

# Processing swaps: controls, challenges, and considerations

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## Abstract

**Purpose** – *The aim of this paper is to discuss the business and operational considerations and controls involved when derivatives, specifically swap contracts, are used as investment vehicles. Overall, the paper attempts to provide the baseline for understanding swap processing requirements and guidance to professionals who have compliance and oversight responsibility for these investment products.*

**Design/methodology/approach** – *The approach focuses on the core understanding of the swap investment vehicle and the procedures, controls, and operating environment required to process them correctly.*

**Findings** – *Historically, firms have addressed the procedures and controls surrounding swap investment vehicles as a reaction to processing errors. Financial services companies and their service providers need to proactively review their portfolios, procedures, and controls in an effort to mitigate and manage the risks associated with the processing of swap contracts.*

**Originality/value** – *Based on first-hand experience working at and/or with asset managers and service providers, the paper has endeavored to present current and thought provoking information for management consideration on this hot-button issue.*

**Keywords** *Investments, Exchange, Control systems*

**Paper type** *Technical*

## Introduction

The growth of the over the counter derivatives (OTC) market has been significant over the past decade and has mirrored the expansion of alternative investment funds. Derivatives, particularly swaps, are used by investment managers to supplement their total investment return, hedge against or exploit interest rate, foreign exchange and other market fluctuations, and to manage the total risk of their portfolios. As investors seek more alpha-producing opportunities, more complex and innovative investment products will be devised to meet the demand. This environment presents several operational challenges to asset managers and their service providers. The volume and complicated economics of these instruments will continue to put pressure on the scalability of securities processing operations.

The International Swaps and Derivatives Association (ISDA) estimated that by mid-2006, the total notional amount outstanding of interest rate swaps, options and cross-currency swaps expanded 18 percent over the prior year to \$250.8 trillion. The fastest growing segment of the market continues to be credit default swaps, which swelled 52 percent over the same period to \$26.0 trillion, up from \$17.1 trillion. Equity derivatives, including equity swaps, grew 15 percent to \$6.4 trillion.

The ISDA also monitors a number of operational issues that present challenges during a derivative's lifespan. These issues occur in the trade entry and confirmation processes. The mid-2006 ISDA operations survey indicated that approximately 21 percent of credit

derivatives needed to be rebooked to correct or complete deal details. Additional complexity is introduced when fund administration is outsourced and the timely communication of deal details is not always possible.

Because of the additional risks borne by divergent product knowledge and few automated controls, investment managers and service providers must deploy experienced personnel to provide the level of expertise required to correctly process, value, account for, and report on each transaction. Several investment managers and service providers have enacted top-down mandates that ensure that proper controls and review procedures are in place, especially where spreadsheets and manual accounting entries are the coin of the realm. An emerging trend among service providers is to adopt a proactive and collaborative approach with investment managers and external auditors, led by a complex securities specialist who acts as a single point of contact for derivatives. This arrangement represents the model for identifying issues early and resolving them correctly. Indeed, all aspects of swaps and derivatives processing could benefit from process-improvement initiatives.

### **Today's challenges**

Today's challenges existed when the first swap transactions were completed years ago. However, at that time they were understandable and more manageable due to the low volume and complexity, which by today's standards would be considered basic.

Achieving the success rates strived for by securities servicing agents today requires skilled, knowledgeable personnel, effective daily and periodic procedures and controls, and an operating model that efficiently and effectively utilizes the available resources and technology. The end result is the prevention of most errors and the detection of the rest.

The shared priorities for investment managers and asset service providers are two-fold. First, they need to ensure that the daily processing of swaps and other complex derivatives is performed accurately. Second, they should undertake a broader, more strategic review of their operations to ensure that the tasks, systems, and people are appropriately organized in a way that makes the first priority possible.

