + \beta_5 MEET * SURP\_SWAP \quad (2)$$

Panel A: Estimation of equations 1 and 2 using MEET

Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**
INTERCEPT	0.0020	0.0022	0.0028	0.0027
	(0.0020)	(0.0022)	(0.0022)	(0.0022)
SURP	0.3645***	0.3647***	0.3483***	0.3496***
	(0.1339)	(0.1338)	(0.1415)	(0.1410)
SURP_SWAP			-0.7958***	-0.6398**
			(0.3058)	(0.3178)
SWAP		-0.0006	-0.0008	-0.0007
		(0.0018)	(0.0018)	(0.0018)
MEET	0.0170***	0.0170***	0.0158***	0.0158***
	(0.0019)	(0.0019)	(0.0020)	(0.0020)
MEET * SURP_SWAP				-0.3813***
				(0.1531)
SIZE*SURP	-0.4744***	-0.4744***	-0.1206	-0.1211
	(0.1926)	(0.1926)	(0.2264)	(0.2261)
GROWTH*SURP	0.4428**	0.4420**	0.6250**	0.6129**
	(0.2346)	(0.2429)	(0.2819)	(0.2822)
BETA*SURP	-0.0011***	-0.0011***	-0.0011***	-0.0011***
	(0.0003)	(0.0021)	(0.0003)	(0.0003)
N		5,156		
R-squared	0.042	0.042	0.044	0.044

Table 4. Stock market response to meeting EPS forecast due to interest rate swap, continued

Panel B: Estimation of equations 1 and 2 using MEET2

Variable	Model 1	Model 2	Model 3	Model 4
INTERCEPT	0.0112***	0.0123***	0.0120***	0.0120***
	(0.0016)	(0.0017)	(0.0017)	(0.0017)
SURP	0.4925***	0.4913***	0.4530***	0.4537***
	(0..1109)	(0.1102)	(0.1192)	(0.1192)
SURP_SWAP			-1.1893***	-1.1702***
			(0.3054)	(0.3097)
SWAP		-0.0041**	-0.0044**	-0.0044***
		(0.0020)	(0.0020)	(0.0020)
MEET2	0.0110***	0.0132***	0.0129***	0.0129***
	(0.0024)	(0.0026)	(0.0026)	(0.0026)
MEET2 * SURP_SWAP				-0.5693
				(1.4706)
SIZE*SURP	-0.3962*	-0.3992*	0.1207	0.1135
	(0.2386)	(0.2368)	(0.2350)	(0.2351)
GROWTH*SURP	0.4822**	0.4755**	0.7453***	0.7400***
	(0.2434)	(0.2429)	(0.2842)	(0.2857)
BETA*SURP	-0.0010	-0.0010***	-0.0010***	-0.0010***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
N	5,156	5,156	5,156	5,156
R-squared	0.029	0.030	0.034	0.034

Table 5. Stock market response to meeting EPS forecast due to interest rate swap controlling for direction of swap.

The sample is comprised of 5,888 firms. *CAR3* is the size-adjusted cumulative abnormal stock return for days -1 to =1 where 0 corresponds to the annual earnings announcement date. *SURP* is total unexpected earnings, defined as reported EPS (IBES "actual" EPS) minus the most recent consensus EPS forecast from IBES. *SURP_SWAP* is the change in annual EPS attributable to the swap. *SWAP* is an indicator variable equal to one if the firm engaged in a swap for the year. *SWAP_POS* is an indicator variable equal to one if the swap that the firm engaged in lead to an increase in EPS. *MEET* is an indicator variable equal to one if the firm met or beat earnings expectations for the period. *FLOAT* is an indicator variable equal to one if the firm uses a swap to move from a fixed rate to a floating rate during the period. Note that the response coefficient for the swap earnings surprise component is given by the sum of *SURP* and *SURP_SWAP*. All non indicator variables are deflated by beginning year price, P. White heteroskedasticity-consistent standard errors, adjusted for clustering by company and year, are reported in parenthesis below the coefficients. *, **, and *** correspond to the coefficients being significant at 10%, 5%, and 1%, respectively

