



The “Financial Economics” Debate

And the Need for a New Way Forward

Dimitry Mindlin, ASA, MAAA, Ph.D.

President

CDI Advisors LLC

dmindlin@cdiadvisors.com

April 2, 2010

*I'm not coming down
No matter what you say
I like it up here anyway*

Paul McCartney, "Mr. Bellamy"

In numerous discussions lately, readers have been treated to a high drama on a most unlikely subject – pension valuation and accounting. The story has been told as an epic contest between those who favor transparency, accountability and scientific correctness (the so-called “financial economics,” or FE approach) and those who self-interestedly cling to deficient archaic practices (the “traditionalists”). Welcome to the “Financial Economics” debate!

For the last several years, academics and practitioners have been debating “financial economics” and its main application – “marked-to-market” pension accounting. What started as an obscure discussion about the foundation of actuarial science has now spread out to the actuarial and accounting standard setting bodies as well as the mainstream media as an important public policy debate. Indeed, the future of DB plan management is at stake as the controversy strikes at the heart of regulatory, funding and asset allocation policies.

The direction of this debate, however, needs a major correction. This narrative as the choice between the traditional and “marked-to-market” approaches is misleading and counterproductive. Both the “traditional” and “marked-to-market” approaches have fundamental problems (although the problems with the latter approach are much more consequential than the ones with the former). The narrative that limits our choices to two flawed approaches is unjustifiably restrictive.

This narrative obscures the real issue – the need for an effective cost-risk management framework for a healthy DB system. Although the drama might make the story more captivating, it obstructs the development of such a framework. In order to make lasting improvements in the management of DB plans, it is desirable to eliminate the unproductive distraction this narrative has become.

This paper returns to the origins of the “financial economics” debate and gives a brief review of the debate’s development. The paper attempts to bring certain clarity to the debate and take it to its logical conclusion. Both the traditional and “marked-to-market” approaches have little to do with financial economics, as both approaches ignore risk. No matter which approach ultimately prevails in this debate, the challenge will remain – to develop a new way forward that brings risk management tools from financial economics and actuarial science to the decision-making process of DB plans. Let us face this challenge without delay.

“Financial Economics” in a Nutshell

Financial economics as a scientific discipline needs no introduction. Its impact on the practices of finance and the development of capital markets is universally recognized. The major developments in financial economics have received the highest scientific awards. Numerous textbooks and countless academic papers scrupulously describe the foundations and applications of financial economics.

Pension practitioners, however, have encountered a different side of the term “financial economics.” Over the last several years, the key aspects of DB plan management have come under intense criticism for their lack of compliance with the principles of “financial economics.” The critics have cited shortcomings of the traditional approach and promoted their views as the only alternative to the traditional approach. Numerous pension practitioners have come under persistent attacks for not being sufficiently acquainted with “financial economics.” These attacks are getting increasingly harsh.

How did a highly acclaimed scientific discipline turn into a highly controversial viewpoint on DB plans? Why hasn’t “financial economics” acquired too many fans in the pension practitioner community? What should be done to make the debate about the future of the DB system more productive? The answers to these and other critical questions require a deeper look at FE and the fierce debate it has catalyzed.

In this paper, the term “financial economics” in quotation marks (or, alternatively, FE for brevity) refers specifically to the version of corporate pension finance currently utilized to justify “marked-to-market” pension accounting and the “reinvention” of conventional practices of pension plans. Thus, this paper distinguishes “financial economics” (FE) and financial economics in a traditional sense. One of the main messages of this paper is *the “financial economics” approach has little to do with financial economics and a lot to do with the futile aspiration to make the future transparent.*

The FE approach is essentially based on the following premises:

1. Pension commitments are similar to debt.¹
2. There exists a matching bond portfolio for every pension commitment.
3. A pension commitment and its matching bond portfolio must be priced the same.²

These premises are discussed in later sections. According to the FE approach, the present value of a pension commitment (a.k.a. “liability”), defined as the price of the matching bond portfolio, has bond-like characteristics. Therefore, to ensure proper asset-liability matching, bonds and

bond-like instruments should dominate the asset side. This is the logic behind a bond-centric approach to pension investing called Liability Driven Investing (LDI). While FE and LDI are closely connected, a discussion of LDI is outside of the scope of this paper.

