



DC SOLUTIONS

STAY THE COURSE

February 2022

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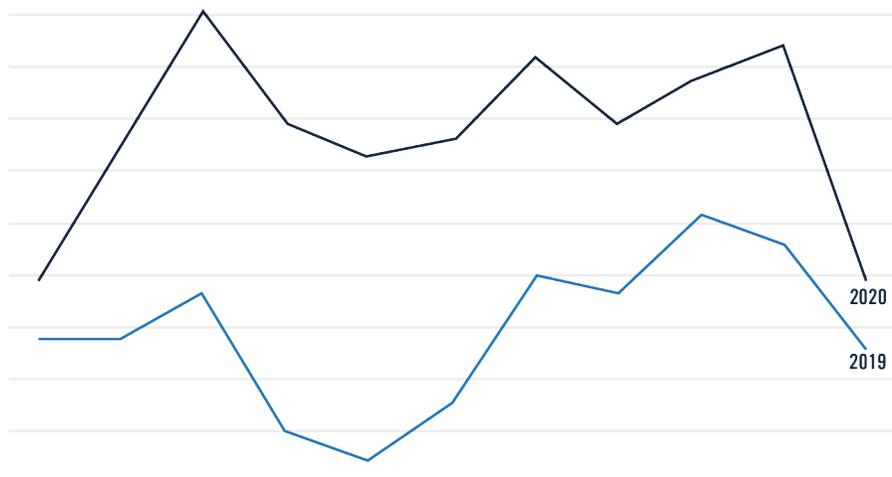
KEY FINDINGS

- This research explores participant trading activity during 2020 for 730,533 participants obtained from Prudential Financial Inc., with a specific focus on how allocating to a product that provides guaranteed lifetime income is related to participant trading
- We find that participants using any type of professionally managed portfolio solution were significantly less likely to trade in 2020 than those who were self-directing.
- Among participants who were self-directing their accounts who traded in 2020, older participants made the most significant changes. These participants were also significantly less likely to use a professionally managed portfolio option, which suggests those participants who may benefit most from professional investment management are not the ones receiving it.
- Participants defaulted in a multi-fund professionally managed portfolio traded less than those who were defaulted in a single fund professionally managed strategy (i.e., a target-date mutual fund). While the exact reason for this effect is unclear, a potential explanation could be that the diversification benefits of the multi-fund strategy are more apparent than a single multi-asset fund strategy (i.e., the participant would log in and see an 8+ fund portfolio versus holding a single target-date fund, which would appear to be more like a “black box”).
- Older participants (age 55-70) who had higher allocations to an annuity that provided guaranteed lifetime income were less likely to trade during 2020. This suggests guaranteed (or protected) income products have the potential to not only simplify the retirement income decision process, but may also improve participant trading behaviors.

2020 WAS AN UNPRECEDENTED YEAR

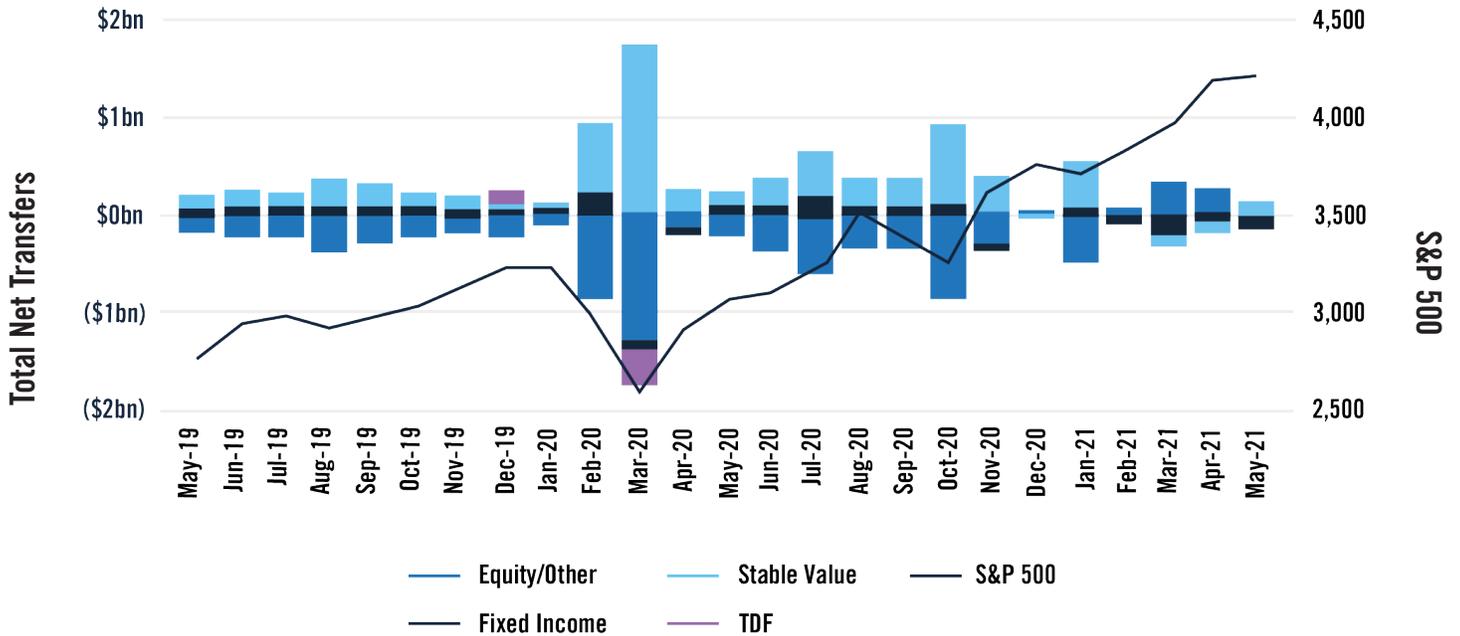
The year 2020 was one unlike too many others. While the year started off relatively normal, the coronavirus had a sudden and significant impact on the economy and financial markets. Market volatility resulted in significant concern among investors and notable changes in participant behaviors. For example, Exhibit 1 provides some perspective on the total participant web and mobile logins during 2019 and 2020 at Prudential and Exhibit 2 provides information on total net transfers among DC participants at Prudential.

Exhibit 1: Total Participant Web and Mobile Logins



Source: Prudential, Data as of December 31, 2020

Exhibit 2: Total Net Transfers Among Defined Contribution Participants



Source: Prudential, Data as of May 30, 2021

Both exhibits suggest participants were nervous during 2020, resulting in increased trading activity, especially when market volatility increased significantly. Investors tend to “react” to downturns and/or market volatility and move to more conservative portfolios. Therefore, products and strategies that can keep participants invested during periods of market turmoil can be especially valuable as they effectively protect participants from themselves.

DATASET

Data for the analysis is obtained from Prudential, a top recordkeeper with over 4,300 plans covered approximately 4 million plan participants and over \$300 billion in assets as of March 31, 2021. The primary objective of the analysis is to understand both the impact of professionally managed portfolios and in-plan guaranteed retirement income options on participant investment behaviors during the 2020 calendar year.