Variable	Model 1
INTERCEPT	0.0028
	(0.0022)
SURP♌,♋	0.3441***
	(0.1409)
SURP_SWAP♌,♋	-0.7175**
	(0.3238)
SWAP	-0.0056**
	(0.0023)
MEET	0.0155***
	(0.0020)
MEET*SURP_SWAP♌♋	-4.7391***
	(1.0531)
MEET2	
MEET2*SURP_SWAP♌♋	
FLOAT	0.0060**
	(0.0029)
FLOAT*SURP_SWAP♋	4.6562***
	(1.0552)
SIZE*SURP	-0.1460
	(0.2257)
GROWTH*SURP	0.6043**
	(0.2845)
BETA*SURP	-0.0010***
	(0.0003)
♌F- test	22.66***
♋F- test	1.44
N	5,156
Adj. R-squared	0.049

** Significant at the 1% level.
* Significant at the 5% level.

Table 6. Stock market response to meeting EPS forecast due to interest rate swap controlling for direction of swap and swap usage.

The sample is comprised of 5,888 firms. *CAR3* is the size-adjusted cumulative abnormal stock return for days -1 to =1 where 0 corresponds to the annual earnings announcement date. *SURP* is total unexpected earnings, defined as reported EPS (IBES "actual" EPS) minus the most recent consensus EPS forecast from IBES. *SURP_SWAP* is the change in annual EPS attributable to the swap. *SWAP* is an indicator variable equal to one if the firm engaged in a swap for the year. *FLOAT* is an indicator variable equal to one if the firm uses a swap to move from a fixed rate to a floating rate during the period. *USE_PERC* the percentage of years during the sample period that the firm used interest rate swaps. *USE_STD* standard deviation of swaps as a percentage of debt for the firm over the sample period. *USE* a dummy variable equal to one if the firm used a swap at least once during the sample period and zero otherwise. All non indicator variables are deflated by beginning year price, P. Robust standard errors are reported parenthetically. White heteroskedasticity-consistent standard errors, adjusted for clustering by company, are reported in parenthesis below the coefficients. *, **, and *** correspond to the coefficients being significant at 10%, 5%, and 1%, respectively

Variable	Model 2	Model 3	Model 4
INTERCEPT	0.0041*	0.0027	0.0034
	(0.0022)	(0.0022)	(0.0024)
SURP	0.3454***	0.3442**	0.3443***
	(0.1404)	(0.1409)	(0.1406)
SURP_SWAP	-0.7580**	-0.7177**	-0.7208**
	(0.3240)	(0.3236)	(0.3234)
SWAP	0.0002	-0.0058**	-0.0049**
	(0.0032)	(0.0025)	(0.0025)
MEET	0.0155***	0.0155***	-0.0155***
	(0.0020)	(0.0020)	(0.0020)
MEET*SURP_SWAP	-4.7209***	-4.7201***	-4.7370***
	(1.0312)	(1.0665)	(1.0534)
FLOAT	0.0059**	0.0061**	0.0060**
	(0.0029)	(0.0029)	(0.0029)
FLOAT*SURP_SWAP	4.6725***	4.6379***	4.6545***
	(1.0327)	(1.0675)	(1.0555)
USE_PERC	-0.0103***		
	(0.0037)		
USE_STD		0.0020	
		(0.0104)	
USE			-0.0011
			(0.0021)
SIZE*SURP	-0.1329	-0.1469	-0.1437
	(0.2260)	(0.2257)	(0.2259)
GROWTH*SURP	0.6094**	0.6044**	0.6051**
	(0.2852)	(0.2844)	(0.2841)
BETA*SURP	-0.0011***	-0.0010***	-0.0011***
	(0.0003)	(0.0003)	(0.0003)
N	5,164	5,164	5,164
Adj. R-squared	0.050	0.049	0.049