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PGIM DC SOLUTIONS

ADDING NON-CORE FUNDS TO IMPROVE PARTICIPANT PORTFOLIOS

May 2024

The role of the core investment menu in defined contribution (DC) plans continues to evolve as default investments, in particular target-date funds, carry on in capturing participant assets. Some plan sponsors are hesitant to increase the size of the core menu and/or add certain asset classes, given potential trading restrictions or concerns regarding participant misuse.

One potential approach to give professionally managed solutions, such as managed accounts, access to a more robust investment opportunity set would be to add funds to a "non-core" menu. Funds on a non-core menu would be exclusively available to professionally managed portfolios in the plan, such as a managed accounts solution.

While non-core funds could be less liquid options, such as private real estate or even private equity, they could just as well include more traditional asset classes, such as long-term bonds, TIPS, high yield bonds, global bonds, emerging market equity, real estate, and commodities that are commonly used in institutional defined benefit plans or professionally managed portfolios. Offering non-core funds may provide individuals in a retirement plan the opportunity to access a highly robust portfolio built by professional investment advisors that generally would not be accessible to them individually.

Leveraging data from 8,271 401(k) plans, we note significant gaps in availability of assets classes and that improving fund availability has the potential to improve portfolio efficiency by at least 50 basis points and result in four more years of retirement income for DC participants.

Overall, this analysis suggests the non-core fund approach is something plan sponsors should consider who are interested in helping professionally managed solutions build more efficient portfolios without increasing the size of the core menu while ensuring proper usage of these additional asset options.

THE EVOLVING CORE MENU

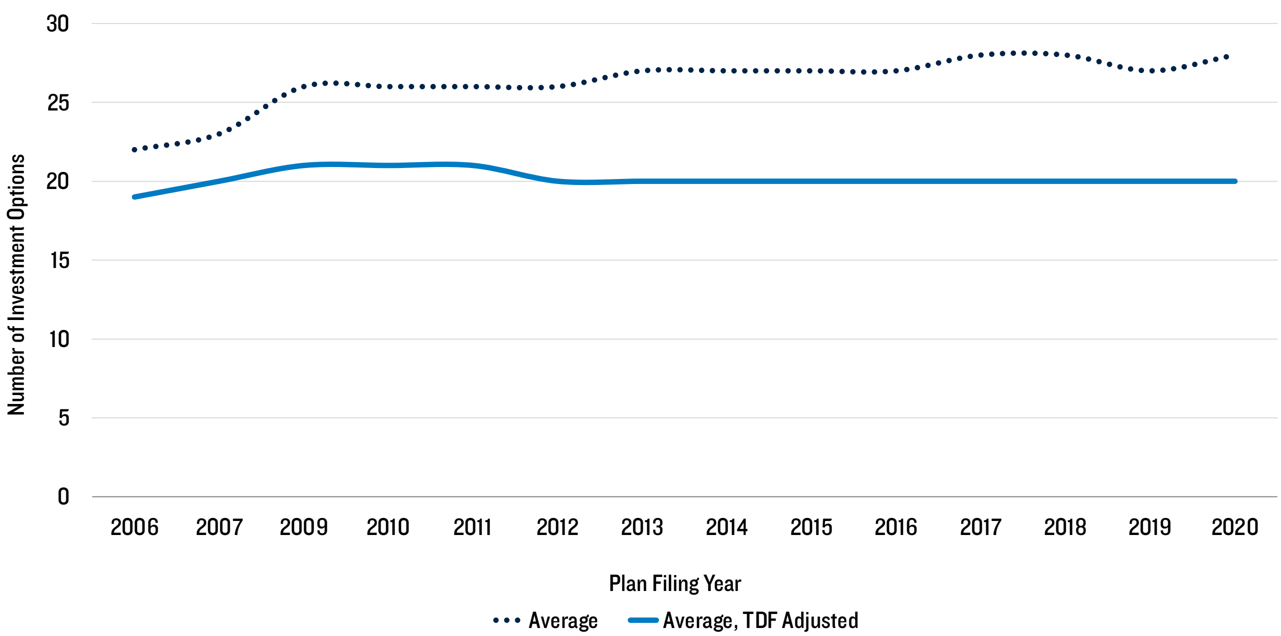
The role of the core menu in DC plans has changed considerably over time. Initially, as the DC market evolved from a single-pooled portfolio to daily-valued individual accounts, the core menu took center stage with participants primarily building portfolios themselves from the various options available. Early research explored topics like how core menu design impacted participant decisions around allocations (Bernartzi and Thaler 2001) and even whether to participate in the plan itself (Iyengar, Jiang, and Huberman 2003).