In order to be included in the analysis the plan had to offer Prudential IncomeFlex to participants as of December 31, 2019. This limited the initial test dataset to 730,533 participants. We limit the initial dataset to these plans so we can observe behaviors of participants who allocated to IncomeFlex while controlling for access (i.e., all participants in the dataset had access to the product).¹

A number of filters are included on the initial dataset. For example, the participant had to be coded as Active as of both December 31, 2019 and December 31, 2020. The participant needed to have a balance over \$100 in both periods, reasonable age and salary values, and a balance that did not reduce significantly over the year (which would suggest a potential rollout). While deferral rates are available for roughly half of the participants, income is relatively unavailable and therefore these variables are not included in order to increase the potential sample size.

The test dataset includes both 401(k) plans and 403(b) plans. There is a flag available whether the participant was defaulted into their current portfolio. Only participants defaulted into a plan offering GoalMaker (i.e., a multi-fund professionally managed investment solution built using funds from the underlying core menu at no additional fee) or a target-date fund are considered. The filters reduce the test population to 389,195 participants.

There are four potential investment-type groups for participants: self-directors (SD), those who were defaulted into a professionally managed multi-fund portfolio (MFP), those who were defaulted into a target-date fund (TDF), and those who opted into a professionally managed multi-fund portfolio (MFP). The total participant count by investment group is included in Exhibit 3.

Exhibit 3: Investment Group and Participant Count

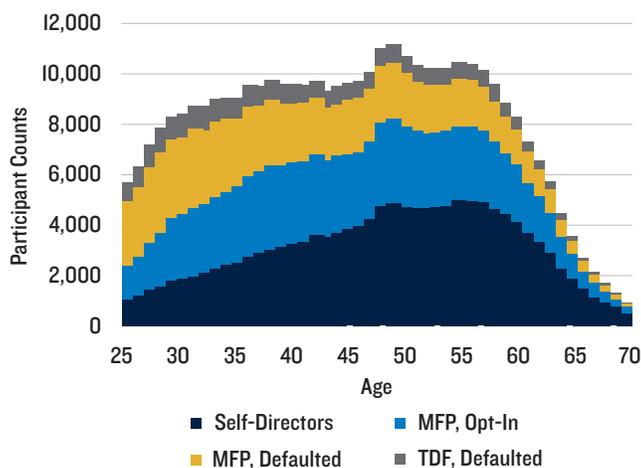
Group	Count
Self-Director (SD)	145,028
Defaulted-Multi-fund portfolio (MFP)	97,829
Defaulted-TDF	31,969
Not Defaulted-Multi-fund portfolio (MFP)	114,369
Total	389,195

Source: Prudential, Data as of December 31, 2020

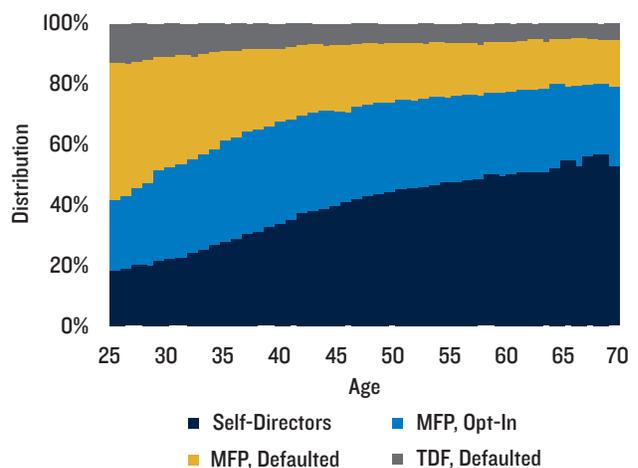
Exhibit 4 provides some context around the total count (Panel A) and distribution (Panel B) of participants by investor type and age.

Exhibit 4: Participants by Investor Type and Age, Count

Panel A: Counts



Panel B: Distribution



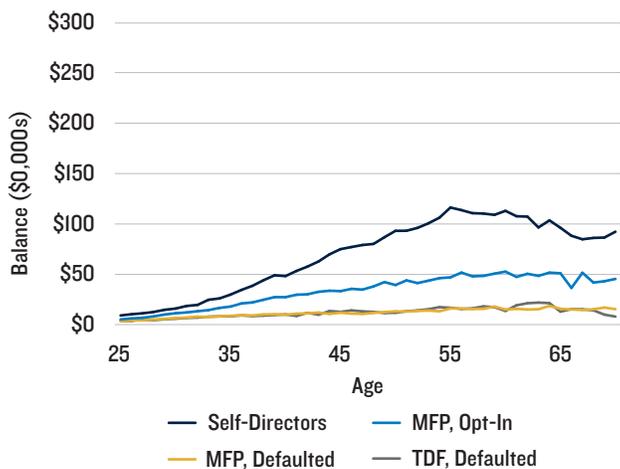
Source: Prudential and Author's Calculations, Data as of December 30, 2020

There is a notable decrease in the portion of older participants at older ages, there is also a decline in the percentage of participants in any type of professionally managed option (i.e., a multi-fund portfolio or a target-date fund), especially those who are defaulted. While this effect is actually mostly related to balances (since older participants tend to have higher balances, an effect explored next) it demonstrates a potential gap associated with usage and acceptance of professionally managed portfolios that exist across participant demographics (which is age, in this instance).

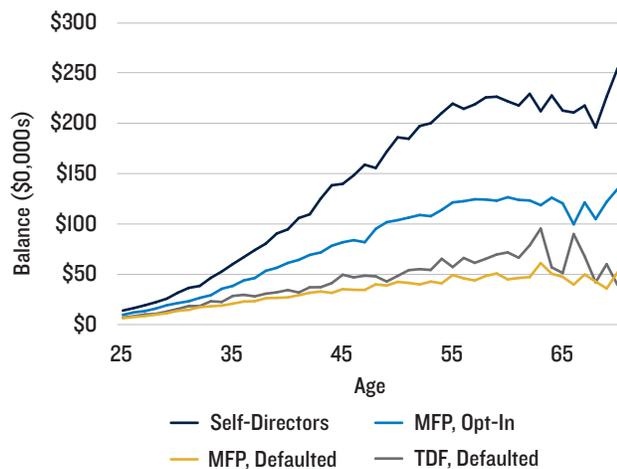
Balances provide some context around the implied sophistication of the respective groups and median (Panel A) and average (Panel B) values are provided in Exhibit 5.

Exhibit 5: Plan Balances by Investor Type

Panel A: Medians



Panel B: Averages



Source: Prudential and Author's Calculations, Data as of December 30, 2020

Balances are highest for self-directors, followed by MFP opt-in and the respective defaulted participants (MFP and TDF), which are very similar (and lower).

Exhibit 6 provides additional context regarding the breakdown of age, balance, and investor-type.



