

Fixed Income Capacity & the Canadian Bond Market

TD Asset Management's ("TDAM") goal is to deliver a positive and consistent investment experience with all our product offerings, based on our disciplined investment process and core philosophy. The achievement of this goal requires agility in both identifying and acting on investment opportunities as they arise. It also requires a solid foundation in both analyzing and understanding when prudence is needed, particularly regarding the capping of new inflows to our investment strategies. Therefore, understanding the capacity dynamics of the markets we invest in is crucial, as we work towards meeting the evolving needs of our clients. Get it right and our clients can benefit from our investment ideas. However, misinterpreting market capacity may lead us to fall short of our goals due to capacity issues.

In this paper, we cover how factors such as asset class, investment style, philosophy, and approach to trading affect capacity. Additionally, we highlight how we take these considerations into account when deciding to cap new inflows to our strategies.



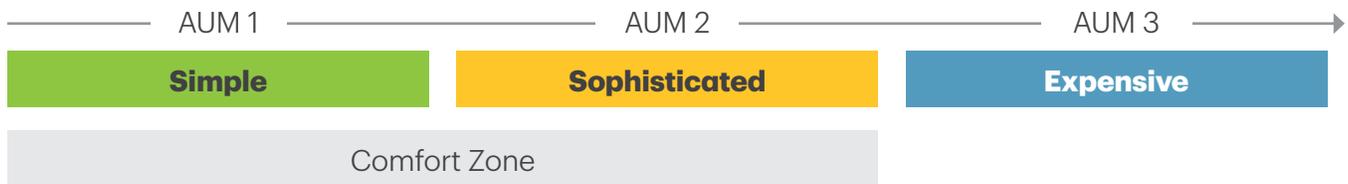
Defining capacity in a fixed income context

The investment community often relies on simplistic metrics to monitor capacity. However, extensive research on this subject has shown that capacity analysis is far more nuanced than is often characterized. We share this belief and see capacity as a rich and subtle topic that demands careful explanation, proper monitoring and oversight, and thorough integration into the overall investment process.

To better understand the impact of capacity, **Chart 1** details three phases of capacity usage that asset managers go through. Initially, they may start with few assets under management (AUM), which has little potential for market impact. In turn, they can achieve their desired outcomes

by using **simple** portfolio management and trading techniques. As the manager's assets grow into the second phase, liquidity considerations become more important. Fortunately, increased scale allows the manager to invest in talent and/or technology, allowing for the adoption of more **sophisticated** approaches that they may use to fulfill their investment objectives. Some managers may even become a market leader, which provides them with preferential access to primary markets, thereby increasing their capacity and ability to achieve positive outcomes. This leadership position also allows the manager to access deeper pools of secondary market liquidity. The final phase of capacity usage must be avoided through careful monitoring. In this phase, the manager grows beyond available capacity which leads to **expensive** trading costs, high market impact costs, and declining performance.

Chart 1¹:

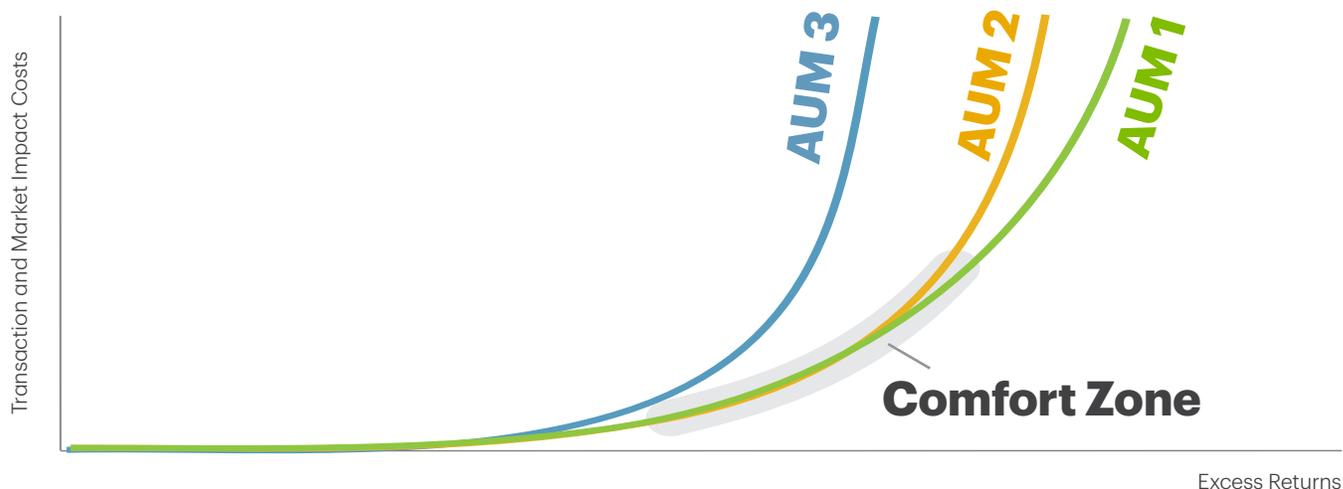


The following chart (**Chart 2**) demonstrates how increasing AUM eventually decreases the availability of excess returns. The smaller fixed income manager in category AUM 1 has access to greater excess returns, at reasonable transaction and market impact costs, than a manager in category AUM 3. **Chart 2** also depicts how transaction and market impact costs limit excess return generation as the size of the manager's AUM increases. It should be noted that a manager in category AUM 2 remains competitive by adopting sophisticated trading and portfolio management techniques, as well as gaining preferential access

to the market. Smaller managers, such as those in category AUM 1, have similar costs to those of category AUM 2 managers. However, the advantage of a smaller manager is that they can trade more efficiently in small, illiquid secondary markets. Conversely their transaction costs can be very high and the incremental risk a smaller manager takes in those illiquid secondary markets may not be adequately compensated. Simply put, for every dollar of excess return, transaction costs increase exponentially.

¹Chart 1 is for illustrative purposes only. Source: TDAM Internal.

Chart 2:

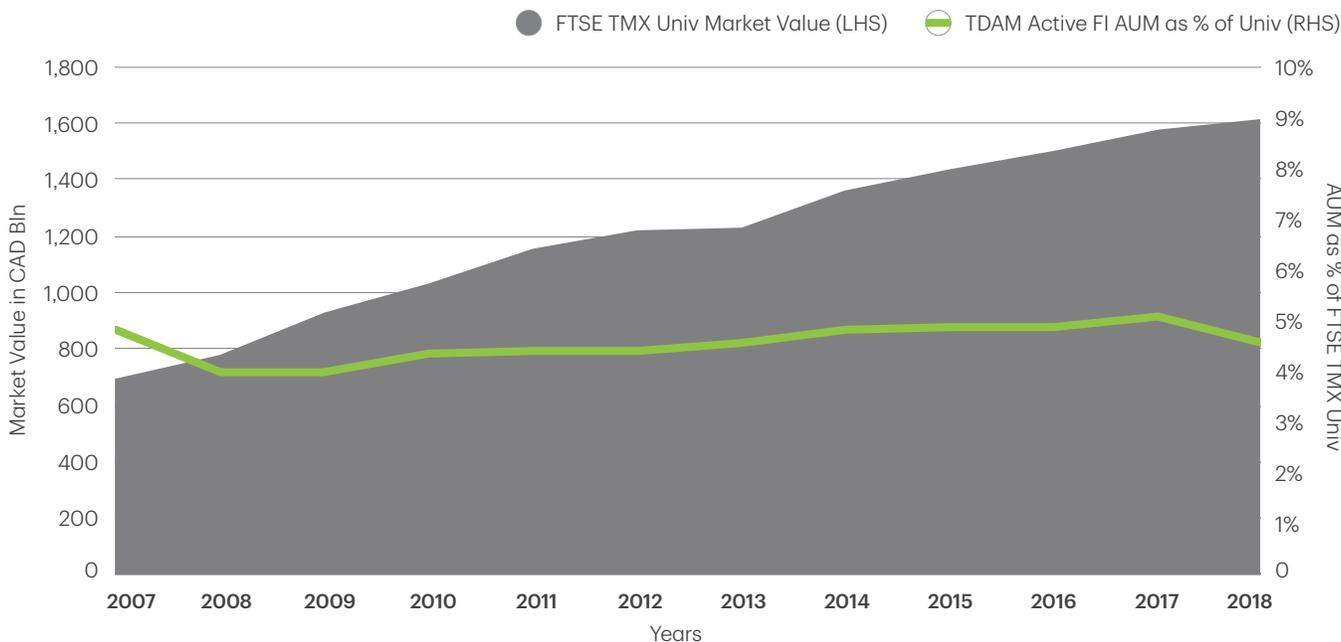


TDAM aims to stay in the 'sweet spot' indicated in **Chart 2** – the Comfort Zone. Within this area, the marginal increase in excess return per dollar of cost is optimal. In fact, we define capacity as the levels of AUM for which we can confidently deliver on our targets. We believe in capping new inflows to our strategies before they outgrow these levels. In following this approach, we are aligning our investment actions with the best interests of our clients¹. Furthermore, this approach requires a rather sophisticated framework to understand and monitor.

Composition of the Canadian fixed income market

The Canadian fixed income market, as measured by the FTSE Canada Universe Bond Index, has grown by ~ 140% over the last 11 years³. During this period, TDAM's active fixed income assets have grown roughly in line with the market, maintaining an AUM just under the 5% threshold of the overall Canadian fixed income market.

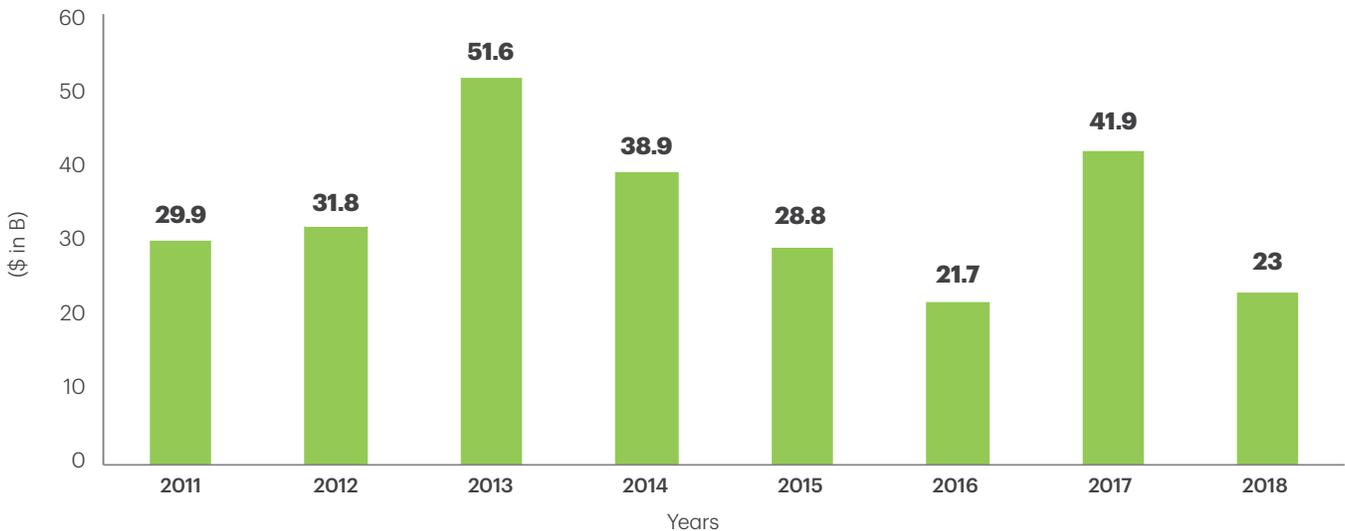
Chart 3: TDAM's Active Fixed Income Market Share



²Chart 2 is for illustrative purposes only. Source: TDAM.
³Data taken from Bloomberg Financial L.P. Data as of January 2019.

Focusing on the investment grade corporate market, this fixed income segment has grown by ~ 50% since 2011, outpacing the growth of the overall Canadian fixed income universe⁴. The underlying basis for this growth has been consistently positive net new issuance and growth in the number of issuers. The chart (**Chart 4**) below illustrates this occurrence.