Given the rise in plan features such as automatic enrollment, and in particular, the rise of default investments, such as target date funds, core menus have increasingly been taking on a more supporting role in DC plans although the size of the core menus haven't changed much over time when controlling for target-date funds (since target-date funds tend to offer a number of vintages), as noted in Exhibit 1.

One potential option for plan sponsors not interested in increasing the size of the traditional core menu, or adding certain asset classes would be to add funds to a "non-core" menu, which would be exclusively available to professionally managed portfolios in the plan, such as a managed accounts solution. These may be funds that have trading restrictions or funds the plan sponsor is concerned participants may misuse.

One benefit of increasing the availability of asset classes to managed accounts providers is that the opportunity set of funds in 401(k) plans is often significantly less than what may be available in some type of prepackaged professionally managed portfolio, such as a target-date fund, where the portfolio managers typically have access to effectively an unlimited opportunity set. As we will demonstrate in the following section, core menus today can be relatively limited in terms of coverage, potentially resulting in suboptimal outcomes for DC participants.

Exhibit 1: The Evolution of Core Menu Sizes From 2006 to 2020 for all 401(k) Plans



Source: BrightScope/ICI (2023). Data as of 2020 Plan Year Filings.

CORE MENUS TODAY

To better understand the current state of core menus in 401(k) plans, data was obtained from RightPond Intelligence (RPI), specifically 2020 plan year filings. To be included in the test dataset, the DC plan had to meet a number of requirements, which include the plan being coded as a total participant directed 401(k) plan, offering at least 10 funds, of which both 95% of funds and 95% of the plan fund weighted assets residing in funds that are identifiable by Morningstar with an available Morningstar Category (the classification approach for investment style). A total of 8,271 plans met the required filters.

Plans are grouped by total assets into five groups, those with less than $1 million, $1 million to $10 million, $10 million to $100 million, $100 million to $250 million, and over $250 million, with 320, 2,909, 4,145, 482, and 415 plans, respectively, for a total of 8,271 plans.

First, we explore the general availability of twelve common asset classes, where Exhibit 2 includes the percentage of plans offering at least one fund in the respective style. The investment styles (i.e., Morningstar Categories) used for each broad asset class are included in Appendix 1.

We can see that certain asset classes, in particular cash, intermediate bond, large cap, small/mid cap, and foreign stock are featured prominently in menus today. The availability of cash options is likely higher than noted given the difficulty of identifying cash options (e.g., stable value) since they are often not publicly traded mutual funds.

Exhibit 2: Availability of Asset Classes in 401(k)

	401(k) Plan Assets				
Asset Class	<$1m	$1m-$10m	$10m-$100m	$100m-$250m	>=$250m
Cash	80	86	90	93	94
Intermediate Bond	84	95	98	99	94
Long Bond	3	4	3	3	2
Inflation-Protected Bond	33	30	32	31	33
High Yield Bond	33	36	33	20	19
World Bond	22	25	23	21	13
Large Cap	98	100	100	99	99
Small/Mid Cap	90	94	98	99	95
Foreign Stock	85	96	98	98	93
Emerging Markets	53	58	57	45	32
Commodities	8	14	13	8	4
Real Estate	37	47	47	34	26

Source: Morningstar, RPI, and Authors' Calculations. Data as of 2020 Plan Year Filings.