### **Required knowledge of swaps**

In the processing of transactions in more common financial instruments (stocks, bonds, commercial paper, etc.) and some simple derivatives, an understanding of the fundamental characteristics of the instrument is preferable, but not required. Correct transaction processing simply requires the proper adherence to established procedural instructions and subsequent supervision and review. No such luxury exists with swaps. Processing swaps requires a solid understanding of swaps in general and an in-depth understanding of the swaps in the portfolios under one's care. Falling short of this requirement is akin to playing with fire. One may not always get burned, but if something is not learned from the experience, getting burned in the future is all but a certainty.

Swaps come in many sizes, shapes, and varieties, from a straight-forward interest rate swap exchanging variable interest for fixed, to more complex and exotic swaps based on commodities, currencies, credit risk, or various market indices. As the complexity of the swap increases, so too does the difficulty in understanding it and determining its proper accounting and valuation treatment. Regardless of the complexity, however, the ground rules are the same for understanding all types of swaps. First, one must understand the fundamental characteristics of the swap, and second, possess at least a basic comprehension of the economic intention of the swap.

### ***Fundamental characteristics***

Understanding the fundamental characteristics of a specific swap presupposes a general understanding of swaps. Such an understanding includes a broad knowledge of financial instruments, financial markets, various indices, securities processing, fund accounting and valuation, and how any or all relate to swaps. Funds investing in swaps are often among the more challenging funds to administer and, as such, typically have more experienced staff assigned to them at the fund administrator shops. This broad experience will often be

sufficient in meeting the general understanding requirements. If not, a quick tutorial can provide the required foundation.

The fundamental characteristics of a swap differ depending on the type of swap, but most of what needs to be understood for accounting and valuation of a swap falls into two categories:

1. Who pays/receives what?
2. How will the swap be valued?

*Who pays/receives what? When? How is it calculated?.* With every swap transaction, each party pays or receives something in exchange for something else. On an interest rate swap, variable interest is exchanged for fixed; on an equity swap, variable interest may be exchanged for the return on an equity security. Understanding the details of this dynamic is critical for the proper setup and processing of a swap.

When a swap transaction is executed, the investment manager and the counterparty (broker) agree on all key elements of the trade, which the investment manager would then provide to the fund administrator via a trade ticket. The information on the trade ticket would include, but not be limited to, that shown in Table I.

In Table I, a fund entered into an interest rate swap on July 24, 2007 which calls for it to pay a fixed rate of 5.05 percent and receive the three-month Libor based on a notional amount of \$100 million. The swap is effective for one year beginning July 31, 2007, and the three month Libor rate should be reset every three months (October 31, January 31, April 30). Properly accounting for this swap requires updating the three-month Libor rate each quarter and recognizing the interest income and expense streams beginning on July 31, 2007. The cash settlement of the income/expense streams can be either on a gross or net basis, which is determined by the investment manager and counterparty.

Determining the accounting treatment can be more difficult with complex swaps, but the exercise is very much the same. Essentially, the administrator will need to determine what the fund will be paying and receiving, then establish both payment streams on the accounting system.

The second requirement for the proper accounting treatment in this example is the valuation of the swap. The valuation will occur on the frequency mandated by the account and could range from daily for a registered retail fund to monthly for a hedge fund. The swap in the example assumes daily valuation beginning July 25 2007, or a traditional trade date + 1 basis.

*How will the swap be valued?.* The value of a swap can vary on a daily basis depending on the type of swap and the market conditions that affect it. The fluctuations in value can sometimes be substantial. The fund administrator must clearly understand how to value a

**Table I**

<i>Element</i>	<i>Example – interest rate swap</i>
Buy or sell	Buy
Trade date	July 24, 2007
Settle date	July 27, 2007
Effective date	July 31, 2007-July 31, 2008
Description	Pay 5.05 fixed, receive 3 Mo. Libor
Maturity date	July 31, 2008
Notional amount	100,000,000
Rate to be paid	Fixed 5.05 percent
Rate to be received	3 month Libor
Calculation methodology	30/360, reset quarterly
Settlement amount	\$0
Counterparty	ABC Bank
Currency	US\$

swap properly, right from its inception. Clean (no income streams included) or dirty (income streams included in price) pricing methods need to be verified with the investment manager or pricing vendor. Some accounting operations have tools available to them that calculate swap values; others use external vendors, while some are valued by brokers. Regardless of the method used, the valuation process must be reliable, agreed upon with the investment manager and compared to a second source whenever possible.

