



EM-61.1

Category: Sensitivity
Topic: Interest Rate Risk
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Overview

The *Interest Rate Risk* topic provides guidance on evaluating interest rate risk (IRR) at Farm Credit System (System) institutions. This evaluation includes assessing the sources of IRR and determining both the realized and estimated future impact of IRR on financial condition and performance. While the guidance below focuses on banks and associations, it is also applicable to service corporations if they have IRR. Farm Credit Administration (FCA) Regulations [615.5180](#) and [615.5182](#) and Bookletter [BL-072](#) address requirements and expectations for institutions to identify and measure IRR exposures.

IRR is the risk that interest rate changes could adversely affect earnings or capital. From an earnings perspective, interest rate changes may affect net interest income, fee income, and other interest rate-sensitive income and expenses. From a capital perspective, interest rate changes affect the market value of equity (MVE). MVE represents the value of capital when the balance sheet and all financial positions are valued at fair market value. FCA Bookletter [BL-072](#) provides a more detailed description of MVE.

IRR exposures can vary considerably, particularly between associations and banks. Some institutions minimize IRR by closely matching asset and liability maturities, optionality, and repricing characteristics. Such institutions are seeking a rate-neutral balance sheet mix where earnings and MVE are stable in all interest rate environments. Other institutions are exposed to IRR through mismatched assets and liabilities. Mismatching may result from challenges in match-funding assets, or from a deliberate attempt to increase earnings through balance sheet positioning. For most associations, the funding bank manages the liability mix and uses funds transfer pricing (FTP) to provide funding that matches the maturity, optionality, and repricing characteristics of the association's loan assets. Mismatching can still occur on assets with unusual terms that are not supported by the bank's FTP process, or from intentionally mismatching the asset and the FTP rate (if allowed by the funding bank). In addition, some associations do not use their funding bank's FTP process. Instead, they order blocks of funding from the bank and manage their own asset/liability mix, which results in more complex IRR exposures like those at a bank.

Refer to the *Interest Rate Risk Management* Examination Manual topic for guidance on examining an institution's IRR management framework and practices.

Examination Procedures and Guidance

General

1. IRR Sources:

Evaluate the mix and pricing characteristics of and embedded options in assets and liabilities, and determine if significant mismatches or other sources of IRR exist.

Guidance:

Identifying the sources and types of IRR is essential to examining IRR exposure, measurement, and management. IRR results when assets and liabilities, including the impact of derivative contracts, are not directly matched or aligned. More specifically, IRR exists when the repricing, terms, or options differ between an asset (primarily loans and investments) and its funding. Such mismatches are typically the primary sources and causes of IRR. However, other sources of IRR may also exist, such as paying premium prices when purchasing prepayable loans and investments.

IRR is typically categorized into the following four generic types of risks:

- *Repricing Risk* – Arises from timing differences or gaps between the maturity or repricing of an asset and its funding source. Repricing risk results from changes in the general level of market interest rates.
- *Yield Curve Risk* – Arises when the pricing characteristics of an asset and its funding source are based on different points on the same yield curve. Yield curve risk results from changes in the shape of the yield curve.
- *Basis Risk* – Arises when an asset and its funding source reprice based on different interest rate indexes or yield curves. Basis risk results from a shift in the relationship or spread between these different rates.
- *Options Risk* – Arises when the options embedded in an asset (e.g., prepayment, interest rate caps, interest rate floors, forward rate locks) differ from the options in its funding source. Options risk results when changing interest rates trigger the exercise of an option and alter the maturity or repricing behavior of assets or liabilities.

Identifying the type of risk is important because it drives the processes required to measure, quantify, and manage IRR. Some IRR sources can result in more than one type of risk. For example, a Prime-indexed variable-rate loan funded by a 6-month Farm Credit discount note could be exposed to repricing, yield curve, and basis risks.

Repricing risk should not be confused with price risk. Price risk is the risk to earnings and capital resulting from changes in market prices and values, and it arises from activities in which value changes are reflected in the income statement. While price risk is closely related to IRR, it focuses on assets that are accounted for primarily on a mark-to-market basis. For example, this risk can arise when assets and liabilities are accounted for under the fair value option (i.e., market price declines are charged to current income), assets are sold before maturity, or loans are held for sale or in a lending pipeline. Market prices can vary due to changes in interest rates, investor-required spreads, and other market factors. The same fundamental principles of risk management apply to both IRR and price risk. Due to its close relationship to IRR, price risk is addressed in the guidance below along with IRR.