Exhibit 3: Average Number of Funds by Asset Classes in 401(k) Plans

	401(k) Plan Assets				
Asset Class	<$1m	$1m-$10m	$10m-$100m	$100m-$250m	>=$250m
Cash	1.12	1.29	1.52	1.72	1.75
Intermediate Bond	1.46	1.79	2.01	1.98	1.79
Long Bond	0.03	0.04	0.03	0.03	0.02
Inflation-Protected Bond	0.36	0.32	0.33	0.33	0.34
High Yield Bond	0.34	0.38	0.34	0.22	0.20
World Bond	0.24	0.28	0.26	0.22	0.15
Large Cap	3.10	3.85	3.95	3.61	3.33
Small/Mid Cap	3.18	4.09	4.54	4.09	3.55
Foreign Stock	1.74	2.16	2.27	2.25	2.14
Emerging Markets	0.56	0.64	0.63	0.48	0.37
Commodities	0.09	0.17	0.18	0.10	0.06
Real Estate	0.40	0.50	0.50	0.37	0.27
Common Options	10.59	13.18	14.28	13.65	12.57
Less Common Options	2.02	2.33	2.27	1.74	1.40

Source: Morningstar, RPI, and Authors' Calculations. Data as of 2020 Plan Year Filings.

Exhibit 3 provides information about the average number of funds available by asset class.

The results in Exhibit 3 are very similar to Exhibit 2, where the average funds that are commonly available (i.e., cash, intermediate bond, large cap, small/mid cap, and foreign stock) are featured significantly more prominently than the remaining asset classes, with about six times as many funds on average.

The lack of availability of certain asset classes has important implications when building portfolios in the core menu. Exhibit 4 includes the results of a series of portfolio optimizations targeting risky asset levels of 10%, 25%, 50%, 75%, and 90%, with optimal portfolios determined for an investor who is in accumulation and retirement.

Two different sets of portfolios are created to reflect the fact that the definition of risk changes when it comes to investing across the lifecycle. Younger investors should be primarily concerned with accumulating wealth. As an individual ages, the portfolio starts to focus more on generating income during retirement. This creates a different perspective on risk, since the goal of the portfolio is no longer to just maximize return, but rather maximize the probability that the investor will be able achieve a target consumption level in retirement. Some light constraints are included in the optimizations to ensure the results are reasonably consistent with portfolios that an investor would be willing to implement (e.g., include minimum weights to intermediate bond and large cap equity).

The accumulation portfolios are effectively those with the highest return per unit of risk (i.e., are optimized in an asset-only space). The retirement portfolios are optimized by factoring in the retirement liability (i.e., a form of surplus optimization).

The underlying capital market assumptions are included in Appendix 2. We intentionally use a reduced opportunity set (e.g., exclude Growth and Value dimensions) in our analysis to limit overly precise estimates from our optimizations. The base capital market assumptions for the respective asset classes are based primarily on PGIM Quantitative Solutions' Q4 2023 Capital Market Assumptions (CMAs)[1] but are supplemented with additional information, if necessary. Returns are assumed to follow a multivariate normal distribution.

Unlike past research that assumes the liability is a more traditional investment asset class (e.g., TIPS) or something like inflation, we develop a model to estimate how the actual cost of income has evolved historically and build risk metrics based off of that to determine the efficient retirement portfolios.

We can see that while the portfolios are relatively similar, there are definitely some differences, especially across target risk levels. For example, the retirement optimized portfolios tend to have higher allocations to alternatives (defined as commodities and real estate) and lower allocations to fixed income and equities. This can likely be attributed to the ability of the alternative asset classes to provide attractive return exposure around things like inflation. Accumulation portfolios tend to have significantly higher allocations to high yield bonds, as well as large cap, foreign stock, and emerging markets equity.

Quite a few asset classes receive allocations that are not well represented in core menus today. Exhibit 5 provides some perspective around what percentage of the allocations for the optimal portfolios are in the funds that are less commonly available.