Exhibit 6: Distribution of Participants by Age, Balance, and Investor-Type

		Self-Director					
		Balance Quintile					Tot
Age Group		1	2	3	4	5	Tot
	<30	13	12	16	23	37	100
	30-39	13	14	17	22	34	100
	40-49	12	14	18	24	32	100
	50-59	12	14	19	24	31	100
	>=60	13	15	19	24	29	100
	Avg	13	14	18	23	33	

		MFP, Defaulted					
		Balance Quintile					Tot
Age Group		1	2	3	4	5	Tot
	<30	23	23	22	19	12	100
	30-39	26	26	22	17	9	100
	40-49	32	29	21	13	5	100
	50-59	36	30	20	10	4	100
	>=60	37	31	19	10	4	100
	Avg	31	28	21	14	7	

		MFP, Opt-In					
		Balance Quintile					Tot
Age Group		1	2	3	4	5	Tot
	<30	17	17	19	22	26	100
	30-39	17	19	21	22	21	100
	40-49	18	21	22	22	18	100
	50-59	20	22	22	21	16	100
	>=60	19	23	22	20	15	100
	Avg	18	20	21	21	19	

		TDF, Defaulted					
		Balance Quintile					Tot
Age Group		1	2	3	4	5	Tot
	<30	24	26	20	16	13	100
	30-39	29	24	19	15	12	100
	40-49	34	25	19	13	8	100
	50-59	37	27	18	12	6	100
	>=60	39	24	18	13	7	100
	Avg	33	25	19	14	9	

Source: Prudential and Author's Calculations, Data as of December 30, 2020

Self-directors have much higher balances across the age spectrum, followed by MFP opt-in, and the two defaulted groups with clearly relatively small balances. This is important context for future analysis, particularly in light of other research showing that self-directors tend to underperform the defined contribution industry as a whole.

Exhibit 7 provides additional descriptive statistics about the participants included in the analysis. Most of the variables are self-explanatory; however additional context is required for gender and marital status, since both fields technically have three fields. For gender, each participant is coded as male, female, or unknown. Therefore, context is provided around whether the participant is coded as male or female, where unknown is the omitted variable. For marital status, each participant is coded as single, married, or unknown. Therefore, context is provided around whether the participant is coded as single or married, where unknown is the omitted variable.

Exhibit 7: Descriptive Statistics

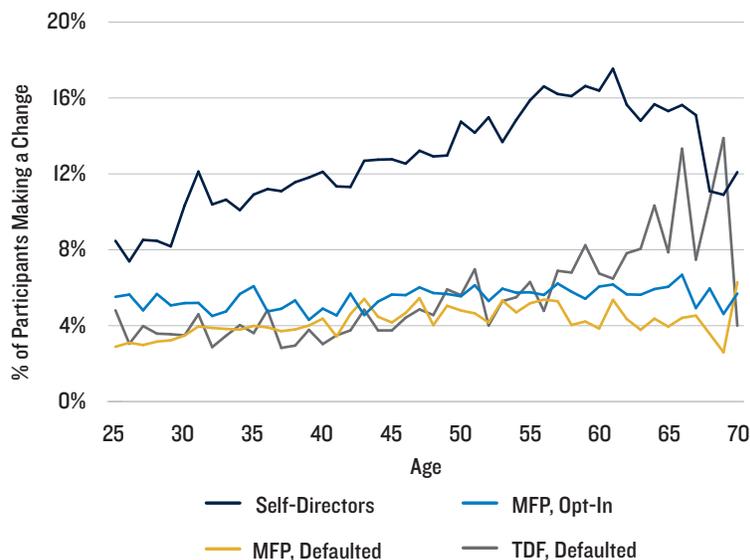
	Change	Age	Tenure	Balance	Male	Female	Single	Married	GLIP%	Equity%	401k?
Average	0.07	44.77	8.21	\$89,605	0.51	0.44	0.31	0.39	2.78	67.59	0.74
Median	0.00	45.00	5.48	\$23,623	1.00	0.00	0.00	0.00	0.00	78.08	1.00
Std Dev	0.26	12.08	7.76	\$182,937	0.50	0.50	0.46	0.49	14.66	28.57	0.44

Source: Prudential and Author's Calculations, Data as of December 30, 2020

YEAR 2020 TRANSFER RATE

This section explores the transfer rate of participants during the 2020 calendar year. A participant is coded as initiating a transfer if he or she makes any kind of transfer or investment election during the year. Exhibit 8 includes the transfer rate by age for the four investment-types considered.

Exhibit 8: % of Participants with a Change by Age and Investment-Type



Source: Prudential and Author's Calculations, Data as of December 30, 2020

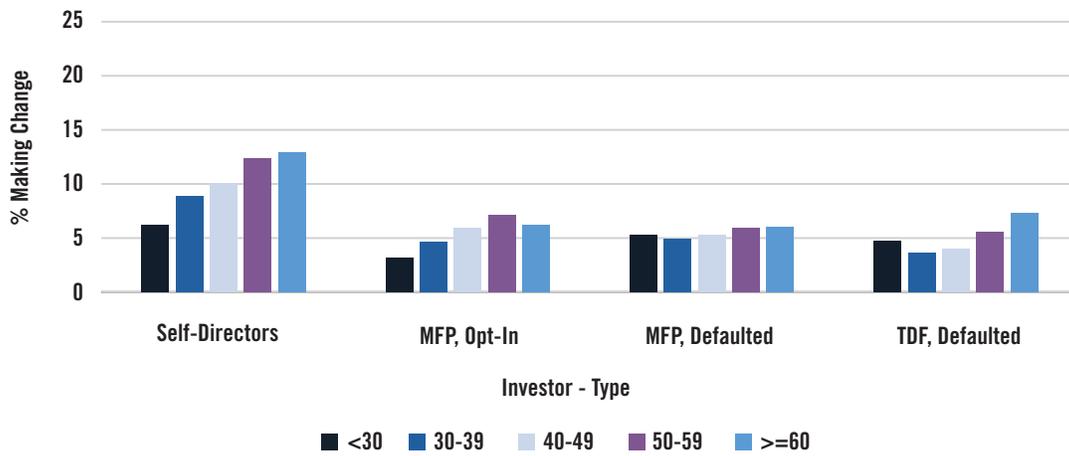
Approximately 12.8% of all participants self-directing made a change, versus 5.5% for MFP opt-in, 5.5% TDF defaulted, and 4.2% MFP defaulted.

There are obviously sizeable gaps in portfolio change/trading activity among participants who were self-directing their portfolios and the three professionally managed investment strategies, which had relatively similar change rates. We also observe a clear pattern by age, along with a notable balance effect. This specific effect is explored in more detail next and is especially important since older participants typically have higher balances and therefore the financial implications are effectively magnified.

Next, we explore average change rates by investor-type by both age and balance, when controlling for either factor, to better understand whether changes rates vary more by age or balance. These results are included in Exhibit 9.