Chart 4: Canadian Investment Grade Net New Issuance



Please Note: Chart depicts investment grade corporate bonds with a maturity of 2 years or greater at time of issuance. Data as of January 31, 2019. Source: TDAM, RBC Capital Markets.

As the market has grown over this period, average daily trading volumes have increased due to the entrance of new participants such as hedge funds, with more active and speculative trading strategies. However, daily trading volumes do not tell the complete story, as liquidity is fluid and can vary daily

for each fixed income instrument. We constantly monitor liquidity conditions through our market involvement and track metrics such as, *bid-ask spreads, age of issues, issuer outstanding, and firm-wide positioning in specific securities.*

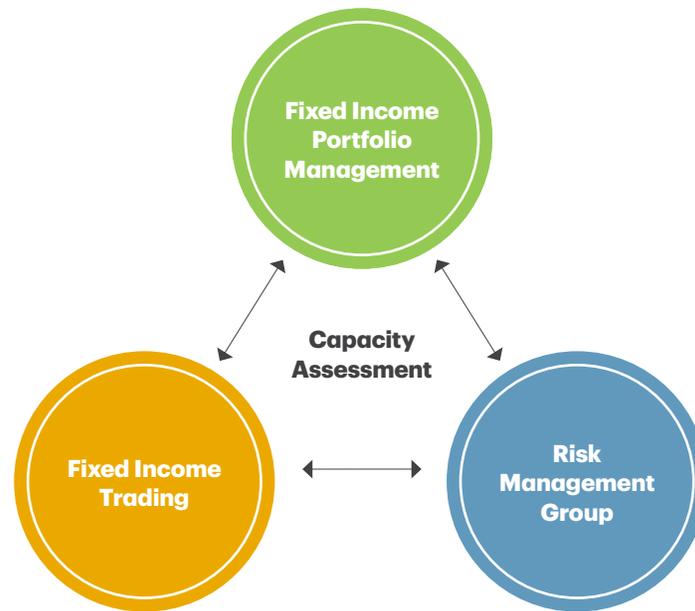
TDAM's portfolio management approach towards capacity assessment

TDAM's active fixed income philosophy combines our expertise in macroeconomic analysis and credit research, with an in-depth understanding of yield and credit curves. Both elements are key to helping create sustainable long-term success. We believe that delivering this expertise through a highly disciplined portfolio construction methodology, while closely

monitoring and understanding capacity, is the most predictable way to help generate competitive risk-adjusted returns; when measured against any given benchmark. The chart (**Chart 5**) below illustrates TDAM's capacity management framework, a dynamic process that involves the continual interaction of three business areas.

⁴Data taken from Bloomberg Financial L.P. Data as of January 2019.

Chart 5: TDAM's Capacity Management Framework



When assessing capacity, we consider our investment style and philosophy. Our portfolios tend to exhibit a low turnover because we primarily focus on free cash-flow generation and an issuer's ability to make timely coupon and principal repayments. Our primary source of value added is not driven by trading in and out of securities, whether corporate or sovereign. Our key focus is evaluating corporate risk and the compensation received for assuming that risk. We examine multiple factors, including: the company's history of maintaining a consistently satisfactory financial position; the stability of revenue; earnings strength; cash flow; operating and financial leverage and bank-line liquidity; and access to capital markets. This allows us to have the confidence and visibility in the corporate credit we invest in.

In addition, our investment philosophy is grounded in taking a high-conviction, long-term approach to portfolio positioning and we typically do not trade in/out of positions entirely, unless there is a significant credit risk issue or change in default risk. Note, our ability to trade when required is not impaired by our size, as the capacity of our portfolios is independently monitored. The TDAM Risk Team monitors capacity (Process details on page 5-6) on a quarterly basis to independently evaluate our ability to deliver on our investment goals.

Our size and scale has allowed us to invest in people and technology. Our dedicated trading team provides expert execution through valuable insights into the depth and breadth of the market. The trading team, alongside the portfolio management team, monitors and sources liquidity available in the market place by utilizing data, leveraging dealer relationships and deploying technology to daily assess the general tone of market liquidity.

