Securities Price Testing and Fair Value Hierarchy

September 9, 2024

BDO®

With You Today

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Agenda for Today

(!)	**Introduction**
(icon)	**Overview of Fair Value and Fair Value Hierarchy (FVH)**
(icon)	**Explanation of Securities Pricing Testing**
(icon)	**Explanation FVH Active Market Test**
(?)	**Final Comments**

WITH YOU TODAY

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Managing Director - VCMA

Why is Fair Value and the Fair Value Hierarchy Important?

WHY DO COMPANIES HOLD INVESTMENTS OR DERIVATIVES?

- ▶ Management of excess cash
- ▶ Income diversification
- ▶ Tax advantages
- ▶ Asset and Liability Management
- ▶ Hedging
- ▶ Liquidity to satisfy claims

FAIR VALUE (EXIT PRICE)

- ▶ Accurate disclosures
- ▶ Accurate balance sheet reporting (Fair Value Balance Sheet)
- ▶ Ability to calculate proper metrics
  - Working Capital
  - Asset / Liability Matching
  - Hedge requirements

FAIR VALUE HIERARCHY

- ▶ Accurate disclosures
- ▶ Monitoring liquidity
- ▶ Riskiness of holdings
- ▶ Peer comparison

Example: Excess Cash (and Income Diversification)

- ▶ Corporation ABC has excess cash of $5,000,000 that it expects to be needed in 5 years for a project. The operating account provides no interest on cash balances and costs 0.05% in maintenance fees.

- ▶ The corporation could deposit the cash into the operating account and pay the maintenance fee or it could invest the cash into a medium term investment.

- ▶ Investment Option A: Purchase a 5 year US Treasury that has a yield of 4.36% but the coupon payment is Federally taxable at 21%.

- ▶ Investment Option B: Purchase a 5 year Municipal Bond that has a yield of 4.25% but is tax exempt.

- ▶ If the Corporation can hold the Municipal Bond to maturity they will actually make more interest income. The US Treasury would need to yield 5.38% to be equivalent.

- ▶ Tax Equivalent Yield = Tax Free Yield / (1 – Tax Rate)

- ▶ This example not only provides a return on excess cash but also provides a diversified stream of revenue and a tax advantage.

Example: Asset and Liability Management

▶ Insurance Company A is a Property and Casualty Insurer. They have a mixed duration for expected liabilities.

▶ The insurance company will invest in a mix of securities both short and long term to match the expected duration of the liabilities.

▶ Typical product mix
  • Dividend paying public stock
  • Municipal bonds (short and long terms)
  • US Treasury Bills and Bonds
  • Mortgage Backed Securities

▶ There may be a need for funding at short notice to satisfy claims the company can either use the interest and dividend income to satisfy the liability or sell the investment.

▶ Due to the unexpected claim life cycle P&C insurers will invest in more liquid easily tradeable securities.

ASC 820 Overview – Fair Value

▶ Fair value is a market-based measurement, not an entity-specific measurement.

▶ Fair Value can be determined either through observable market transactions or through alternative valuation techniques.

- Level 1 and some level 2 are observable
- Level 3 are typically not observable
- Inputs to the price are what helps to determine the level of the security within the fair value hierarchy

▶ Proper determination of Fair Value (or exit price) directly affects the balance sheet as well as operating metrics such as working capital.

ASC 820 Overview – Fair Value Hierarchy

▶ ASC 820 establishes a Fair Value Hierarchy that prioritizes the inputs used in valuation techniques into the following three levels:

- Level 1: Quoted prices (unadjusted) in *active* markets for identical assets and liabilities that the reporting entity can access at the measurement date
- Level 2: Inputs other than quoted prices in *active* markets for identical assets and liabilities that are observable either directly or indirectly
- Level 3: Unobservable inputs

▶ The fair value hierarchy is intended to increase consistency and comparability among fair value measurements. Classification within the hierarchy also plays a critical role in disclosures by allowing financial statement users to assess the relative subjectivity of the various fair value measurements made by a company

ASC 820 Overview - Fair Value Hierarchy

LEVEL 1 INPUTS

▶ Directly observable price

▶ Active market

▶ Examples:
- Active public common stock
- Active public options
- Active futures
- Active corporate bonds
- US Government debt (On- the-Run)

LEVEL 2 INPUTS

▶ Indirectly observable price

▶ Market activity insufficient to classify as Level 1

▶ Valuation techniques do not determine level

▶ Examples:
- Thinly traded corporates
- Interest rate swaps
- OTC equity options

LEVEL 3 INPUTS

▶ Unobservable price

▶ No observable market activity

▶ At least 1 significant unobservable input

▶ Examples:
- Exotic OTC Derivatives
- CLO Equity

What is Securities Price Testing?
What Investments Types are Included?