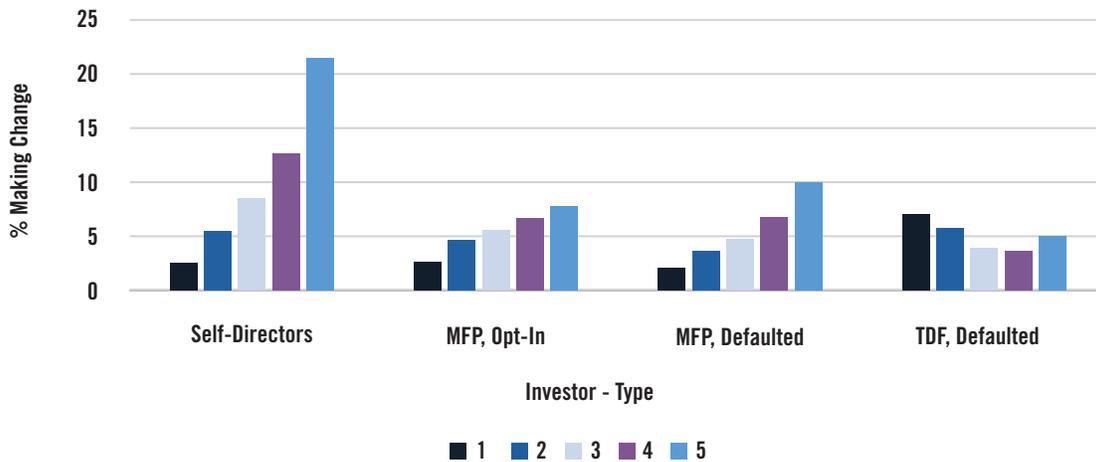
Exhibit 9: Change Rate by Age and Balance by Investor-Type

Panel A: Change Rate by Age and Investor-Type, Controlling for Balance



Source: Prudential and Author's Calculations, Data as of December 30, 2020

Panel B: Change Rate by Balance Quintile and Investor-Type, Controlling for Age



Source: Prudential and Author's Calculations, Data as of December 30, 2020

The relation between change rate and age or balance clearly varies by investor-type, although balance clearly has a stronger general effect than age. In other words, the probability of trading is more related to have a higher balance than being older, *ceteris paribus* (although the two are obviously related). For example, the spread between the lowest and highest age groups for Self-Directors is 6.7 versus 19.0 for balance.

Since certain types of strategies may be more popular in plans with different demographics (e.g., higher balances and older workers) it's important to control for the various factors that could be driving the results to ensure the results are truly significant. To do this we run a series of probit regressions and focus on the marginal effects. The results from the regressions are included in Appendix 1, but discussed here.

The regressions also demonstrate that the likelihood of making a change is related, but the nature of the relationship is more nuanced. While it's appropriate to say that older investors were more likely to make a change, the regression results again suggest it's actually not age that is the primarily driver of the change (with respect to demographic variables).

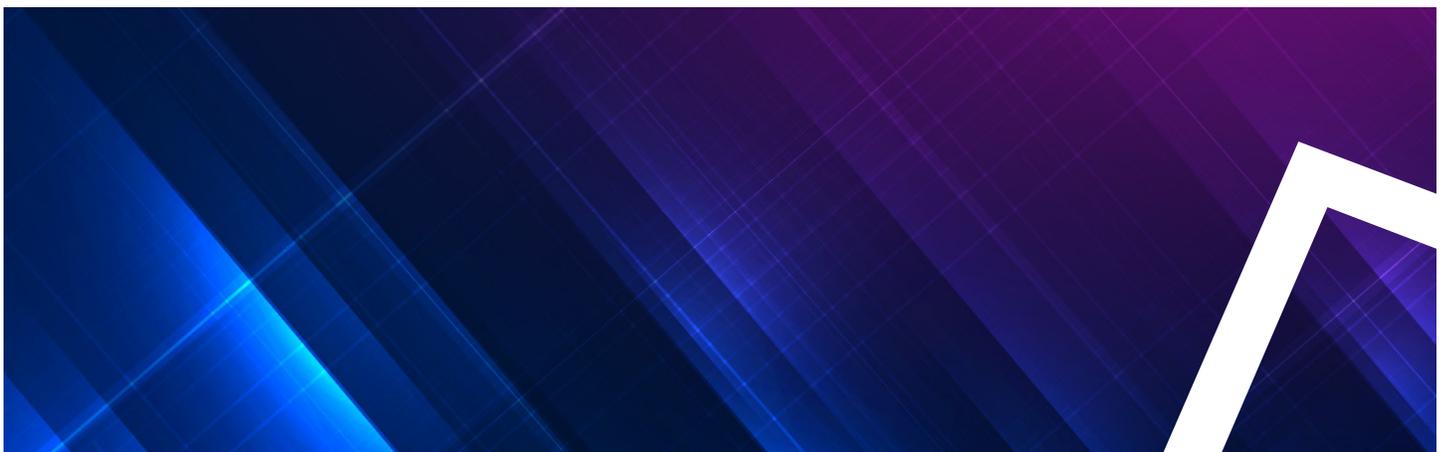
This point is important for plan sponsors and consultants interested in potentially isolating certain groups who may be more likely to transact. While going after older participants would capture part of the effect, age appears to be secondary to other participant attributes, such as balance (and likely income as well).

The results of the regression also suggest the probability of making a change increases for older participants, as well as for those with longer tenure, higher balances, males, higher equity allocations (although the relation was relatively weak), and the type of DC plan (with participants in 401(k) plans being significantly more likely to make a change). The probability of making a change is lower for females and single individuals.

Clearly, participants in a professionally managed solution had a lower probability of making a change. The reason the coefficient for participants in the opt-in MFP strategy is the most negative suggests the actual change rate is lower than expected when controlling for balances.

Participants with higher balances have a much higher probability of making change. Participants in default investments (either TDF or GM) had much lower balances.