The Rise of “Financial Economics”

Corporate pension finance started essentially in the 1970s.³ There were several notable papers on the subject in the 1970s and 1980s, mostly regarding taxation and the role of pension plans in the capital structure of a corporation.⁴ These papers produced controversial conclusions and had few followers. Pension practitioners had largely ignored corporate pension finance until the early 2000s.

The ideas of corporate pension finance resurfaced under the tag of FE early in this decade during the time that was (undeservedly) dubbed “the perfect storm.” At the time, the rapid deterioration of accounting measurements of many plans accentuated the shortcomings of the traditional approach to pension plan management. Several actuaries and economists presented the principles of FE and declared that conventional actuarial practices were in violation of these principles. Consequently, there was a call for a wholesale “reinvention” of pension actuarial science and actuarial practices, which would be replaced by the “brainchild” of FE – “marked-to-market” pension accounting.⁵ While the practices of the entire pension actuarial profession were declared “obsolete,” only a handful of actuaries and economists voiced their unequivocal disagreement with FE and its scientific foundation at the time.⁶

The extent of the call received a lot of attention and jump-started an extensive debate in the actuarial circles and beyond. It should be mentioned that actuarial organizations did a great job of presenting all sides of the debate and reaching out beyond their membership for contributions to the debate. Actuarial publications and conferences welcomed all sides of the debate. In particular, financial economists of all persuasions had many opportunities to present their views to actuarial audiences.

Some actuaries were sympathetic to the ideas of FE. Many others, however, were increasingly skeptical, realizing that FE contained serious flaws. In response to this skepticism, the attacks on pension practitioners were getting increasingly harsh. Among other allegations, pension practitioners, especially actuaries, were found guilty of the demise of the DB system, the production of deceptive financial statements, and, naturally, the lack of education.

Yet, the deficiencies of FE were becoming progressively more evident. As corporate DB plans appeared to be in the process of self-termination and the debate was shifting to the public plans arena, a growing number of public plan practitioners were joining the opposition to FE.

This opposition was on display when the American Academy of Actuaries and (separately) GASB were considering the appropriateness of the concept of “market value of liability” (MVL) – the core of “marked-to-market” pension accounting – for public plans. In both cases, the depth of opposition to the concept was simply remarkable. Several large organizations representing pension plans, a number of pension plan officials, and numerous actuaries took these opportunities to dispute the conclusions of FE and question the usefulness of MVL. A number of elected officials and their national organizations documented the justification of their opposition.⁷

Facing dwindling support, the proponents of “marked-to-market” pension accounting appeared to have paradoxically concluded that the power of their arguments had won the debate. They intensified their rhetoric and focused on urging relevant governing bodies to implement the principles of FE in regulations. Some even declared that the debate was over. Indeed, what is the point of presenting economic arguments to unenlightened pension practitioners when “there is no professional disagreement” on this issue among economists? The fact that this amusing argument comes from the highest echelons of the Federal Reserve makes it an absolute gem.⁸

In fact, an open debate regarding “marked-to-market” pension accounting has never materialized outside of actuarial circles and governing bodies. The coverage of the debate in the media and some industry publications has been remarkably one-sided. The proponents of FE are usually portrayed as innovators, while their opponents are ignored at best and portrayed as self-serving incompetents at worst. These publications contain little evidence of the existence of a sizable group of knowledgeable professionals that have good reasons to believe that FE is fundamentally flawed and this “cure” is much worse than the “disease.”⁹

On the Theoretical Foundation and Usefulness of “Financial Economics”

The theoretical foundation of FE has been analyzed in several publications, so this section contains only a concise summary of this analysis.¹⁰

Let us look at the basic premises of FE presented above. It is true that, as Premise 1 states, pension commitments have certain similarities to debt. However, the presence of similarities by itself is insufficient for useful conclusions, as dissimilarities also matter. Due to substantial dissimilarities between pension commitments and debt, the existence of a matching bond portfolio for every pension commitment claimed in Premise 2 is little more than an accounting fantasy.

Furthermore, Premise 1 and Premise 2 do not necessitate Premise 3, even if we assume that Premise 1 and Premise 2 are perfectly valid. There is no sound economic principle that requires a non-tradable non-transferable pension commitment and the matching portfolio of tradable bonds to be priced the same. To the contrary, a strict application of financial economics requires the opposite conclusion due to the existence of “the liquidity premium.”