Securities Price Testing focuses on the *price verification* or *price testing* of investments or financial instruments and provides companies with an assessment of the fair value of the investments within their portfolio

Securities Price Testing should also include the review of the *Fair Value Hierarchy (FVH)* classification assigned to each investment per GAAP

What is Securities Pricing Testing?
What Investments Types are Included?

▶ Level 1 and Level 2 Securities Types

▶ Fixed Income Products Includes:

- Treasuries
- Corporate Bonds
  - Investment Grade
  - High Yield
- Securitized Products
  - Asset Backed Securities (ABS)
  - Mortgage-Backed Securities (MBS)
  - Residential Mortgage Back Securities (RMBS)
  - Collateralized Loan Obligation (CLO)
- Municipal Bonds
- Loans

What is Securities Pricing Testing?
What Investments Types are Included?

▶ Exchange Traded Securities:
- Common Stock
- Futures
- Exchange Trade Derivatives
- Mutual Funds

▶ Vanilla Derivatives:
- OTC Equity Options
- Interest Rate Swaps
- Interest Rate Caps/Floors
- Forwards / FX Forwards
- FX Swap / FX Option

Securities Price Testing:
Vendor data versus Model based

▶ Industry Guidelines:

- Vendor data (preferably multiple sources) when performing Securities Price Testing

- In the absence of vendor data, a model can be leverage (e.g. DCF model for a fixed income security)

- Vendor Data allows for a more transparent approach while model-based leaves room for interpretation of inputs (e.g. Option Adjust Spread applied in DCF model)

Securities Price Testing:
Vendor data versus Model based

▶ **Leveraging vendor data allows for transparency of the data leveraged for securities price testing**
  - Disclose vendor names and the prices pulled from each source
  - Disclose the "fuel" that went into the vendor data pricing
    o Broker runs
    o Institutional transactions
    o Retail transactions
    o Actual transactions (TRACE)

▶ **Leveraging multiple vendors allows for transparency and demonstrates "strength" or confidence of Independent Price Testing results through vendor metrics:**
  - Vendor scores
  - Assess vendor price dispersion, to build confidence around reliability of vendor prices
  - Using a DCF or modelled approach strength is more difficult to triangulate (e.g OAS spread)

Fair Value Levelling Classification for Securities:
Vendor data versus Model based

▶ Fair Value Hierarchy Level 1 and Level 2 requires an *active market test*

- GAAP updated guidance to incorporate active market test in 2013
  - o Departure from 2009 guidance, established in the wake of GFC

▶ Leveraging vendor data allows for the implementation of 2013 guidance

- Multiple vendors allows use of market data
  - o 30, 60 and 90 day volume
  - o Last trade date
  - o Number of transactions on a monthly basis
  - o Liquidity Score

Fair Value Levelling Classification for Securities:
Vendor data versus Model based

▶ When using model-based approach for price testing and *ignoring market data* similar fixed income products fall under level 2

- Fair Value Hierarchy requires level 2 when leveraging models with inputs / parameters, and not assessing liquidity with market data.
  - Models are considered an alternative pricing methodology when pricing data is available

- If liquidity or observable trade dates are not assessed and supported through market data this could be incorrectly classified as level 2

Fair Value Levelling Classification:
Active Market Test for Corporate Bond

▶ Fixed Income Corporate Bonds that are price tested and levelled while leveraging market data from third party vendor (or Service) disclose:

- If there are *actual trades* on or near the valuation date that can be observed to substantiate the vendor price allowing it to be classified as Level 1.

- If there is sufficient volume and frequency to justify a Level 1 classification, which requires:
  - A deep and liquid market exists.
  - Meets the definition of the *Active Market* test.