Evaluative questions and items to consider when examining IRR sources include:

- **Associations Using the Funding Bank's FTP Process: Do mismatches exist between any asset and its underlying FTP rate, resulting in IRR exposure?** For associations that use their funding bank's FTP program, IRR primarily results when a mismatch exists between an asset and its FTP rate. Mismatching can result from a deliberate decision by the institution or from originating and purchasing loans with unique pricing characteristics that are not supported by the FTP program or special pricing arrangements. Such mismatches can result in volatility in interest rate spreads, net interest income, and MVE. The dollar volume of mismatch exposure and the type of IRR that results from each mismatch (i.e., repricing, yield curve, basis, or options risk) are important considerations. Mismatches may be described in the association's or funding bank's reports. Mismatches can also be identified by comparing each loan type and investment product to its underlying FTP rate. Examples of FTP mismatches include the following:
 - Funding an indexed loan with an FTP rate based on another type of index or the bank's cost of funds for a debt pool. (Basis risk)
 - Funding a floating rate loan with an FTP rate that reprices on a different frequency or schedule. (Repricing risk)
 - Funding an indexed loan with an FTP rate that is based on the same index but has a shorter-term maturity or spread guarantee in relation to the index. (Basis and repricing risk)
 - Funding a fixed-rate loan with a floating FTP rate. (Repricing risk)
 - Using an FTP rate that does not contain the same embedded prepayment or cap options as the loan. This includes FTP options in which the funding bank may charge fees for excessive prepayments and the fees are not passed through to the loan. (Options risk)
 - Lagging interest rate changes on administered rate loans when underlying FTP rates change. (Repricing risk)
 - Offering a teaser interest rate that is not matched to the FTP rate. Risk is further increased if the mismatched teaser rate has an embedded cap that significantly limits rate increases when the teaser period ends. (Repricing and options risks)
 - Committing to a forward interest rate on a prospective loan without locking in the underlying FTP rate or matching breakage fees. (Options risk)
 - Funding a pool of loans held for sale with an FTP rate that does not hedge against changes in the pool's market prices. (Price risk)
 - Potential for the bank to adjust its direct loan spread after loans are originated. (Options risk)
- **Banks and Block-Funded Associations: Do significant mismatches between assets and liabilities or other sources of IRR exist?** For banks as well as associations that do not use their funding bank's FTP process, identifying IRR sources can be complex. Instead of match-

funding each asset, these institutions fund the balance sheet at the macro level. To identify significant mismatches and other IRR sources, it is important to understand the balance sheet structure, trends in balance sheet composition, embedded options, off-balance sheet exposures, and business activities that create risk. Management and shareholder reports should provide information on balance sheet structure. Significant mismatches and other IRR sources should be categorized by the type of IRR presented (i.e., repricing, yield curve, basis, or options risk). Detailed gap reports provide an initial indication of repricing risks. Results of IRR simulations under various interest rate scenarios may also indicate the types of IRR the institution is exposed to, although further analysis and management interviews may be needed to understand and identify the underlying causes of risk captured and measured in these simulations. Examples of areas that could be mismatched or otherwise contribute to IRR include the following:

- Volume of fixed-rate assets versus liabilities and derivatives, and the volume of variable-rate assets versus liabilities and derivatives. (Repricing risk)
 - Volume of prepayable, fixed-rate assets versus callable debt, and the extent that debt call options are out of the money versus asset prepayment options. (Options risk)
 - Volume of assets with caps versus liabilities and derivatives, and the extent that asset caps are out of the money versus liabilities and derivatives. (Options risk)
 - Volume and weighted average life of assets versus liabilities and derivatives tied to each index (e.g., Prime, the Federal Funds Rate, and the Secured Overnight Financing Rate). (Basis and repricing risks)
 - Weighted average life, duration, and convexity (a measure of how price and duration change) for assets versus liabilities and derivatives. (Repricing and options risks)
 - Volume of assets purchased at a premium price with prepayment or call options. (Options risk)
 - Volume of loans held for sale relative to hedges against market prices. (Price risk)
 - Unrealized holding gains or losses on balance sheet positions. (Type of risk depends on sources of gains or losses)
 - Hedges with an accounting treatment that differs from the risks they are offsetting. This includes derivatives or other positions functioning as economic hedges but not qualifying for hedge accounting treatment. Under such circumstances, the earnings impact of valuation gains and losses on hedges may not offset the earnings impact of hedged items. (Type of risk depends on type of hedged exposure)
- **Equity Allocation: Is equity concentrated in funding assets in certain time buckets, resulting in IRR exposure?** Equity funding (or loanable funds) inherently involves IRR because equity reduces the amount of debt used to match-fund each asset. Decisions on how to allocate and position equity affect IRR because they affect the volume of assets versus underlying debt repricing in a given period (i.e., repricing risk). When equity is used to fund short-term or variable-rate assets, earnings are typically more rate sensitive because changes in interest rates directly impact the yield generated by these assets. Conversely,