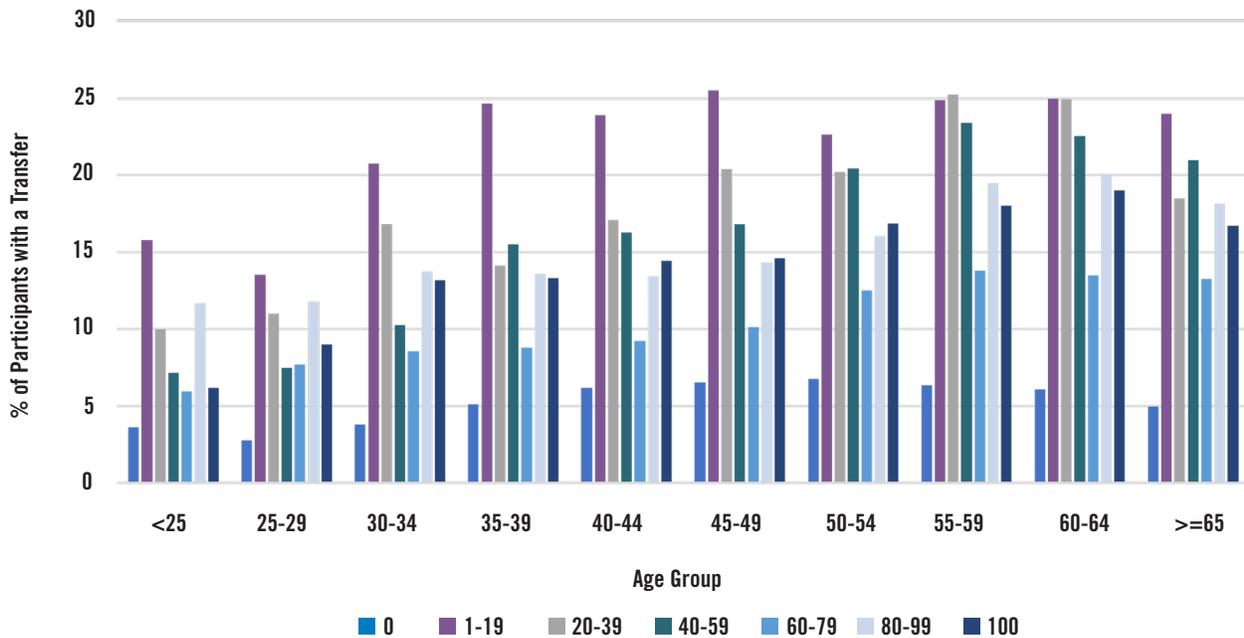
Overall, the analysis provides relatively compelling evidence with respect to the benefits of offering and actively promoting professionally managed investment options to participants in defined contribution plans.



TRADING DECISIONS AMONG SELF-DIRECTORS

We observe quite clearly a significantly higher change rate among self-directors, who we would expect to be more active. It's also worth understanding how things like equity allocation and age were related to the changes. Exhibit 10 includes some context as to how the percentage of participants who were Self-Directors and made a change varied by age and equity allocation, based on the respective equity allocations as of December 31, 2019.

Exhibit 10: % of Self-Directors Who Made a Transfer by Equity Allocation and Age



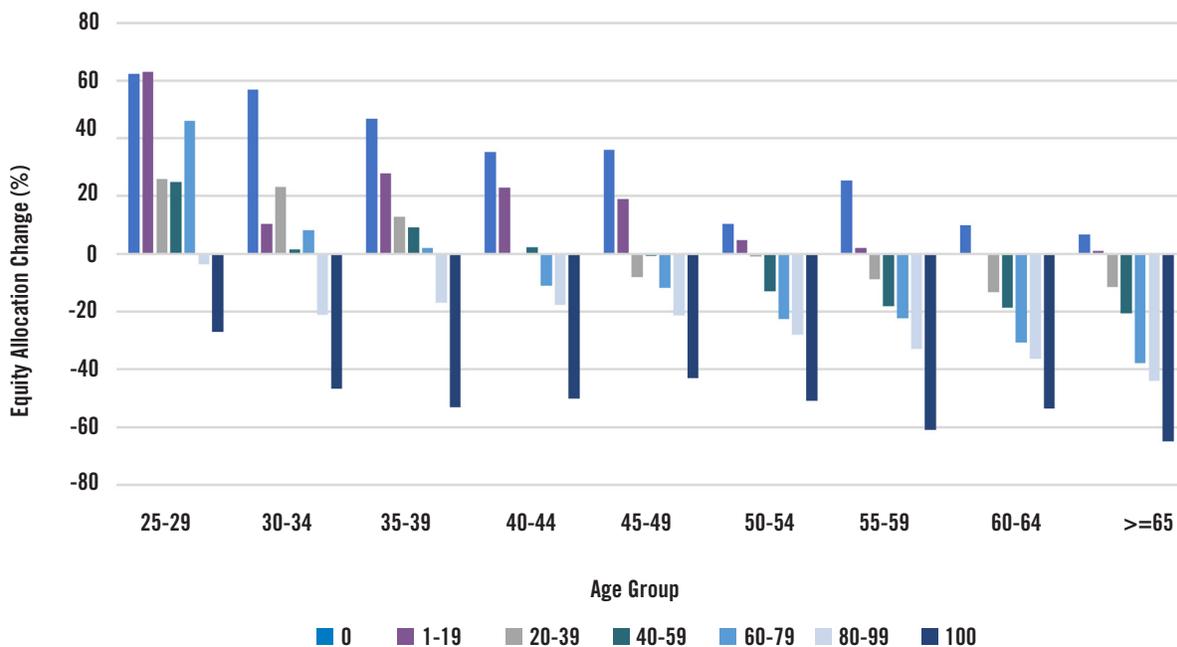
Source: Prudential and Author's Calculations, Data as of December 30, 2020

Exhibit 10 demonstrates there was a relatively weak relation to equity allocation, since the changes across the groups are clearly not monotonic (i.e., constantly increasing or decreasing). In contrast the age relation is relatively stark, where age was clearly positively related to making a change, i.e., older investors were increasingly likely to transact. These results are relatively similar to Exhibit 9, but provide additional context around the potential effect of equity level (and the subsequent lack thereof).

A series of probit regressions are performed exploring just participants who were self-directing their accounts and the results are included in Appendix 2. The results are effectively similar to the results in Appendix 1 (which included all participants). Perhaps again the most notable finding is the lack of general significance for age when controlling for balance.

Next, we try to better understand the changes in risk (i.e., equity allocations) made by those self-directors who made a change. The average equity allocation shift by age group and equity allocation as of December 31, 2019. The values are included in Exhibit 11.