▶ Corporate bonds are observable through TRACE data i.e., Actual Trade prices and volume

FVH Example: Corporate Bond

- Corporate Bond A Valuation Date 6/30/20xx
- Price $99.58 (From Price Vendor)
- Last Trade Date – 6/29/20xx
- 30 Day Volume = 1,135,000
  - Corporate Bond A is classified as Level 1 due to recent trade observed as well as sufficient volume to indicate the market is active.

- Corporate Bond B Valuation Date 6/30/20xx
- Price $99.58 (From Price Vendor)
  - 3 similar bonds are priced from 99.50 to 99.60
- Last Trade Date – 5/15/20xx
- 30 Day Volume = 0
  - Corporate Bond B is classified as Level 2 due to a lack of observed recent trades as well as insufficient volume to indicate the market is active.

Fair Value Levelling Classification:
Active Market Test for Corporate Bond

▶ Most differences between Clearinghouses and/or Broker Statements can be attributed to the data available or access to data.

▶ One may apply an active market test to all securities using actual trade data, while the other side may not have access to that data and rely on Matrix and / or evaluated prices using models which would drive a level 2 classification (or an asset-based classification)

▶ Access to market data or a service that subscribes to market data is essential when determine an active market and therefore correct FVH classification

Fair Value Levelling Classification:
Active Market Test for Corporate Bond

Asset Class	CUSIP	Position Name	Client FV Level	BDO FV Level	IHS Liquidity Score	Last Trade Date (TRACE)	TRACE Volume	Last Trade Date (IHS)	IHS Volume 30 Day	On the Run	Level Conflict Comment	Market Value
Corporate Investment Grade	US89236TJX46	TOYOTA MOTOR CREDIT CORP	2	1	1	12/29/2023	200	12/29/2023	60,189,000	FALSE	BDO has observed trade data within 5 days of the valuation date and sufficient volume over 30 days to support level 1 classification.	1,000,335
Corporate Investment Grade	US69371RR241	PACCAR FINANCIAL CORP	2	1	2	12/29/2023	1,000	12/29/2023	45,200,000	FALSE	BDO has observed trade data within 5 days of the valuation date and sufficient volume over 30 days to support level 1 classification.	1,146,583
Corporate Investment Grade	US931142DP52	WALMART INC	2	1	1	12/29/2023	921	12/29/2023	54,017,000	FALSE	BDO has observed trade data within 5 days of the valuation date and sufficient volume over 30 days to support level 1 classification.	499,853
Corporate Investment Grade	US06406HCV96	BANK OF NEW YORK MELLON CORP	2	1	1	12/29/2023	169	12/29/2023	16,344,000	FALSE	BDO has observed trade data within 5 days of the valuation date and sufficient volume over 30 days to support level 1 classification.	995,954
Corporate Investment Grade	US61761JVL06	MORGAN STANLEY	2	1	1	12/29/2023	2,216	12/29/2023	202,904,000	FALSE	BDO has observed trade data within 5 days of the valuation date and sufficient volume over 30 days to support level 1 classification.	994,079
Corporate Investment Grade	US904764AX59	UNILEVER CAPITAL CORP	2	1	1	12/28/2023	810	12/28/2023	41,640,000	FALSE	BDO has observed trade data within 5 days of the valuation date and sufficient volume over 30 days to support level 1 classification.	993,674
Corporate Investment Grade	US064159MK98	BANK OF NOVA SCOTIA	2	1	1	12/29/2023	87	12/29/2023	62,460,000	FALSE	BDO has observed trade data within 5 days of the valuation date and sufficient volume over 30 days to support level 1 classification.	1,010,142
Corporate Investment Grade	US438516BW59	HONEYWELL INTERNATIONAL INC	2	1	1	12/29/2023	61	12/29/2023	55,017,000	FALSE	BDO has observed trade data within 5 days of the valuation date and sufficient volume over 30 days to support level 1 classification.	594,527
Corporate Investment Grade	US02665WDD02	AMERICAN HONDA FINANCE CORP	2	1	1	12/29/2023	25	12/29/2023	27,618,000	FALSE	BDO has observed trade data within 5 days of the valuation date and sufficient volume over 30 days to support level 1 classification.	837,436
Corporate Investment Grade	US0641593X29	BANK OF NOVA SCOTIA	2	1	1	12/28/2023	130	12/28/2023	57,746,000	FALSE	BDO has observed trade data within 5 days of the valuation date and sufficient volume over 30 days to support level 1 classification.	674,741
Corporate Investment Grade	US91324PEB40	UNITEDHEALTH GROUP INC	2	1	1	12/29/2023	46	12/29/2023	103,941,000	FALSE	BDO has observed trade data within 5 days of the valuation date and sufficient volume over 30 days to support level 1 classification.	491,316
Corporate Investment Grade	US04636NAC74	ASTRAZENECA FINANCE LLC	2	1	1	12/29/2023	197	12/29/2023	130,652,000	FALSE	BDO has observed trade data within 5 days of the valuation date and sufficient volume over 30 days to support level 1 classification.	888,069