Premise 3 – the requirement of identical pricing of tradable and non-tradable cash flows – is one of the cornerstones of FE. Throughout this debate, the proponents of FE have been remarkably vague about the basis for this premise. Some publications hint that this premise is based on the law of one price.¹¹ Some other publications state that the premise is not based on the law of one price.¹² The fact that the proponents of FE have been unable to clarify this fundamental issue speaks volumes about the quality of FE as a scientific discipline.

In the absence of solid theoretical justification, “marking-to-market” moves from the realm of scientific principles to the realm of what is *practical and useful*. The usefulness of “marking-to-market” has never been the favorite topic of the proponents of FE. As a number of public plan practitioners have stated that “marked-to-market” pension accounting is unhelpful for their goals, it is clear that the proponents of FE do not have a terribly good case to argue otherwise. Essentially, the FE approach boils down to the view that solvency concerns should dominate pension plan management. The usefulness of this view is debatable at best.

The deficiencies of FE go far beyond the basic premises stated above. The emphasis FE on finding matching bond portfolios and their pricing misrepresents the funding objective of a pension plan - to ensure that the money is readily available every time a promised payment is due. The proponents of FE appear to have little appreciation for the fundamental difference between *pricing* and *funding* pension commitments. The success of the funding objective has everything to do with the ability of plan’s assets to deliver the money when it is due and may have little to do with matching bonds, which represent a just small subset of the multitude of assets available for the funding purposes.

“Marked-to-market” pension accounting statements the proponents of FE promote contain an additional volatility induced by fluctuating interest rates. This volatility may have little to do with the process of funding pension commitments and create considerable problems for plan sponsors. Introducing a spurious volatility to financial statements may not be the best encouragement for plan sponsors to keep their plans on-going and open. As far as the survival of the DB system is concerned, FE is unhelpful at best and likely detrimental. As a reflection of this attribute of FE, its proponents were called “windmill fighters in Potemkin villages” in a paper published in an actuarial magazine.¹³

The FE approach adds little to the hallmarks of financial economics – rigorous quantitative models with extensive practical applications. In many respects, the FE approach is at odds with financial economics. Conflicts between certain pronouncements of FE and financial economics are visible even upon a cursory examination. Here are a few examples.

1. According to R. Merton, financial economics is "*the allocation and deployment of economic resources ... in an uncertain environment.*"¹⁴ In contrast, FE assumes away all uncertainties and proclaims that asset allocation is irrelevant. After all, \$100 of stocks is the same as \$100 of any asset.
2. According to W. Sharpe, "*there would be no role for financial economics were it not for time and uncertainty. ... both of these aspects are crucial elements in the lives of individuals and economies.*"¹⁵ In contrast, FE neither analyzes uncertainties nor contains risk measurements.
3. A popular investment textbook states, "*One of the central concerns of finance theory is the measurement of risk and the determination of the risk premiums.*"¹⁶ In contrast, once again, FE contains no risk measurements, and, according to the proponents of FE, "The equity risk premium ... is all but irrelevant to corporate finance."¹⁷
4. According to F. Black circa 1989, "*The best mix will depend on your view of the liability. ... To hedge the broad liability, you will want a large proportion of stocks.*"¹⁸ In contrast, "the broad liability," defined as "the present value of all benefits paid by the plan" including past and future service for current and future employees, has no place in FE. Investing in stocks is against the principles of FE as well.¹⁹
5. According to F. Black circa 1995, "*... a plan sponsor may want to choose an investment strategy to minimize the present value of future contributions to the plan.*" In contrast, the present value of future contributions in FE is a perfectly known value – it is equal to the difference between the market values of liabilities and assets. A known value cannot be minimized or maximized – it is what it is. As a result, F. Black's views circa 1995 have no place in FE.²⁰
6. If the FE mindset prevailed, there would be no need for one of the most prominent achievements of financial economics – the Black-Scholes formula. Who needs independent valuations of future cash flows when market prices are readily available?
7. "Pension Actuary's Guide to Financial Economics" – a comprehensive presentation of the principles of FE – lists four major risks "usually taken in pension investing that merit consideration." These risks are equity (beta) risk, interest rate risk, credit risk, and alpha risk. Remarkably, the risk of having insufficient assets to fund the pension commitment and the risk that the cost of running the plan exceeds certain undesirable level do not "merit consideration" in FE.²¹

Overall, the FE approach contains major flaws. While some may treat these flaws as “rounding errors” for the purposes of an abstract theory, practitioners cannot ignore them. The utilization of a deficient theory may put the promised benefit at a greater risk, increase the cost of providing these benefits, and may not be the best way to discharge one’s fiduciary responsibility.