TDAM's Fixed Income Team & Capability

The fixed income trading team at TDAM is comprised of a group of investment professionals with diverse backgrounds and capabilities. Each team member is focused on a specific segment of the bond market and is regarded as subject matter experts in their field. The team's deep understanding of market sectors, supply and demand dynamics, and the nuances of the over-the-counter marketplace greatly contributes to their ability to provide best in class trade execution. The team prides itself on being able to negotiate beyond stated bid-ask spreads to add value and preserve client capital. The trade team is an integral part of the investment management process. The team is focused on continually assessing liquidity conditions, evaluating

trade points and identifying market opportunities. The traders work in conjunction with our Portfolio Managers to ensure that investment ideas are developed into positive investment outcomes.

We are consistently reevaluating our trading process to ensure we remain thought leaders in the field. While the bond market lags the advances in automated and high frequency trading seen in equity markets, the market has evolved and embraced the use of technology. The past few years have seen an emergence of financial technologies, 'fintech', which have driven the evolution of fixed income market structure. Electronic requests for quote systems are common place across investment grade and high yield markets. Integration of these platforms into our order management system has allowed TDAM to take advantage of the scale they afford. Transacting in dark-pools has also been widely embraced by sophisticated investors. When trades are executed peer-to-peer, transaction costs are compressed to the benefit of both parties.

The relationships between investors (buy side) and investment dealers (sell side) remain important in our over-the-counter markets. TDAM has an excellent reputation among our most important counterparties, crafted over years of good-faith negotiation and fair dealing. Good working relationships with the most prominent investment dealers and sell side traders provide our trading team with a distinct competitive advantage. We perceive that we receive best-in-class market intelligence, which leads to a better understanding of market conditions and allow us to capitalize on opportunities as a result. Our long-standing relationships provide us first opportunities to act on investment opportunities in the secondary market. Our constant market engagement allows us to operate with the knowledge that our counterparties' long term interests are aligned with those of our clients.

The management of a wide array of assets across a variety of mandates creates intraday rebalancing

and flow-based trading. Our sophisticated portfolio management and trading teams have developed workflows that identify when a cross trade, which is a trade between internally held accounts, is possible. The crossing of a bond between accounts, rather than executing separate buy and sell transactions, allows investors to eliminate transaction costs. Being able to execute cross trades for individual trades or across a program is a luxury only available to a manager with sufficient scale. We also take the opportunity to utilize our knowledge of sell-side desk positioning to invert the bid/offer spread in situations where the market allows, again benefiting both the client selling and the client buying.

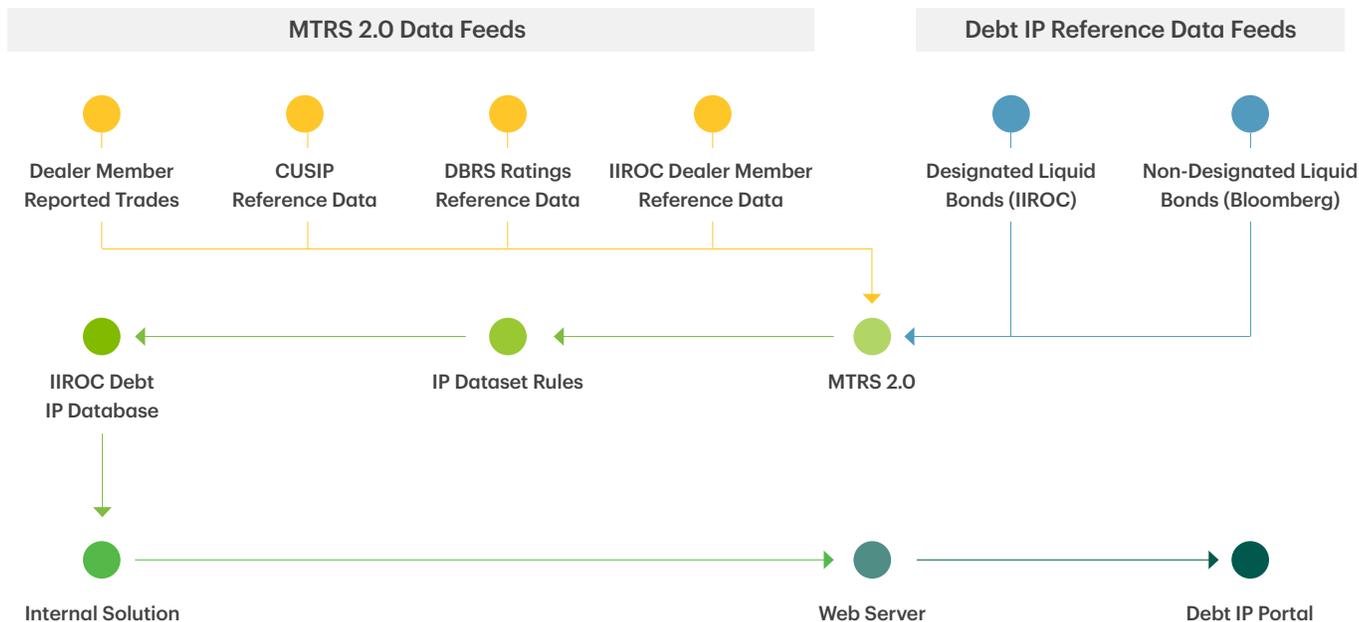
Risk management quantitative assessment of capacity