Fair Value Levelling Classification: Active Market Test for Treasuries

▶ US Treasury Securities do not have an observable market and are priced using the yield curve, matrix pricing, hence the majority are level 2 (not traded on an exchange like a Corporate Bond)

▶ When assessing the FVH level for a US Treasury it is important to consider whether it is:

- On-the-Run
- Off-the-Run

Fair Value Levelling Classification:
Active Market Test for Treasuries

▶ On-the-Run - Have the most liquidity, therefore they are considered Level 1.

▶ Even though these are modelled many practitioners "give them credit" for being on the run as it is known that these are the most transacted Treasuries. (For a 6-month treasury this would be every 4 weeks not every week)

Fair Value Levelling Classification:
Active Market Test for Treasuries

▶ Off the Run Treasuries – Are less liquid and therefore deemed Level 2

- While there is a broker market, no actual transaction prices are published meaning no actual price discovery is possible

- All published (vendor sourced) prices are priced off the yield curve (model) meaning that technically these should be viewed as Level 2

- Off-the-Run Broker market is indicative, and does not represent an actual transaction or price to execute

Fair Value Levelling Classification:
Active Market Test for Treasuries

Asset Class	CUSIP	Position Name	Client FV Level	BDO FV Level	IHS Liquidity Score	Last Trade Date (TRACE)	TRACE Volume	Last Trade Date (IHS)	IHS Volume 30 Day	On the Run	Level Conflict Comment	Market Value
Government Investment Grade	US91282CCT62	UNITED STATES TREASURY	1	2	1				0	FALSE	BDO FVH Level 2 due to position being an Off the Run Treasury with no observable market activity to support Level 1.	972,746
Government Investment Grade	US91282CCX74	UNITED STATES TREASURY	1	2	1				0	FALSE	BDO FVH Level 2 due to position being an Off the Run Treasury with no observable market activity to support Level 1.	969,553
Government Investment Grade	US91282CDB46	UNITED STATES TREASURY	1	2	1				0	FALSE	BDO FVH Level 2 due to position being an Off the Run Treasury with no observable market activity to support Level 1.	968,522
Government Investment Grade	US91282CDH16	UNITED STATES TREASURY	1	2	1				0	FALSE	BDO FVH Level 2 due to position being an Off the Run Treasury with no observable market activity to support Level 1.	966,008
Government Investment Grade	US91282CDN83	UNITED STATES TREASURY	1	2	1				0	FALSE	BDO FVH Level 2 due to position being an Off the Run Treasury with no observable market activity to support Level 1.	723,603
Government Investment Grade	US91282CEK36	UNITED STATES TREASURY	1	2	1				0	FALSE	BDO FVH Level 2 due to position being an Off the Run Treasury with no observable market activity to support Level 1.	995,118
Government Investment Grade	US91282CFA45	UNITED STATES TREASURY	1	2	1				0	FALSE	BDO FVH Level 2 due to position being an Off the Run Treasury with no observable market activity to support Level 1.	1,000,754
Government Investment Grade	US912796ZY88	UNITED STATES TREASURY	1	2	1				0	FALSE	BDO FVH Level 2 due to position being an Off the Run Treasury with no observable market activity to support Level 1.	1,494,945
Government Investment Grade	US912797GC52	UNITED STATES TREASURY	1	2	1				0	FALSE	BDO FVH Level 2 due to position being an Off the Run Treasury with no observable market activity to support Level 1.	1,498,035
Government Investment Grade	US912797GE19	UNITED STATES TREASURY	1	2	1				0	FALSE	BDO FVH Level 2 due to position being an Off the Run Treasury with no observable market activity to support Level 1.	1,493,415
Government Investment Grade	US912797GN18	UNITED STATES TREASURY	1	2	1				0	FALSE	BDO FVH Level 2 due to position being an Off the Run Treasury with no observable market activity to support Level 1.	1,490,385
Government Investment Grade	US912797GP65	UNITED STATES TREASURY	1	2	1				0	FALSE	BDO FVH Level 2 due to position being an Off the Run Treasury with no observable market activity to support Level 1.	991,520