Exhibit 4: Optimal Portfolios by Equity Risk Target and Risk Definition

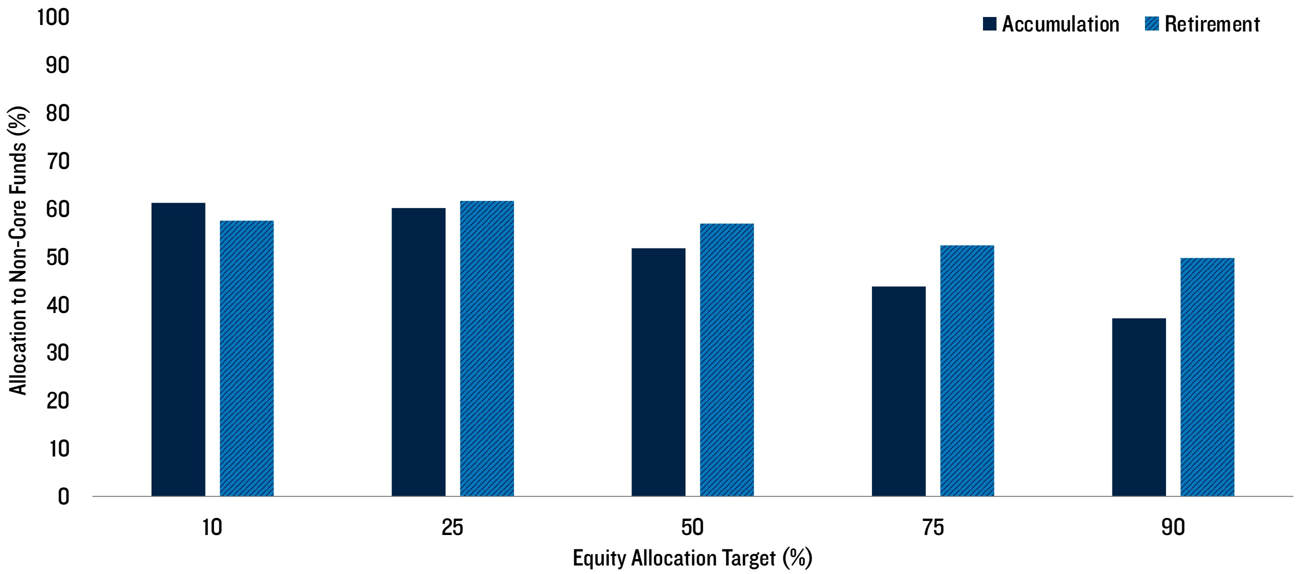
	Accumulation Portfolios					Retirement Portfolios					Retirement - Accumulation				
Risky Asset Target (%)	10	25	50	75	90	10	25	50	75	90	10	25	50	75	90
Cash	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intermediate Bond	34	28	18	8	4	36	32	20	9	3	2	4	2	1	-1
Long Bond	8	6	4	2	1	8	7	5	2	1	1	1	1	0	0
Inflation-Protected Bond	25	21	13	6	3	27	24	15	7	2	2	3	2	1	-1
High Yield Bond	21	20	15	9	2	0	0	0	0	0	-21	-20	-15	-9	-2
World Bond	2	0	0	0	0	0	0	0	0	0	-2	0	0	0	0
Large Cap	2	5	13	21	26	6	6	10	17	21	4	1	-3	-4	-5
Small Cap	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign Stock	3	7	17	27	33	0	0	13	21	26	-3	-7	-4	-5	-6
Emerging Markets	0	5	13	21	26	0	6	10	17	21	0	1	-3	-4	-5
Commodities	5	8	6	5	3	16	16	16	14	13	10	8	10	10	10
Real Estate	0	0	0	1	2	7	9	11	12	13	7	9	11	12	11
Total	100	100	100	100	100	100	100	100	100	100	0	0	0	0	0
Fixed Income	90	75	50	25	10	71	63	40	18	5	-19	-12	-11	-7	-5
Equity	5	17	44	70	85	6	13	33	56	69	1	-4	-11	-14	-16
Alternative	5	8	6	5	5	23	24	27	26	26	17	17	21	21	21
Total	100	100	100	100	100	100	100	100	100	100	0	0	0	0	0

Source: Authors' Calculations. Data as of Q4 23.