Exhibit II: Equity Allocation Shift Among Self-Directors Who Made a Transfer



Source: Prudential and Author's Calculations, Data as of December 30, 2020

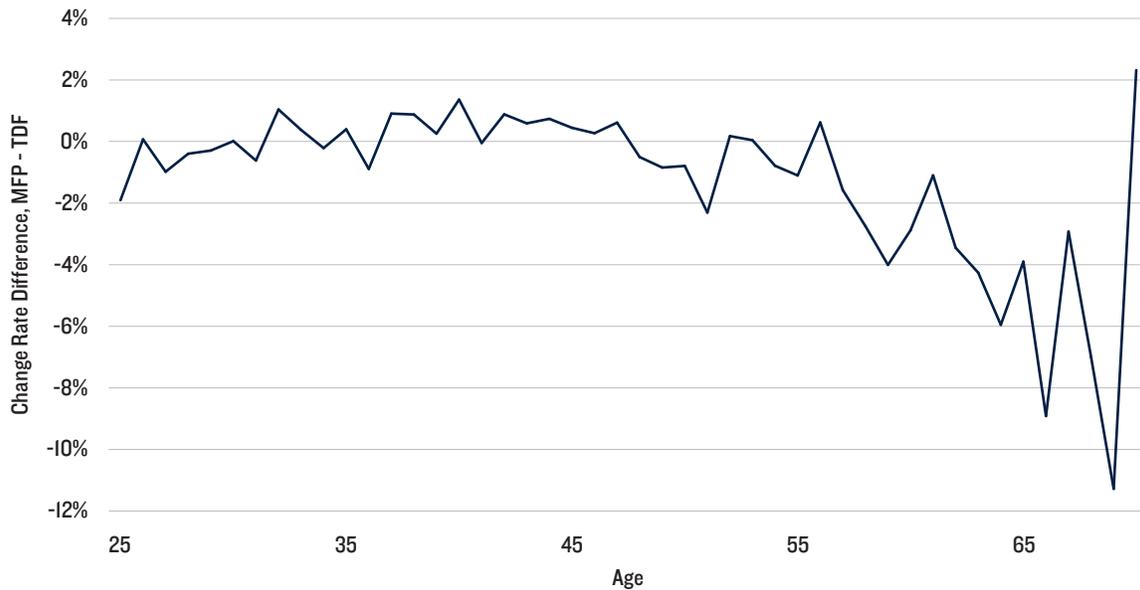
There is an incredibly clear pattern, where older participants who were invested more aggressively made the largest shifts to more conservative portfolios. This suggests older investors “reacted” significantly more to market volatility than younger participants and that older investors who decided to transact likely significantly underperformed as a result (given the rally in equities during the later part of 2020). Again, the impact of doing this on a relatively larger balance must be seriously considered.

This trading activity is perhaps counter to expectations. In theory, older investors are more experienced, and likely sophisticated, and therefore should be less likely to trade. In reality, they were the investors who tended to make the most extreme trades and suggest they could benefit the most from any type of professionally managed strategy to help stay the course. At the same time, though, older participants are those who are most likely to self-direct their accounts.

OPTIMAL DEFAULT: MULTI-FUND PORTFOLIOS (MFPs) VERSUS TARGET-DATE FUNDS (TDFs)

Next, we are curious whether multi-fund portfolios (MFPs) or target-date funds (TDFs) resulted in lower trading activity (i.e., performed better as a default investment). Early evidence (e.g., Exhibit 8) suggests that MFPs had a lower change rate than participants defaulted into a target-date fund as of December 31, 2019. For example, Exhibit 12 includes the difference in the change rate among participants defaulted in MFP versus those defaulted in a TDF.

Exhibit 12: Change Rate Difference for Defaulted Participants, MFP minus TDF



Source: Prudential and Author's Calculations, Data as of December 30, 2020

The change rates are significantly lower (i.e., more negative) at older ages for the MFP. In theory, this suggests that the MFP is a “stickier” default for older participants; however, there could be other variables driving this effect, therefore a series of probit regressions are performed and the results are included in Appendix 3.

The results suggest that participants defaulted in MFP clearly were less likely to make a change versus those who were defaulted in a target-date fund; however, there is not statistically significant age effect. In other words, while the probit regressions provide strong evidence that participants who were defaulted in MFP versus a TDF were less likely to transact overall, there is not necessarily an age-related component (at least one that is linear and/or statistically significant).

Overall, this suggests multi-fund portfolios and target-date funds offer significant and very similar benefits to investors. If there is another element – perceived better or more complete diversification perhaps – that leads to “stickier” participant behavior in one versus the other, we must clearly take that into account as well, not just in plan design, but in product design as well.

GUARANTEED INCOME ANALYSIS

Finally, we want to understand the impact that allocating to a guaranteed lifetime income product (GLIP) had on participant behaviors. All participants included in the analysis were in a DC plan that offered a GLIP, which is a retirement income strategy that provides participants guaranteed lifetime income that can never decline regardless of the performance of the market.

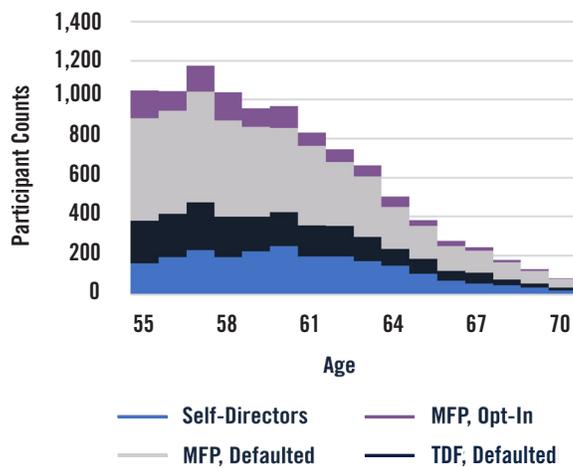
In theory, having an allocation to a product that provides guaranteed income would reduce participant trading behaviors, but it's not necessarily clear if this is the case.

For this analysis the sample is limited to participants to ages 55 to 70, since that is the target age for the product and age 55 (i.e., 10 years until retirement) is when it is included as part of the potential portfolio allocation as part of the default investment allocation. There are 94,216 participants that fit within this age group, of which 10,260 have an allocation to GLIP.

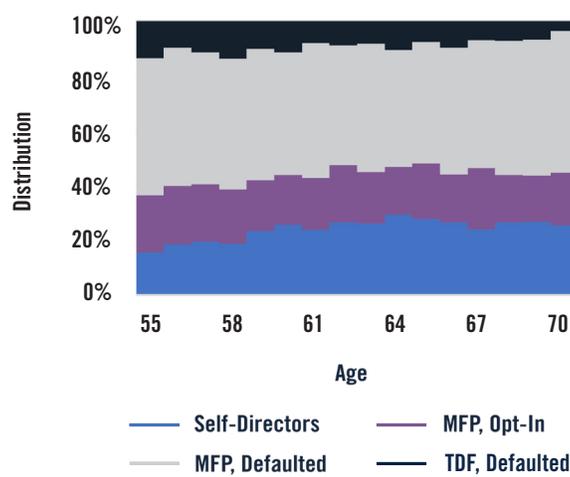
Exhibit 13 provides some perspective on the number (Panel A) and distribution (Panel B) of participants using IncomeFlex across the four investment-types.

Exhibit 13: Participants with a Balance in a Guaranteed Lifetime Income Product by Investor Type and Age

Panel A: Count



Panel B: Distribution



Source: Prudential and Author's Calculations, Data as of December 30, 2020

Most participants (58%) who had an allocation to the GLIP were defaulted into the product, with allocations through the MFP significantly more common than through a target-date strategy.

The allocations to the GLIP, as a percentage of total balance, were relatively constant across ages, as demonstrated in Exhibit 14.