An important factor in understanding the fundamental characteristics of a swap is the quality of communication with the investment manager. Currently there are no industry standards for trade ticket formats or even the trade information required for each swap ticket. Standardization efforts, while underway, remain very much in the development stage. Each investment manager uses a format that best suits its needs, which can result in the delivery of incomplete or confusing information to the fund administrator. Furthering the confusion are the numerous and unique abbreviations, symbols, and acronyms used by each investment manager to complete a trade ticket. The investment manager must be willing to educate its service providers on how to understand and interpret their swap trade tickets, and service provider must insist this education process takes place and is effective. Failure in this area will result in processing and valuation errors at worst and inefficiencies at best.

### *Economic intention of the swap*

Understanding the intention of the investment manager regarding a swap may, at first glance, seem an unreasonable expectation of the fund administrator, especially in an outsourced arrangement. Indeed, for some complex hedge funds or other portfolios that use swaps extensively, this expectation is unrealistic. However, for mutual funds and other products that use swaps in manageable numbers, understanding the economics of the swaps is not only reasonable, it should be viewed as a requirement.

The fund administrator's team, at least at the supervisory and management levels, should have a good understanding of the investment characteristics, objectives, and intentions of each of the funds under its care. Understanding how each investment in a fund contributes to those objectives, or identifying when one does not, may not be a contractual duty of the fund administrator, but it would certainly fall under the minimum requirements for good client service. This applies to all investments in a fund, but may be more important for swaps because it can play a critical role in identifying processing and valuation errors.

The fund administrator's understanding of the market factors behind a swap does not need to equal that of the investment manager. At a general level, the fund administrator should understand what the investment manager is trying to accomplish with the swap, and what market conditions would impact the value of the swap, both positively and negatively. For example, if the manager is looking for exposure to European equity markets and enters into a swap where the fund receives the return on a European equity index and pays the three-month Libor, that would make sense to the fund accountant. However, if the swap was set up backwards (fund receives the three-month Libor and pays the index return), that should raise a red flag at the fund administrator. As the relevant European equity index rises and falls, the swap value on the funds books should rise and fall accordingly. Periodic changes in the three-month Libor would also affect the value of the swap, but not on a daily basis.

When the economics of the swap are understood, review procedures that consider the relevant current market conditions, the reasonableness of the swap value, and its impact on the fund should be implemented. Changes in swap value or fund impact that are inconsistent with expectations are often indicative of processing or valuation errors. Reviewing and recalculating the swap valuation should be the first step taken. If the unexpected impact still exists, the investment manager should be consulted to assist in explaining and validating the current value, or in determining the correct value. Investigation should continue until the swap value and the impact on the fund are explained, accepted, and deemed reasonable by those qualified to make that determination.

## Procedures and controls

Knowledge is a critical requirement in swaps processing, but equally important are the procedures, controls, and oversight employed in processing and valuing swaps on a daily basis. The proper balance of these ingredients will give all parties involved the best possible chance of achieving accuracy and avoiding the operational, client service, and often financial hassles associated with processing and valuation errors.

Proper procedures and controls in the swap processing environment should include the following key components: confirmation or verification of the existence of the swap; effective batch controls to ensure all swap trades are recorded; reliable and controllable valuation process; periodic reconciliation of outstanding swap positions with the investment manager; periodic confirmation of outstanding swap positions with counterparties; periodic meetings with the investment manager on swap issues:

1. *Confirmation or verification of the existence of the swap.* The ideal method of verifying existence is to confirm the swap with the counterparty. This can sometimes be accomplished by obtaining the swap agreement or term sheet from the counterparty. Oftentimes it can be several days or even weeks before the final swap agreement is available. In the interim, a draft agreement, trade ticket or any other communication from the counterparty that confirms the existence of the swap can suffice.
2. *Effective batch controls to ensure all swap trades are recorded.* Establish a procedure between the investment manager and the service provider to ensure that the investment manager has sent and the fund administrator has received all swap trades each day. This batch control is similar to those for other types of trades, but given the manual nature of swaps and swap trade communication, it is virtually impossible for the fund administrator to unilaterally assess whether all swap trades have been received. Effective two-way communication each day can contribute greatly to eliminating the risk of unrecorded swap transactions.
3. *Reliable and controllable valuation process.* Establish a reliable, reviewable and controllable process for valuing the swap on a daily or periodic basis. This process should cover the following key steps:
  - The investment manager and fund administrator should consult and agree on the best valuation source and/or best calculation method or tool to be used for each swap. In doing so, the fund administrator does not cede control of the valuation process to the investment manager, but simply seeks the latter's input on valuation options.
  - Identify and document the specific steps to be taken in obtaining relevant market data (interest rates, index values, etc.), entering that data into a calculation tool, interpreting the output from the calculation tool and entering the results into the fund accounting system.
  - Implement multiple reviews or redundant procedures at the critical points in the valuation process. For example, obtain the index change from Bloomberg and properly enter it as a positive or negative into the calculation tool; obtain the value from the calculation tool and properly enter it as a positive or a negative into the fund accounting system. To the extent these steps can be automated, the human error element is removed. With or without automation, this portion of the daily process is ripe for procedural errors.
  - Implement an analytical review of the swap value and its impact on the fund to determine that the value "makes sense" given the change in relevant market conditions since the last valuation. The person or persons performing this review should have a good understanding of the fund, the swap, and the valuation source, and have the experience and capability to detect a problematic valuation.
  - If possible, compare the valuation to a second source. An independent source is ideal, but even comparing it to the investment manager's internal valuation is a useful exercise that will highlight material valuation errors.

4. *Periodic reconciliation of outstanding swap positions with the investment manager.* Reconciling outstanding swap positions with the investment manager should be a standard procedure, one to which the fund administrator and the investment manager are equally committed. Since the investment manager is the primary, and typically only, source for swap trade information, reconciling with them helps ensure that the fund administrator has received and recorded all swaps that have been executed by the investment manager. Ideally, this reconciliation would be achieved at each valuation date if the investment manager is providing its swap values as a valuation double-check. The comparison to the investment manager's values should include the notional amount and extended value of the swap.
5. *Periodic confirmation of outstanding swap positions with counterparties.* Confirm outstanding swap values with the counterparties on a monthly basis. The success of this step depends on the willingness of the counterparties to provide necessary information on a timely basis. Counterparties are often resistant or delinquent in sending monthly statements or confirmations, but an attempt should be made to obtain as many as possible. Enlisting the investment manager's help in urging the counterparties to comply with the monthly request can improve the success rates.
6. *Periodic meetings with the investment manager.* Hold regular meetings with the investment manager to discuss swap issues. The meetings should provide an opportunity to: better understand the swap documentation (trade tickets and term sheets); resolve specific or general processing or valuation issues; gain a better appreciation and understanding of the economic intentions and objectives of the swap; and gain insight into the investment manager's swap strategies for the purpose of preparing for new or different swap vehicles that may be incorporated into those strategies in the future.

Developing and implementing swap procedures and controls that effectively incorporate the above components will largely dictate the overall success rates achievable in an operation's swaps processing. The operating environment will vary from one firm to the next, depending on volumes, complexity, and available technology. Low volumes and low complexity can be adequately handled in an environment that is predominantly manual. As volumes and complexity increase, technology commitments must be made to ensure performance and accuracy levels do not deteriorate.