1 Marci, Hall and Johnson (2023) *2023 Q4 Capital Market Assumptions*. Available at: https://www.pgimquantitativesolutions.com/outlook/2023-q4-capital-market-assumptions (Accessed May 2024)

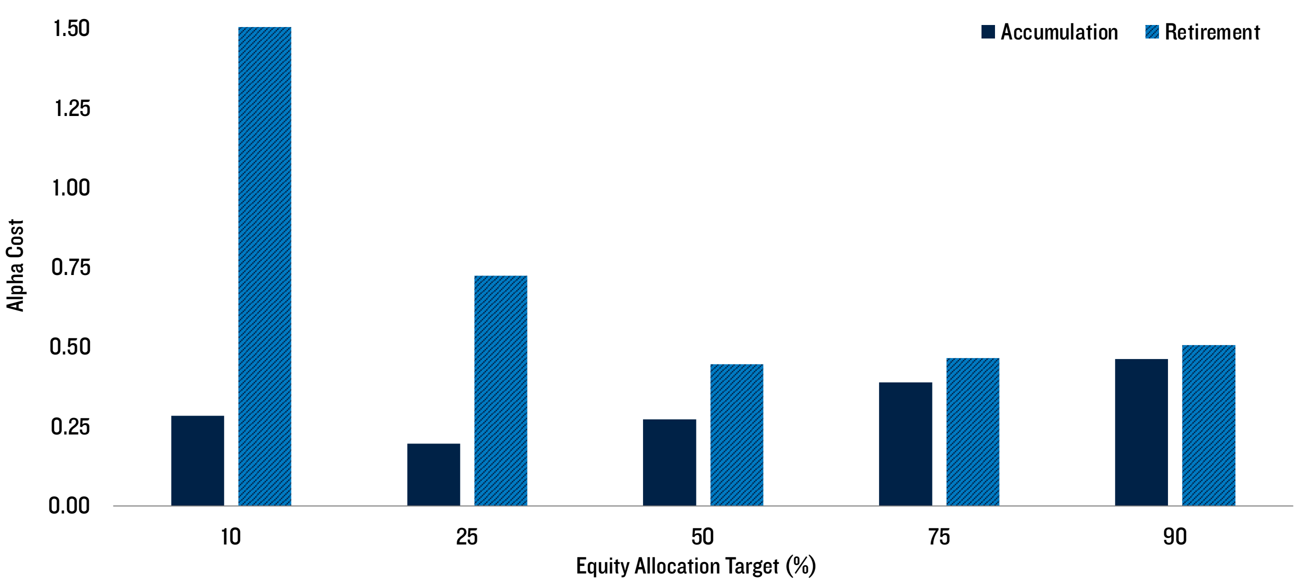
We can see that the allocation to these less common asset classes is approximately 50% of the total portfolio on average. Not offering these funds has significant implications for portfolio efficiency. For example, if we compare the risk-adjusted returns for the optimal portfolios built using only the common funds to all twelve of the asset classes considered, we can see in Exhibit 6 that there is a significant potential alpha benefit to having all twelve asset classes available, where the average potential increase in risk-adjusted returns (i.e., alpha) is approximately 50 basis points.

Exhibit 5: % of Total Allocation in Less Common (Non-Core) Funds



Source: Authors' Calculations. Data as of Q4 23.

Exhibit 6: Alpha Benefit of Including All Less Common (Non-Core) Funds



Source: Authors' Calculations. Data as of Q4 23.

Finally, we attempt to determine the potential benefit, in terms of additional years of lifetime income, that could be generated in each plan if it had a complete menu of funds.

For this analysis we assume the participant starts saving at the age of 25. The initial compensation is $50,000, which increases by 1% a year in real terms (where inflation is 2.5% per year). The total saving rate, which includes employee deferrals and employer contributions is 10% of pay and the retirement age is 65 and the retirement end age is 95.