Due to the various liquidity levels of the multitude of securities traded, capacity varies significantly across asset classes and investment styles. There are multiple techniques to assess capacity using various models (ex-post analysis; simulation analysis based on existing portfolios; predictive models and etc.). Each model has its own advantages and disadvantages. We believe that the simpler models, such as some of the ex post analysis models are not sufficiently accurate. To be able to correctly apply the more sophisticated models, we need access to consistently accurate data, which requires significant effort to obtain in the Canadian fixed income market place. For this reason, unlike equities, there is no off the shelf tool to quantify capacity in the Canadian fixed income landscape.

We have developed what we believe to be a precise, quantitative capacity assessment model for Canadian fixed income. To assess capacity, our risk management team developed a quantitative process that relies on an independent data source developed by the Independent Industry Regulatory Organization of Canada (IIROC).

The chart below details how trade data is collected from IIROC. All Individual trades are reported by IIROC dealer members, as per IIROC's Debt Trade Reporting Rule 2800C^{5,6}. These trades are aggregated and de-identified by IIROC, and the resulting daily data is published two business days later in IIROC's Debt IP Portal.

Chart 6^e: The collection of trade data from IIROC



IIROC members trading volume data is aggregated by IIROC quarterly, where all trades are assigned to a specific sector and term bucket. For example, as of Q1 2018, every Federal Bond traded is assigned to a 0-3 year term, 3-10 year term or > 10 year term bucket. Similar buckets are created for corporate, provincial, municipal and RRB securities traded.

Every quarter, the TDAM Risk Management team replicates the IIROC process by using the TDAM Canadian Fixed Income trading volume data and mapping them to the IIROC sector and term buckets.

A model has been built to track TDAM's Canadian fixed income participation rate in the total quarterly trading volume with a capacity limit of 20% over a 7 day trading period. We chose a 7 day trading period to be in line with the SEC definition on liquidity (rule 22E4). If the 20% is breached, the risk team will discuss capacity concerns with the Head of Fixed Income and

decide whether it would be appropriate to cap new inflows to our strategies.

TDAM's Oversight, Monitoring and Escalation Process

The capacity framework is utilized within TDAM Risk Management Group, which is comprised of the CEO, the Regulatory and Policy Governance Group and the Investment Risk Management Group. TDAM's Risk Management Group is independent of the portfolio management team and has oversight of the Investment Performance and Oversight Committee (IPOC) which is chaired by the CEO of TDAM. As an example, if capacity becomes a concern, the issue is escalated to IPOC. In case of further disagreement, TDAM's Risk Management Group escalates the capacity discussion to the Conflict of Interest Committee which is chaired by TD's Head of Wealth Management.

⁵IIROC dealer members: Beacon, BMO Nesbitt Burns, Merrill Lynch Canada, National Bank Financial, Canaccord Genuity, Casgrain & Company, Odlum Brown, RBC Dominion, CIBC World Markets, CTI Capital, Scotia Capital, Toronto Dominion, Desjardins, HSBC Canada, Laurentian Bank.