In the opinion of this author, FE is little more than *an attempt to apply asset pricing and accounting concepts beyond the scope of their applicability*.

Where Do We Go from Here?

The DB system contains significant problems that require creative solutions. So far, the “financial economics” debate has done little to either strengthen the DB system or advance the retirement security of pension plan participants. To make this debate more productive, this author would like to make a few suggestions.

First, the “financial economics” inspired criticism of pension practitioners should stop. The FE approach contains neither superior insight into pension plan management, nor some esoteric theory applicable and useful to pensions. The approach is based on unreasonable assumptions, lacks solid theoretical foundation, and is likely to accelerate the DB system’s demise. FE provides no basis for casting doubt on the integrity and professionalism of pension practitioners.

The proponents of FE should realize that their approach emphasizes short-term solvency and ignores the long-term concerns of the cost and safety of promised benefits. The proponents of the traditional approach should realize that their approach emphasizes long-term median cost of funding and ignores short-term solvency concerns and long-term riskiness of funding. Both approaches have their pros and cons, and both sides should welcome a truly open debate. The ability to strengthen the DB system should be one of the main criteria of the effectiveness of a particular approach.

To those participants of this debate who believe that the alleged consensus among economists regarding FE is a valid scientific argument, the following reminder is in order. Science is not a democratic institution. Scientists do not resolve their disagreements by plebiscite, acclamation, voice vote, or any other democratic means. To a courteous scientific debate, scientists contribute books and scholarly articles, which gain recognition via the quality of their contents. In the presence of quality academic publications, any “consensus” declaration is needless. In the absence of quality academic publications, any “consensus” declaration is useless. Either way, the claim “every economist knows this” is an inconsequential line of reasoning as well as a clear sign of weakness of one’s arguments.²²

In this author's opinion, the development of effective cost-risk measurements for the DB system will be driven by a new way forward that brings together financial economics and actuarial science. The focus must be on the primary objectives of major stakeholders of DB plans – the safety of benefits for plan participants and the manageability of cost for taxpayers/shareholders. The next step would be to create comprehensive cost-risk measurements of pension commitments with these objectives in mind. These measurements may or may not belong to any accounting statement, but it is imperative to realize that the task of creating efficient pension plan management for a healthy DB system is much more important than any pension accounting reform.

A serious effort in this area is under way, and initial results are very encouraging. The new emerging methodology strives to maximize the safety of benefits and, at the same time, minimize the cost of providing these benefits. This endeavor appears to be the most promising direction of future developments in the area of managing and measuring retirement commitments.²³

REFERENCES

- Bader, L. [2005]. A Critique of “Reaffirming Pension Actuarial Science,” *The Pension Forum*, The Society of Actuaries, April, 2005, <http://www.soa.org/library/newsletters/the-pension-forum/2005/april/pfn0504.pdf>.
- Badder, L. [2009]. Can Pensions Be Valued as Marketed Securities? *Pension Section News*, The Society of Actuaries, June, 2009, <http://newsletters.soa.org/soap/issues/2009-06-05/3.html>.
- Bader, L., Gold, J. [2003]. Reinventing Pension Actuarial Science, *The Pension Forum*, The Society of Actuaries, January, 2003, <http://library.soa.org/library/sectionnews/pension/PFN0301.pdf>.
- Bader, L., Gold, J. [2007]. The Case against Stock in Public Pension Plans, *Financial Analysts Journal*, January-February, 2007.
- Black, F. [1980]. The Tax Consequences of Long-Run Pension Policy, *Financial Analysts Journal*, July-August, 1980.
- Black, F., [1989]. Should You Use Stocks To Hedge Your Pension Liability? *Financial Analysts Journal*, January/February 1989, 10–12.
- Black, F. [1995]. The Plan Sponsor's Goal, *Financial Analysts Journal*, July-August, 1995.
- Blake, D., Khorsanee, Z. [2005]. Discussions of “Pensions and Capital Structure: Why Hold Equities in the Pension Fund?”, *North American Actuarial Journal*, Vol. 9, No. 4, October, 2005, <http://soa.org/library/journals/north-american-actuarial-journal/2005/october/naaj0504-9.pdf>.
- Bodie, Z., Kane, A., Marcus, A.J. [1999]. Investments, *Irwin McGraw-Hill*, 1999.
- McCrorry, R., Bartel, J. [2003]. Reinventing Pension Actuarial Science, A Critique, *The Pension Forum*, January 2003, <http://library.soa.org/library/sectionnews/pension/PFN0301.pdf>.