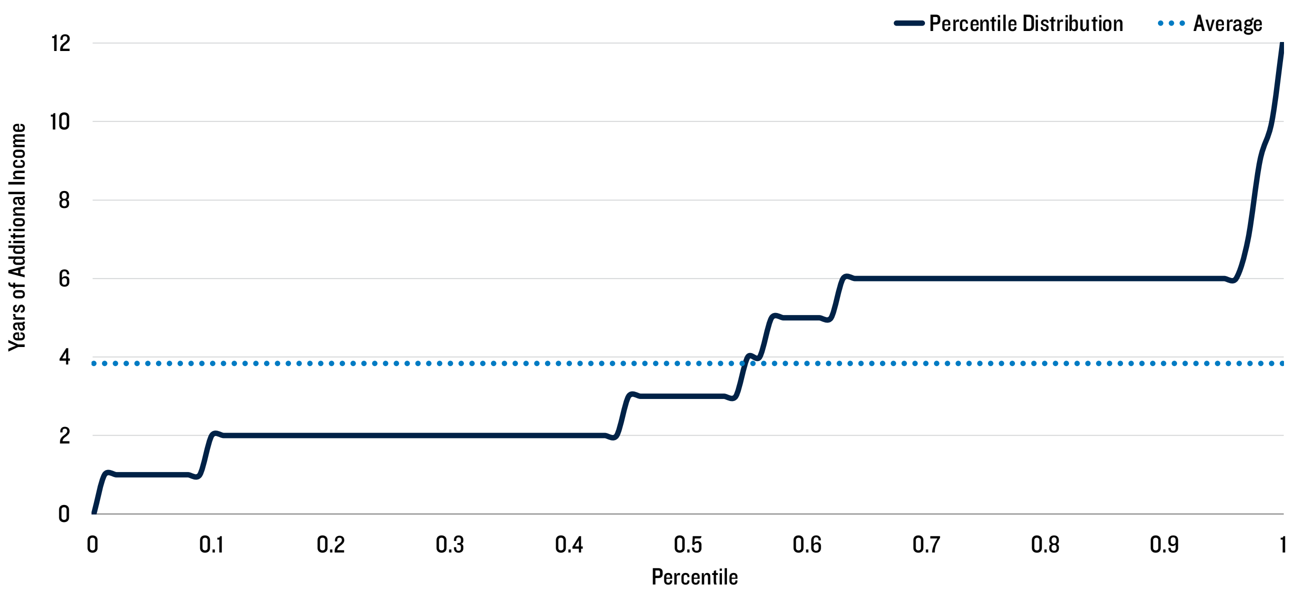
The equity allocation evolves over the participant's lifetime, based on the PGIM Target Date glide path, but is represented by the five equity target allocations considered in the analysis, with the specific. Note, the portfolios before age 65 would be the accumulation portfolios and those after age 65 would be the retirement portfolios.

The model uses returns as base on CMAs included in Appendix 1.

For our model we solve the additional number of years that could be generated if the plan offered a complete core menu. In other words, how many more years of income could be generated using the efficient portfolio set assuming the balance is exhausted at retirement versus the number of years of income that could be generated using the menu of funds available to participants. Exhibit 7 includes both the percentile distribution and the average number of years across plans.

We estimate the average plan participant could generate approximately four more years of income if he or she had a complete menu of funds available. These are relatively staggering estimates that imply participants could realize significant potential benefits from addressing potential gaps in the core menu.

Exhibit 7: Additional Potential Years of Retirement Income with More Complete Core Menus



Source: Morningstar, RPI, PGIM Quantitative Solutions, and Authors' Calculations. Data as of 2020 Plan Year Filings. CMAs as of Q4 2023.

CONCLUSIONS

As interest in including professionally managed solutions, such as managed accounts, in DC plans continues to increase, it's important to ensure the underlying portfolios constructed have the necessarily building blocks. Many core menus today have notable gaps in terms of asset classes that could be used to improve portfolio efficiency.

One option for plan sponsors who want to enable managed account providers the ability to build more efficient portfolios without expanding the core menu would be to add "noncore" options. Non-core funds would be funds that don't sit on the traditional core menu and would only be available to the managed accounts provider.

Non-core funds could include less liquid options, such as private real estate or even private equity, or potentially asset classes such as long-term bonds, TIPS, high yield bonds, global bonds, emerging market equity, real estate, and commodities that are commonly used in institutional defined benefit plans or professionally managed portfolios.

Overall, though, this analysis suggests plan sponsors should actively consider revisiting the funds available to participants and adjusting the core (and non-core) options accordingly!

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ABOUT PGIM DC SOLUTIONS *

As the retirement solutions provider of PGIM, we plan to deliver innovative defined contribution solutions founded on market-leading research and capabilities. Our highly-experienced team partners with clients on customized solutions that seek to solve for current challenges facing DC participants. As of 12/31/2023, PGIM has $169 billion ** DC assets under management.