### Operating model implications

An operating model is defined as the way an organization conducts business. Operating models take many shapes and forms, but are generally developed to allow for a structured work environment that optimizes technology and processing efficiencies and mitigates risk. Often the foundations of a company's operating model can be traced back to the origins of the company and the strengths and weaknesses of its technology. Economic events such as industry evolution, rapid natural growth of assets, or acquisitions and mergers often complicate the operating models of organizations and change the dynamics of the services they provide or offer. The scale of these events serves as a catalyst for companies to reevaluate, and potentially revise, their current operating models to ensure that service levels are maintained and supported. In contrast, events that develop slowly over longer periods of time present different issues and challenges to the operating model and are often more difficult to recognize before they reach a critical point.

In recent years, the expanded use of swaps represents an example of a progressively developing challenge facing investment managers and service providers.

The incremental effect of swaps on the operating environment is often subtle, yet the cumulative impact to operations can be profound. Investment managers often enter into the swap market (as well as other derivative products) with only a few contracts for an individual account. Unless market conditions change significantly, the investments are typically held for significant periods of time. As investment managers receive fund inflows and become more confident in the investment vehicle, the number of swaps on the account can grow over time. The gradual growth often receives minimal attention from the accounting agent, so an

account that processes one swap deal per week, unexpectedly finds itself with 50 + swaps by the end of the year. As the number of swaps increases in each individual account, the cumulative growth across all accounts in an organization can be dramatic, as can the operating model impacts that tend to develop.

In an effort to better understand the impact of swaps on a service provider's operating model, the following highlight some common challenges faced in the market today:

- *Accounting system.* The recording of swap contracts is often dictated by the functionality available on the service provider's accounting system. Since most accounting systems were initially developed prior to the boom in swap trading, few systems can effectively support swaps with built-out functionality. The result requires service providers to break down the elements of a swap contract and identify how to process the individual components on their accounting systems, or maintain offline spreadsheets and post manual entries to those accounting systems on a nightly basis. Either decision forces the service provider to operate outside of its normal, systematic control environment and develop customized, often manual, controls that are time intensive and require closer scrutiny in the review process.
- *Positions and transactions.* The service provider's determination of how to reflect and support the transactions and positions on its books and records has implications for the operating model. Essentially, there are two choices. A swap can be represented as one entity (position) in the accounting system, or each leg (payment and receipt) can be represented separately. Fundamentally, either can be correct, but the decision has impacts throughout the swap life cycle. Should an organization decide that swaps are better reflected by processing both legs of the contract in its accounting system, then the organization will artificially increase swap volumes by requiring two transactions to be processed for each swap. Since swap trades are usually booked manually, as the volume of swaps increases on service-provider accounts, the operating model is impacted by the extra time required to post the transactions and complete specialized swap controls.
- *Security master file data.* While there are some vendors entering the market that provide security reference information for swaps, most service providers manually create dummy security identifiers to support swaps on their internal security master files. Reflecting both legs of the swap contract increase the time and effort required to create, maintain, and link the separate positions.

Security reference data also include the rates, reset dates, and payment and maturity dates for the securities. When reflecting both legs of a swap contract on an accounting system, a firm is essentially treating the payment and receipt legs of the swap as separate securities for the purpose of income and expense. This is a fairly clean approach. In contrast, reflecting income and expense accruals for a swap that is treated as one entity on the books and records presents a greater challenge. The imbedded income and expense streams require the security data group to support a blended rate, a calculation that is likely to be manual and require additional support from an operations group. The economics of the swap necessitate both the security reference data system and the accounting system to accommodate a negative accrual on a positive position (or vice versa) in certain scenarios.

- *Income/expense.* Swaps can either be treated as "dirty" or "clean". "Clean" swaps will accrue the income and expense associated with the contract. "Dirty" swaps have their accruals for income and expenses streams imbedded in the price of the security. With dirty pricing, the most important operational item is the timely and accurate realization of income/expense on payment date. When payment date arrives, the price of the security will change to reflect the net income/expense payment. If the payment is not reflected on accounting, but is reflected on the price of the valued security, the funds value will be misstated. Any operating model design faces a challenge in coordinating swap events like this; however, utilizing multiple groups (i.e. pricing group for the swap valuation and an accounting group for the income event) to support them requires additional operational considerations and controls.