- Merton, R. [1997]. Applications of Option-Pricing Theory: Twenty Years Later. Nobel Lecture, December 9, 1997, http://nobelprize.org/nobel_prizes/economics/laureates/1997/merton-lecture.pdf.
- Mindlin, D. [2005]. Reaffirming Pension Actuarial Science, *The Pension Forum*, The Society of Actuaries, April, 2005, <http://www.soa.org/library/newsletters/the-pension-forum/2005/april/pfn0504.pdf>.
- Mindlin, D. [2006]. The Myth of the Liability Benchmark, *Global Pensions*, October, 2006, <http://www.cdiadvisors.com/papers/CDIMythofLiabilityBenchmarkGP0610.pdf>.
- Mindlin, D. [2007]. Windmill Fighters in Potemkin Villages, *Contingencies*, American Academy of Actuaries, January/February, 2007, <http://www.cdiadvisors.com/papers/CDIWindmillFighters.pdf>.
- Mindlin, D. [2008a]. In Support of the Weatherman, *Contingencies*, American Academy of Actuaries, May/June, 2008, <http://www.contingencies.org/mayjun08/weatherman.pdf>.
- Mindlin, D., [2008b]. The Good, the Bad, and the Ugly of Pension Accounting, *Pension Section News*, *Society of Actuaries*, Issue No. 68, September, 2008, <http://www.cdiadvisors.com/papers/CDIGoodBadUglyofPensionAccounting.pdf>.
- Mindlin, D., [2009a]. Commitment Driven Investing and Time Diversification, *CDI Advisors Research*, CDI Advisors LLC, 2009, <http://cdiadvisors.com/papers/CDIandTimeDiversification090406.pdf>.
- Mindlin, D., [2009b]. “The Plan Sponsor’s Goal” Revisited, *CDI Advisors Research*, CDI Advisors LLC, 2009, <http://www.cdiadvisors.com/papers/CDIThePlanSponsorsGoalRevisited.pdf>.
- Mindlin, D., [2009c]. The Case for Stochastic Present Values, *CDI Advisors Research*, CDI Advisors LLC, 2009, <http://www.cdiadvisors.com/papers/CDITheCaseforStochasticPV.pdf>.
- Mindlin, D., [2009e]. Commitment Driven Investing: An Introduction, *CDI Advisors Research*, CDI Advisors LLC, 2009. <http://www.cdiadvisors.com/papers/CDIIntroduction091109.pdf>.
- Ralfe, J., Speed, C., Palin, J. [2004]. Pensions and Capital Structure: Why Hold Equities in the Pension Fund? *North American Actuarial Journal*, Vol. 8, No. 3, July, 2004, http://www.soa.org/library/pdf/test/journals/north-american-actuarial-journal/2004/july/new_naaj0403-7.pdf.
- SOA-AAA [2006]. Pension Actuary’s Guide to Financial Economics, *Joint Task Force on Financial Economics and the Actuarial Model*, Society of Actuaries and American Academy of Actuaries, 2006, <http://www.actuary.org/pdf/pension/finguide.pdf>.