* PGIM DC Solutions does not establish or operate pension plans.
** Reported data reflects the assets under management by PGIM and its investment adviser affiliates for defined contribution investment purposes only.

APPENDICES

Appendix 1: Asset Class Definitions

- **Cash:** Money Market, Short Government, Short-term Bond, Stable Value, and Ultrashort bond
- **Intermediate Bond:** Inflation-Protected Bond, Corporate Bond, Intermediate Core Bond, Intermediate Core-Plus Bond, Intermediate Government, Multisector Bond, and Nontraditional Bond
- **Long Bond:** Long Government and Long-Term Bond
- **Inflation-Protected Bond:** Inflation-Protected Bond
- **High Yield Bond:** High Yield Bond and High Yield Muni
- **World Bond:** Global Bond and Global Bond-USD Hedged
- **Large Cap:** Large Blend, Large Growth, and Large Value
- **Small Cap:** Mid-Cap Blend, Mid-Cap Growth, Mid-Cap Value, Small Blend, Small Growth, and Small Value
- **Foreign Stock:** Diversified Pacific/Asia, Europe Stock, Foreign Large Blend, Foreign Large Growth, Foreign Large Value, Foreign Small/Mid Blend, Foreign Small/Mid Growth, Foreign Small/Mid Value, Global Large-Stock Blend, Global Large-Stock Growth, Global Large-Stock Value, Global Small/Mid Stock, India Equity, Japan Stock, and World Large Stock
- **Emerging Markets:** Diversified Emerging Mkts and Diversified Pacific/Asia
- **Commodities:** Commodities Broad Basket, Commodities Focused, Energy Limited Partnership, Equity Energy, Equity Market Neutral, Equity Precious Metals, and Natural Resources
- **Real Estate:** Global Real Estate and Real Estate

Appendix 2: Capital Market Assumptions

				Correlations / Asset Class#												
#	Asset Class	Ret	Vol	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Real Income	5.24	5.00	1.00	0.15	0.40	0.50	0.70	0.20	0.20	0.10	0.10	0.00	0.00	0.40	0.30
2	Money Market	3.63	1.50	1.00	1.00	0.33	0.17	0.06	-0.02	0.08	0.01	-0.04	0.01	-0.01	0.04	-0.01
3	Intermediate Bond	5.43	5.63	0.33	0.33	1.00	0.93	0.77	0.29	0.50	0.16	0.04	0.11	0.03	0.02	0.20
4	Long Bond	5.96	10.34	0.17	0.17	0.93	1.00	0.70	0.27	0.43	0.14	0.04	0.08	0.03	-0.03	0.22
5	Inflation-Protected Bond	5.24	5.74	0.06	0.06	0.77	0.70	1.00	0.29	0.54	0.06	0.02	0.12	0.17	0.27	0.27
6	High Yield Bond	6.39	8.50	-0.02	-0.02	0.29	0.27	0.29	1.00	0.20	0.62	0.63	0.54	0.59	0.38	0.60
7	World Bond	5.13	6.78	0.08	0.08	0.50	0.43	0.54	0.20	1.00	0.18	0.10	0.41	0.23	0.31	0.25
8	Large Cap	8.35	15.32	0.01	0.01	0.16	0.14	0.06	0.62	0.18	1.00	0.86	0.69	0.68	0.35	0.59
9	Small Cap	9.62	19.72	-0.04	-0.04	0.04	0.04	0.02	0.63	0.10	0.86	1.00	0.62	0.66	0.35	0.64
10	Foreign Stock	10.15	16.00	0.01	0.01	0.11	0.08	0.12	0.54	0.41	0.69	0.62	1.00	0.71	0.45	0.49
11	Emerging Markets	12.29	23.83	-0.01	-0.01	0.03	0.03	0.17	0.59	0.23	0.68	0.66	0.71	1.00	0.45	0.45
12	Commodities	6.11	14.70	0.04	0.04	0.02	-0.03	0.27	0.38	0.31	0.35	0.35	0.45	0.45	1.00	0.27
13	Real Estate	8.66	17.67	-0.01	-0.01	0.20	0.22	0.27	0.60	0.25	0.59	0.64	0.49	0.45	0.27	1.00

Source: PGIM Quantitative Solutions and Authors' Calculation

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