Fair Value Levelling Classification:
Active Market Test for Treasuries

A common misconception is that securities that are "less risky" should be categorized in Level 1. For instance, many might perceive US Treasury securities as essentially risk-free, and, therefore, should be considered Level 1 in the fair value hierarchy. However, certain Treasury securities are more appropriately categorized in Level 2 because they do not trade in an active market.

4.5.4.1 Level 1 inputs

Level 1 inputs are quoted prices (unadjusted) for identical assets or liabilities in active markets. A quoted price for an identical asset or liability in an active market (e.g., an equity security traded on a major exchange) provides the most reliable fair value measurement and, if available, should be used to measure fair value in that particular market.

In practical terms, the list of instruments that likely qualify as Level 1 fair value measurements is fairly narrow. It includes:

- Listed equity securities traded in active, deep markets (e.g., NYSE, NASDAQ)

- London Metal Exchange futures contract prices

- On-the-run Treasury bills, notes, and bonds[1]

- Exchange-traded futures and options

- Open-ended mutual funds with published daily NAV at which investors can freely subscribe to or redeem from the fund

Fair Value Levelling Classification: Active Market Test for Treasuries

▶ How are Treasuries not level 1 if an Institution or Retail client can call a broker and transact on an Off-the-Run Treasuries on a daily basis?

Fair Value Levelling Classification:
Active Market Test for Treasuries

▶ How are Treasuries not level 1 if an Institutions or Retail client can call a broker and transact on an Off-the-Run Treasuries on a daily basis?

Answer:

- Dealer to Client (DTC) transactions do occur, however, these are not arm's length transactions going to market with bid / ask.

- For example, a client with an account (i.e., UBS) could transact in their account with UBS rather easily however this is an internal metric not publicly disclosed.

- Therefore, this "liquidity" cannot be observed. (see support from FINRA)

Fair Value Levelling Classification:
Active Market Test for Treasuries

▶ FINRA published guidance on observability for Treasury Bills, Notes, Bonds: US Treasury are not observable by CUSIP / ISIN only in aggregated buckets.

▶ Unlike a corporate bond there is no public exchange that displays quotes and volumes

About TRACE Treasury Aggregate Statistics

The TRACE Treasury Aggregate Statistics provides trading volume in U.S. Treasury securities reported to TRACE for the prior day, week or month. The weekly format was discontinued as of February 2023; weekly format history is available.

For Nominal Coupons, Remaining Maturity is grouped as follows:

1. <= 2 years: greater than or equal to 0 and less than or equal to 2 years.
2. > 2 years and <= 3 years: greater than 2 and less than or equal to 3 years.
3. > 3 years and <= 5 years: greater than 3 and less than or equal to 5 years.
4. > 5 years and <= 7 years: greater than 5 and less than or equal to 7 years.
5. > 7 years and <= 10 years: greater than 7 and less than or equal to 10 years.
6. > 10 years: greater than 10 years.

Fair Value Levelling Classification:
Myth versus Fact

▶ All Exchanged traded Derivatives are Level 1 = Myth

- Fact Out of the Money (OTM) options with no trading are Level 2

▶ All Corporates Bonds are illiquid and level 2 = Myth

- Fact many Corporate Bonds are exchange Traded and have published trade prices, trade dates and liquidity metrics

▶ All common stock and mutual funds are level 1 = Myth

- Fact some thinly traded common stocks (pink sheets) or closed-end mutual funds fail the active market test

▶ All Treasuries are level 1 = Myth

- Fact Treasuries are priced off yield curve (model based), and do not have observable market to assess liquidity

▶ All ABS are level 2 = Myth

- Fact some Asset Back Securities demonstrate deep active markets and are level 1