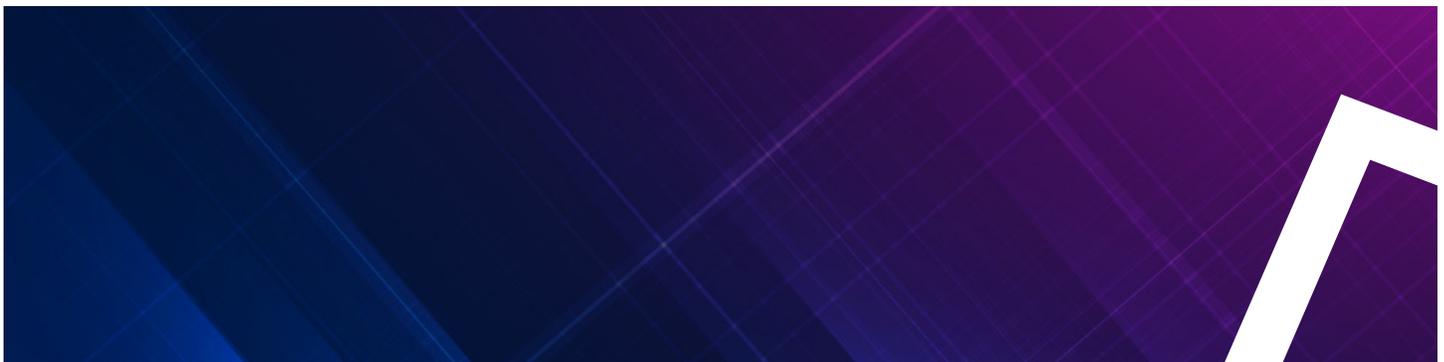
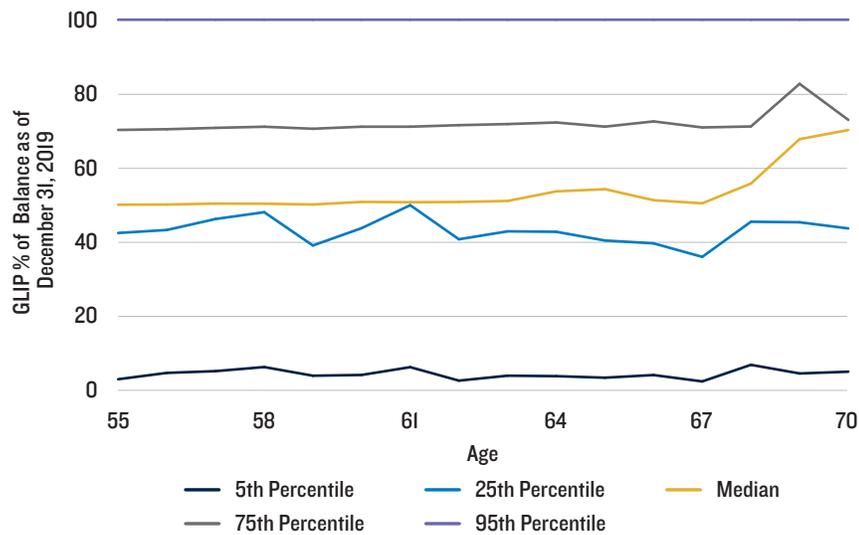


Exhibit 14: Distribution of GLIP as a Percentage of Total Balance by Age

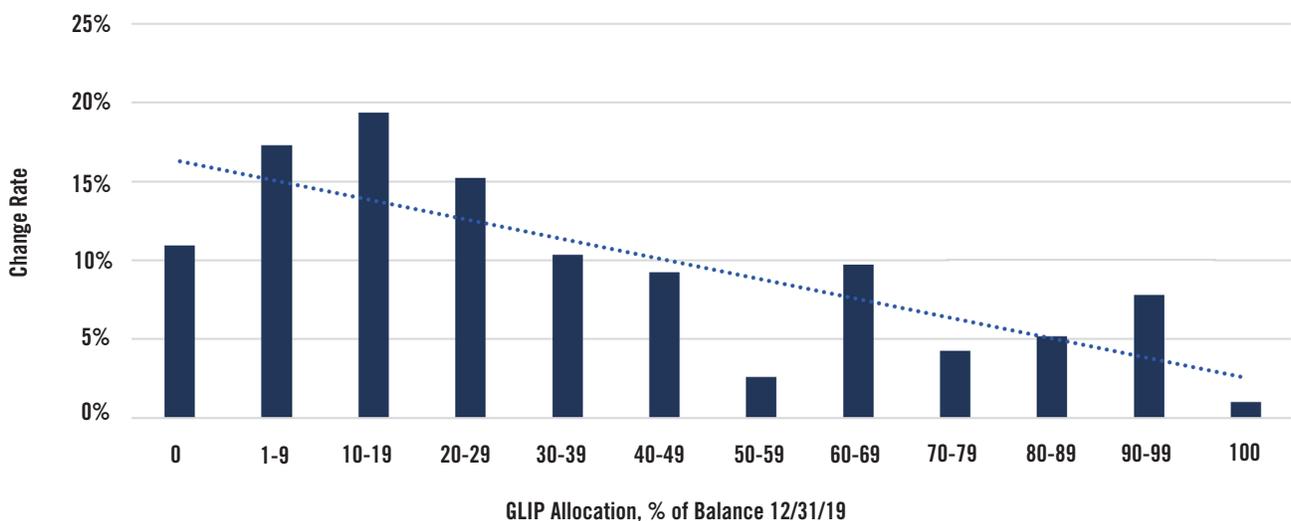


Source: Prudential and Author’s Calculations, Data as of December 30, 2020

It is difficult to define who exactly would be considered a participant allocating to the GLIP given the significant differences in allocations. For example, we could assume any participant who had an allocation to the GLIP of more than one penny to be a “GLIP investor”; however, this would (obviously) not capture the implications by relative balance weight. Therefore, we focus primarily on the percentage of the balance in the GLIP using two different tests, first focusing on grouping and the second on relative thresholds.

For the first test, participants are assigned to one of 12 groups based on their GLIP allocation as of December 31, 2019. For each group the percentage of participants who made a change is estimated. The results are included in Exhibit 15.

Exhibit 15: Transfer Rate by GLIP Allocation Level

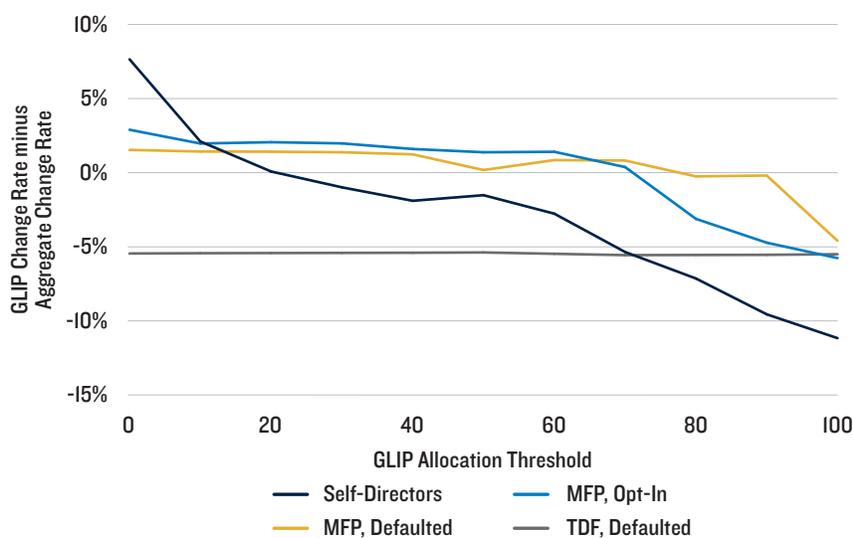


Source: Prudential and Author’s Calculations, Data as of December 30, 2020

There is a relatively clear relation where the probability of making a change decreases as the GLIP allocation increases. In other words, the more a participant had in a product that provided guaranteed lifetime income the less likely he or she was to trade during 2020; however, participants with smaller allocations (less than 30%) had change rates that were higher than those without any product allocation.