Regardless of how the swaps are set up on the accounting system, managing the reset dates of the variable leg of a swap remains a challenge. Reset conventions often differ between counterparties and require the service provider to have firsthand knowledge of both the reset process and the unique swap conventions. For example, a reset date of July 20, 2007 for broker ABC will use the three-month Libor number available on July 19, 2007, where broker XYZ will use the three-month Libor rate from July 17, 2007. Absent comprehensive documentation and controls for each counterparty and swap type, the reliance on an individual's knowledge and often manually intensive, cumbersome tracking methods are ripe for processing errors, especially during resource transition periods.

- *Valuations.* As in the income/expense process, the valuation of swaps can be “dirty” or “clean.” Since prices may be received or calculated using either convention, the service provider needs to identify the convention used for each price calculated or provided for the swap contracts. The service provider must also be aware that the same source may provide clean prices for interest rate swaps, but dirty prices for index swaps. To complicate matters further, the service provider may be forced to convert the prices from “dirty” to “clean” (or vice versa) to keep them in sync with the methodology used in the accounting system and prevent incorrect swap valuations. The number of variables in the valuation process dictates that the service provider’s operating model not only support swaps within its workflow, but also adapts to the requirements of different types of swaps held by the funds while providing the flexibility to support the varying counterparty conventions.

In response to the challenges presented, asset managers and service providers have taken a variety of approaches in developing solutions to support swap processing within their operating environments. As one would expect, the specific infrastructure and knowledge base inherent in the organization serves as the driver in the selection of the operating model solution. While each organization may deploy variations, the following are representative of the operating model designs present in today’s environment:

- *Localized responsibility.* The day-to-day operations group handles all aspects of swap processing on the accounts for which it is responsible. The model allows for increased client-specific customization and encourages product knowledge across the organization, but relies on the quality of individual resources to support the process. Without comprehensive training and tight controls, the model presents challenges when dealing with new swap types and resource transitions.
- *Subject matter expert groups.* Centralized groups support comprehensive swap processing across multiple client groups. The design is better able to take on new swaps and provide resource experts that know all aspects of the process. However, consolidating the processing into a single specialized support group limits the overall swap knowledge base in the organization to a select group of individuals. This has the potential to force major training and redesign efforts as swaps increasingly become mainstream investment vehicles and technology develops integrated swap functionality into its systematic environment.
- *Outsourced solutions.* Recently, a movement toward outsourcing the swap process, or at least portions of the process, to specialized companies has begun to emerge. In today’s market, there are companies that provide standardized (internally developed, not industry-wide) security reference data for certain swaps, independent pricing services for swap contracts, as well as full-service, middle-office swap operation services. These services mitigate the risk to asset managers and service providers while providing efficient processing work streams, but tend to dampen the overall swap knowledge base around the outsourced functions.

Regardless of the operating model approach utilized by an investment manager or service provider, the overall corporate intelligence regarding swaps and the procedures and controls utilized in supporting the process are essential to its success.

## Conclusion

The swap market growth is certain to continue, with investments in swaps becoming more prevalent in mainstream mutual funds and alternative investments alike. Absent regulator-mandated standardization, investment managers and service providers need to coordinate efforts to develop unique procedures and controls for swaps that will ensure a successful, error-free operating environment. The appearance and structure of the environment will vary greatly among affected companies, but the fundamental requirements and characteristics discussed in this article must be effectively incorporated into any swaps processing environment.

The motivation behind achieving successful swaps processing should come from all concerned parties: investment managers, service providers, senior management, and compliance groups. While assigning fault and financial responsibility for processing errors is typically easy, preventing the errors should be the common fiduciary responsibility of all involved. The development and implementation of an effective swaps processing operating model is clearly a shared responsibility of the service providers and investment managers. Those charged with oversight duties, specifically fund management and compliance officers, should review and challenge the operating model to gain a comfort level that the current and future swaps processing demands of the funds under their supervision can and will be successfully met.

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