⁶For more information on the IIROC data collection process please refer to: <https://bondtradedata.iroc.ca/#/product-guide>

Aligning our investment decision with the interest of our clients

Compensation is one of the best ways to align the interests of our investment team with those of our clients, particularly when it comes to capacity. By compensating investment team members for their contribution to attractive fund performance, rather than fund growth, the investment team has no incentive to outgrow capacity.

Investment team members aren't compensated for revenues generated to the firm or the size of individual strategies, either of which would encourage growing the asset base. Instead, they

are compensated for fund performance and for their individual contribution to returns, both of which would be hampered by growing the fund beyond appropriate capacity. In addition, we obtain and retain talent by offering highly competitive salaries relative to our Canadian peers and by rewarding excellent teamwork. This way, we build a team of skilled professionals that values performance over size.

Additionally, portfolio managers are subject to a fund ownership requirement with substantial investments in the funds managed by the individual employee, thereby further incentivizing them to focus on fund performance.

Conclusion

Within TDAM, the capacity of our investment fund offerings is measured and monitored frequently; to ensure that we remain flexible in our ability to execute investment decisions that benefit our clients. We do this through TDAM's fixed income portfolio management approach towards capacity assessment as well as accessing the expertise and experience of TDAM's Risk Management Group for ongoing oversight, monitoring and escalation.

Finally, to align our investment actions with the best interest of our clients, TDAM portfolio managers are subject to fund ownership rules which, tie their compensation to the performance of their funds – not their AUM. In doing this, portfolio managers are incentivized to monitor capacity for our client's assets and pursue investment opportunities that aim to fulfill client needs. ■



The information contained herein has been provided by TD Asset Management Inc. and is for information purposes only. The information has been drawn from sources believed to be reliable. Graphs and charts are used for illustrative purposes only and do not reflect future values or future performance of any investment. The information does not provide financial, legal, tax or investment advice. Particular investment, tax, or trading strategies should be evaluated relative to each individual's objectives and risk tolerance. Certain statements in this document may contain forward-looking statements ("FLS") that are predictive in nature and may include words such as "expects", "anticipates", "intends", "believes", "estimates" and similar forward-looking expressions or negative versions thereof. FLS are based on current expectations and projections about future general economic, political and relevant market factors, such as interest and foreign exchange rates, equity and capital markets, the general business environment, assuming no changes to tax or other laws or government regulation or catastrophic events. Expectations and projections about future events are inherently subject to risks and uncertainties, which may be unforeseeable. Such expectations and projections may be incorrect in the future. FLS are not guarantees of future performance. Actual events could differ materially from those expressed or implied in any FLS. A number of important factors including those factors set out above can contribute to these digressions. You should avoid placing any reliance on FLS. The TD Mutual Funds/Products (the "Funds/Products") have been developed solely by TD Asset Management Inc. The Funds/Products are not in any way connected to or sponsored, endorsed, sold or promoted by the London Stock Exchange Group plc and its group undertakings (collectively, the "LSE Group"). FTSE Russell is a trading name of certain of the LSE Group companies. All rights in the FTSE Russell Index/Indices referred to in this document/publication (the "Index/Indices") vest in the relevant LSE Group company which owns the Index/Indices. "FTSE[®]" "Russell[®]", "FTSE Russell[®]" are trade marks of the relevant LSE Group company and are used by any other LSE Group company under license. "TMX[®]" is a trade mark of TSX, Inc. and used by the LSE Group under license. The Index is calculated by or on behalf of FTSE International Limited or its affiliate, agent or partner. The LSE Group does not accept any liability whatsoever to any person arising out of (a) the use of, reliance on or any error in the Index or (b) investment in or operation of the Funds/Products. The LSE Group makes no claim, prediction, warranty or representation either as to the results to be obtained from the Funds/Products or the suitability of the Index for the purpose to which it is being put by TD Asset Management Inc. TD Asset Management Inc. is a wholly-owned subsidiary of The Toronto-Dominion Bank. Bloomberg and Bloomberg.com are trademarks and service marks of Bloomberg Finance L.P., a Delaware limited partnership, or its subsidiaries. All rights reserved. © The TD logo and other trade-marks are the property of The Toronto-Dominion Bank.