Next, we conduct a threshold analysis, where participants are assumed to be allocated to the GLIP so long as their allocation weight exceeds the respective threshold value, which we vary from .0001% to 99%. We then compare the change rates for participants who have an allocation to the product to those who do not, to determine what the difference is between the groups. We run the analysis separately for each of the four investment-types and include the results in Exhibit 16.

Exhibit 16: Transfer Rate Among GLIP Participants Minus Transfer Rate Among All Participants, Controlling for Age by Investment-Type Using a Threshold Model



Source: Prudential and Author's Calculations, Data as of December 30, 2020

The results in Exhibit 16 also suggests that the probability of a participant making a change declines for higher allocations, consistent with Exhibit 15, although there are differences across the respective strategies. For example, the change rate appears to decline the most for participants who were self-directing their accounts and the least for participants in a target-date fund.

Finally, we perform a series of probit regressions and the results are included in Appendix 4 to understand whether the general relationship is significant after controlling for additional participant demographics. The regressions clearly suggest that higher allocations to the GLIP were associated with a lower change rate. There does not appear to be age effect (i.e., age did not appear to be a significant driver in how participants responded to owning the GLIP); however, there was a balance effect, whereby participants with higher balances were less likely to transact if they had an allocation to the GLIP.

In summary, there did appear to be a benefit to holding a GLIP during 2020 among older participants; however, additional research should be conducted on this topic with a larger sample to better understand its actual significance, and how to ensure it can be replicated before the next downturn.

CONCLUSION

While 2020 was a significant market shock, its effects on financial markets were relatively short lived, even as broader medical, economic and social events persisted. We're grateful for the market bounce-back, but of course the old saying continues to resonate: "Past performance is no guarantee of future results." The brief shock does provide insight into how participants respond to market volatility especially given the notable structural changes in the DC space since the last major market shock (i.e., 2008) when there was relatively little usage of default investments (e.g., target-date funds) and/or annuities.

This analysis clearly suggests that access and usage of professionally managed portfolios can reduce trading activity among DC participants. While older participants who were self-directing their accounts seemed to make the worst decisions (i.e., selling out of equities) they are the cohort who are most likely to not use a professionally managed solution.

Evidence suggests that all default investment structures were effective, but there could be an added behavioral benefit associated with displaying a portfolio as a multi-fund option versus a single fund structure (i.e., a target-date mutual fund, which is the most popular).

There also appears to be some benefit for participants who allocated to an annuity that provides guaranteed lifetime income, and we will continue our research into the levels at which this offers a significant improvement to participant behavior.

Overall, progress, but more to do to help participants stay on course for a successful retirement, especially for older participants.

APPENDICES

Appendix 1: Probit Marginal Effects Regression Results, Dependent Variable = if Change (All Participants)

Variable	Model 1	Model 2	Model 3
Age	0.098***	-0.002	0.015***
Tenure			-0.135***
ln(Balance)		1.857***	-4.121***
ln(Balance) ²			0.302***
Male			1.139***
Female			-1.175***
Single			-0.971***
Married			-0.131
Equity %			0.003*
401(k) plan?			0.949***
MFP, Defaulted	-6.159***	-3.712***	-3.777***
TDF, Defaulted	-4.058***	-1.827***	-2.105***
MFP, Opt-In	-7.016***	-5.648***	-5.333***

***p < .001, ** p < .01, * p < .05

Source: Prudential and Author's Calculations, Data as of December 30, 2020

Appendix 2: Probit Marginal Effects Regression Results, Dependent Variable = if Change (Self-Directors Only)

Variable	Model 1	Model 2	Model 3
Age	0.187***	-0.078***	0.007***
Tenure			-0.344***
ln(Balance)		4.737***	-5.214***
ln(Balance) ²			0.590***
Male			2.755***
Female			-2.815***
Single			-1.673***
Married			-0.271
Equity %			0.000
401(k) plan?			0.581***

***p < .001, ** p < .01, * p < .05

Source: Prudential and Author's Calculations, Data as of December 30, 2020

APPENDICES

Appendix 3: Probit Marginal Effects Regression Results, Dependent Variable = if Change (Default Investors Only)

Variable	Model 1	Model 2	Model 3	Model 4
Age	0.054***	-0.050***	0.001	-0.002
Tenure			-0.019	-0.019
ln(Balance)			-0.224***	-2.224***
ln(Balance) ²			0.148***	0.148***
Male			1.957***	1.961***
Female			-1.580***	1.585***
Single			-1.248***	-1.250***
Married			-0.670***	-0.671***
Equity %			-0.018***	0.018***
401(k) plan?			2.323***	2.321***
MFP, Defaulted	-1.687***	-2.011***	-1.965***	-2.184***
MFP, Defaulted*Age		0.006		0.004

***p < .001, ** p < .01, * p < .05

Source: Prudential and Author's Calculations, Data as of December 30, 2020

Appendix 4: Probit Marginal Effects Regression Results, Dependent Variable = if Change (All Participants from Age 55 to 70)

Variable	Model 1	Model 2	Model 3	Model 4
Age	0.003	-0.000	-0.006	0.009
Tenure	-0.123***	-0.122***	-0.122***	-0.083***
ln(Balance)	-5.937***	-5.880***	-5.878***	3.067***
ln(Balance) ²	0.426***	-0.423***	-0.423***	
Male	1.360***	1.360***	1.359***	1.275***
Female	-0.813*	-0.832*	-0.835*	-1.017**
Single	-0.703**	-0.704**	-0.708**	-0.869**
Married	0.492*	0.492*	0.491*	0.457*
Equity %	0.016***	0.017***	0.017***	0.019***
401(k) plan?	0.655**	0.698**	0.696**	0.952**
MFP, Defaulted	-5.002***	-4.797***	-4.795***	-4.683***
TDF, Defaulted	-1.669***	-1.459***	-1.447***	-1.071***
MFP, Opt-In	-6.992***	-6.944***	-6.943***	-6.870***
GLIP%		-0.018***	-0.096	0.061
GLIP%*Age			0.001	
GLIP%*ln(Balance)				-0.008**

***p < .001, ** p < .01, * p < .05

Source: Prudential and Author's Calculations, Data as of December 30, 2020

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