Endnotes

- ¹ Throughout this paper, “pension commitment” is defined as a stream of payments promised to plan participants.
- ² See, for example, Bader, Gold [2003], SOA-AAA [2006].
- ³ Some consider the works of Modigliani and Miller in the late 50s as a foundation of later developments.
- ⁴ See, for example, Black [1980].
- ⁵ See, for example, Bader, Gold [2003], Ralfe, Speed, Palin [2004].
- ⁶ See, for example, McCrory, Bartel [2003], Mindlin [2005].
- ⁷ The written statements submitted to the Academy are posted on the Academy’s website http://www.actuary.org/events/2008/forum_statements.asp. Links to the GASB discussion of this matter can be found at <http://nasra.org/resources/ITC.htm>.
- ⁸ The Economic Outlook, Vice Chairman Donald L. Kohn, *Federal Reserve*, the National Conference on Public Employee Retirement Systems Annual Conference, New Orleans, Louisiana, May 20, 2008. “While economists are famous for disagreeing with each other on virtually every other conceivable issue, when it comes to this one there is no professional disagreement: The only appropriate way to calculate the present value of a very-low-risk liability is to use a very-low-risk discount rate.” See <http://www.federalreserve.gov/newsevents/speech/kohn20080520a.htm>.
- ⁹ Below is a sample of well-written articles from reputable publications that illustrate this trend.
- Pensions Unplugged, by Arthur Levitt, Jr. *The Wall Street Journal*, November 10, 2005. See <http://online.wsj.com/article/SB113159015994793200.html?mod=article-outset-box>.
- When the spinning stops. Can actuaries help to sort out the mess in corporate pensions? Special Report, *The Economist*, January 26, 2006. See http://www.economist.com/displaystory.cfm?story_id=5436947.
- Pension Fund Short or Full? Depends on the Evaluator, by Mary W. Walsh and Michael Cooper, *New York Times*, August 27, 2006. See http://query.nytimes.com/gst/fullpage.html?res=9A04EFD8103EF934A1575BC0A9609C8B63&sec=&spon=&page_wanted=1.
- Love, D. Who killed DB plans? All the usual suspects, *Pensions & Investments*, December 11, 2006.
- Actuaries Scrutinized on Pensions, by Mary W. Walsh, *New York Times*, May 21, 2008. See <http://www.nytimes.com/2008/05/21/business/21pension.html>
- The Great Public-Sector Pension Rip-Off: Dodging the Bill, *The Economist*, July 9, 2009. See http://www.economist.com/opinion/displaystory.cfm?story_id=13988606.
- Public Pensions Cook the Books, by Andrew G. Biggs, *The Wall Street Journal*, July 6, 2009. See <http://online.wsj.com/article/SB124683573382697889.html>.
- ¹⁰ See, for example, McCrory, Bartel [2003], Blake, Khorsanee [2005], Mindlin [2005], Mindlin [2006], Mindlin [2007], Mindlin [2008a], Mindlin [2008b].
- ¹¹ For example, see SOA-AAA [2006]. This guide displays the law of one price as a sidebar (p. 26), but contains no references to it.
- ¹² See Bader [2005] and Bader [2009], p.43.
- ¹³ See Mindlin [2007].
- ¹⁴ See R. Merton [1997].
- ¹⁵ See http://www.stanford.edu/~wfsjarpe/mia/int/mia_int2.htm.
- ¹⁶ See Bodie [1999], p. 150.
- ¹⁷ SOA-AAA [2006], p. 36.
- ¹⁸ See Black [1989]. Ironically, few, if any, proponents of FE discuss Black [1989] or Black [1995] in their papers, while Black [1980] is very popular.
- ¹⁹ See, for example, Bader, Gold [2007].
- ²⁰ See Black [1995] and Mindlin [2009b] for more details.
- ²¹ See SOA-AAA [2006]. “... it is more tax efficient to take such *equity risk (beta)* outside of the tax-sheltered pension plan. There are, however, *three other major risks* usually taken in pension investing that merit consideration. These are *interest rate risk* (duration mismatch), *credit risk* (from investing in bonds that can default) and the *risk taken to generate returns in excess of benchmarks* (alpha).”
- ²² At some point, most scientists were still in agreement that the earth was the center of the universe, but this agreement did not last forever. A bit later, most scientists were still in agreement that the earth was flat. As evidenced by the declining membership in the Flat Earth Society, this agreement did not last forever as well. As far as scientific facts are concerned, the existence of such “agreements” is irrelevant. However, as far as the lives of some disagreeing dilettantes were concerned, those “agreements” were highly relevant at the time.

²³ See Mindlin [2009a], Mindlin [2009c], Mindlin [2009e].

Important Information

This material is intended for the exclusive use of the person to whom it is provided. It may not be modified, sold or otherwise provided, in whole or in part, to any other person or entity.

The information contained herein has been obtained from sources believed to be reliable. CDI Advisors LLC gives no representations or warranties as to the accuracy of such information, and accepts no responsibility or liability (including for indirect, consequential or incidental damages) for any error, omission or inaccuracy in such information and for results obtained from its use. Information and opinions are as of the date indicated, and are subject to change without notice.

This material is intended for informational purposes only and should not be construed as legal, accounting, tax, investment, or other professional advice.