when equity funds longer-term fixed-rate assets, MVE is more rate sensitive because changes in interest rates cause a greater impact on the net present value of asset cash flows relative to liability cash flows. Thus, concentrating equity in a certain time bucket will typically increase risk to either earnings or MVE. Equity allocation can also impact current earnings regardless of future interest rate changes. For example, if equity is used to fund longer-term assets, it could enable the institution to shorten debt maturities, lower debt costs, and increase short-term earnings. Such a strategy should be balanced with the increased MVE sensitivity and the potential for decreased longer-term earnings capacity in a rising rate environment. Funding banks may provide associations equity allocation options. These options are implemented through the FTP program or by entering into an interest rate swap or other agreement with the bank (e.g., a 5-year receive-fixed swap would in effect position the association's equity to fund 5-year assets). Examples of equity allocation options that may be available include:

- *Pro-Rata* – A pro-rata share of equity is used to fund each asset. This option is considered a neutral position and is typically the most effective at balancing earnings versus MVE sensitivity to interest rate changes. The ultimate impact depends on balance sheet composition and the mix of short-term or variable-rate assets relative to long-term fixed-rate assets.
- *Short-Term/Variable-Rate* – Equity is used to fund short-term or variable-rate assets, while debt is used to fund longer-term fixed-rate assets. This option typically results in lower MVE sensitivity, but higher earnings sensitivity and reduced current earnings.
- *Long-Term/Fixed-Rate* – Equity is used to fund long-term fixed-rate assets, while debt is used to fund shorter-term or variable-rate assets. This option generally results in lower earnings sensitivity and increased current earnings, but higher MVE sensitivity and the potential for decreased longer-term earnings capacity in rising rate environments.
- ***Derivative Contracts: Do derivatives affect IRR exposure?*** Derivative contracts should be considered when identifying IRR sources. System institutions may use derivative contracts only for hedging or managing risks and not for speculative purposes. Derivatives can be used to synthetically change key interest rate characteristics in assets or liabilities, or otherwise alter the institution's IRR profile. The correlation of the derivative's cash flows to the positions hedged or altered is an important consideration in understanding how they affect IRR sources. In addition, derivatives that do not qualify for hedge accounting treatment (see the *Accounting* procedure in the *Derivatives* Examination Manual topic) pose unique risks. Under generally accepted accounting principles, valuation changes on such derivative positions may not be reflected in net interest income (or captured in IRR simulations that focus just on net interest income) but will impact non-interest income and could be a risk to net income. Also, while these derivative valuation changes affect net income, the valuation changes on the items hedged are not included in net income, which can pose a risk to earnings.
- ***Pricing Premiums: Does prepayment or call risk exist in any loans or investments purchased at premium prices?*** Paying a premium price for a loan or debt security creates a source of IRR when prepayment or call options exist (i.e., options risk). Since these instruments are paid off at par, prepayments or calls cause the remaining unamortized premium to be immediately amortized, which reduces current earnings and the effective

rate of return. Higher premiums typically result in a higher risk of loss depending on the potential for prepayment or call. Such risk also exists on guaranteed loans (e.g., USDA guaranteed loans purchased in the secondary market) and securities because the premiums paid above par are not guaranteed in the event of a prepayment, call, or default.

- **Loans Held for Sale (LHS): Are LHS a source of IRR exposure?** Holding loans for sale may create a source of IRR. LHS are typically accounted for at the lower of cost or fair value, with declines in fair value below cost reflected in current earnings. Fair value can change due to fluctuations in market interest rates or required investor spreads. Spreads required by investors can move because of changes in perceived credit risk, pricing of credit risk, market liquidity, and other factors. If declines in fair value are not offset through funding and hedging, the institution could incur a loss that must be recognized in current earnings.

2. Realized IRR:

Determine if IRR exposures have significantly affected financial condition and performance.

Guidance:

This procedure focuses on the actual impact interest rate changes have had on financial condition and performance. This includes determining whether changes in interest rates caused volatility in earnings or MVE due to balance sheet mismatches or other IRR sources. If market interest rates significantly changed, the probability that IRR exposures could have affected earnings and MVE is higher. Interest rate changes may involve changes in the general level of interest rates, shape of yield curves, and relationships (basis) among the different yield curves and indexes.

Evaluative questions and items to consider when examining realized IRR include:

- **Earnings: Did changes in interest rates cause a significant change in earnings?** If the institution is exposed to IRR, changes in interest rates can cause a change in earnings. Even if earnings remained stable or increased, the potential exists that an adverse impact from interest rate changes may have been offset by other factors. IRR can affect net interest margins and spreads, fee income, gains or losses on assets and liabilities recognized in earnings, and any other interest rate-sensitive revenues and expenses. If earnings were adversely affected by IRR, the magnitude of the change and the overall adequacy of earnings are important considerations. For example, the impact of IRR would be high if it caused a major decline in earnings, a reduction in profitability measures to marginal or unsatisfactory levels, a decline in normal patronage refunds, or a restriction in business operations. This analysis should consider:
 - Sources of IRR identified (see the *IRR Sources* procedure).
 - Management and board reports addressing the causes of earnings trends (e.g., period-to-period earnings variance reports) and the results of IRR management strategies.
 - Management discussion and analysis section in shareholder reports.
 - Results from the earnings evaluation (see the *Quantity & Quality* procedure in the *Earnings Adequacy Examination Manual* topic and *Monitoring & Reporting* procedure in the *Earnings Management* topic, which address the causes of earnings trends).

- Market Value of Equity (MVE): At institutions that measure MVE, did changes in interest rates cause a significant change in the base amount of MVE?** As discussed in FCA Bookletter [BL-072](#), institutions that pursue strategies that could threaten MVE should measure the amount of MVE and risk to MVE. Changes in market interest rates can cause a change in base-case MVE and the relationship between MVE and the current book value of equity (BVE). The realized impact of IRR would be high if it caused a major decline in MVE, particularly if MVE declined significantly below BVE (this would indicate the economic value of the balance sheet is significantly lower than the accounting book value). An important consideration is whether factors other than IRR caused the MVE change. For example, MVE can also be affected by an increase in credit risk (due to an increase in credit spreads and a decline in the market value of assets), and changes in the marketability of financial instruments. In addition, as a model-derived value, MVE can be impacted from one period to the next by changes in model assumptions. Management and board reports addressing MVE may assist with this analysis.

3. Estimated IRR:

Evaluate levels and trends in estimated IRR exposure and the potential effect on financial condition and performance.

Guidance:

This procedure addresses the potential impact of IRR on future financial condition and performance. Results from the institution's IRR simulations and other measures should provide the information needed to estimate and assess IRR exposure. If the institution does not measure risk from all IRR sources, additional examination work may be needed to estimate IRR exposure. This procedure is not intended to examine the adequacy of IRR measurement, though deficiencies in measurement can affect conclusions for this procedure.

Evaluative questions and items to consider when examining estimated IRR exposure include:

- Measured IRR: Do IRR measures indicate risk will be maintained at an acceptable level relative to earnings and capital?** Measured IRR exposures should remain within the bounds of prudent risk limits as discussed in FCA Bookletter [BL-072](#). Results from the institution's earnings and MVE simulations (if applicable) are the primary indicators of IRR exposure. Each institution should simulate the potential impact of a ± 200 basis point (bp) interest rate shock on earnings. In addition, as discussed in the *Interest Rate Risk Management Examination Manual* topic, certain institutions should simulate the potential impact of a ± 200 bp interest rate shock on MVE as well as other types of IRR scenarios. For example, the institution may simulate the impact of more severe rate changes, graduated rate changes, lags in rate changes, or changes in the shape of yield curves, spreads between yield curves, and underlying assumptions such as prepayments. In addition to simulations, the institution may measure IRR exposure using duration, gap analysis, or other methods. Results from these types of IRR simulations and measures should provide most of the information needed to assess the amount and causes of IRR exposure. IRR may be excessive if these simulations and measures indicate there is potential for a material decline in earnings or capital under the various interest rate scenarios. When drawing conclusions on measured IRR exposure, the significance of simulation scenarios should be considered in the context of their plausibility in the current interest rate environment.

- **Unmeasured IRR: If the institution does not measure all sources of IRR, do the unmeasured risks represent a significant threat?** The institution should be measuring all material sources of IRR; however, if the institution has IRR sources that are potentially significant but not measured, it may still be possible to assess the materiality of the risks. For example, if basis risk exists in a \$100 million loan segment, a 50 bp shock to the basis or spread could cause up to a \$500,000 net interest income decline in year one [$\$100 \text{ million} \times 0.50 \text{ percent}$] depending on contractual maturities and repricing dates. Such rough calculations may enable examiners to conclude on the institution's vulnerability to IRR despite the lack of, or deficiencies in, IRR measurement. *Note: The 50 bp shock in this example is used only for illustrative purposes and may need to be adjusted depending on the specific risks measured.*