

The Impact of 401(k) Catch-Up Contributions on Retirement Income

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In 2002, Americans age 50 and older were given the opportunity to increase their contributions to qualified individual and employer sponsored retirement plans. The catch-up contribution provision in the Economic Growth and Tax Relief Reconciliation Act provides a tax deferred method to bolster retirement savings. This study measures the marginal returns generated by investing the 401(k) catch-up contributions over the 15-year period spanning 2002 - 2016. The results show that by taking advantage of the provision, individuals earned a total return of up to 115.10% on the incremental funds invested, compared to only 5.38% in a money market account.

INTRODUCTION

The passage of the Economic Growth and Tax Relief Reconciliation Act (the “Act”) in 2001 introduced significant changes to individual and employer sponsored retirement plans. One of the noteworthy inclusions in the Act allows people age 50 and over to increase their annual retirement savings in a qualified retirement plan by an amount, known as a “catch-up contribution” above their ordinary annual maximum contribution limit. Although the provision for catch-up contributions was set to expire, the Pension Protection Act of 2006 made it permanent.

As an example, any person contributing to a 401(k) in 2001 would be allowed to save a maximum of \$10,500. After the implementation of the catch-up contribution in 2002, a person aged 49 years or younger could save a maximum of \$11,000, and a person aged 50 years or older could save a maximum of \$12,000. This represents a potential 14.3% increase in 401(k) savings for a person age 50 or older. The bump in contribution for someone graduating from 49 to 50 years of age is 9%.

The allowance of an additional catch-up contribution for people age 50 and over is designed to allow those people approaching retirement age to bolster their retirement savings. Catch-up contributions paid into a Traditional 401(k) are fully tax deferred up to the annual maximum plus the catch-up contribution limit. Although catch-up contributions are allowed for savers with a Traditional IRA, the tax deductibility of contributions to an individual IRA is subject to annual income limitations. The focus of this paper is on catch-up contributions in employer sponsored 401(k) plans.

LITERATURE REVIEW

A review of the literature available on the topic of retirement plan catch-up contributions yields relatively little information. The lack of attention devoted to the impact of the catch-up provision is noted by researchers studying the utilization of the provision (Guan, Rutledge, Yanyuan Wu, and Vitagliano, 2015). In a study intended to determine whether individuals are utilizing the catch-up contribution provision, Guan et al. sample the retirement savings of individuals age 46 to 53 between 1999 and 2005, noting that 9% of individuals made 401(k) contributions within 10% of the annual maximum contribution limit. Using linear regression, they find that eligible individuals increased their 401(k) savings by an average of 14% per year after the Act was introduced. However, while total 401(k) contributions did increase for catch-up contribution eligible individuals, the increased savings did not reach the annual allowable maximum plus the catch-up contribution limit.

Another study examining the effect tax incentives have on 401(k) retirement savings is conducted by the Center for Retirement Research at Boston College (Rutledge, Yanyuan Wu, and Vitagliano, 2015). The study notes that the Joint Committee on Taxation estimates tax-deferred treatment for retirement plans cost the United States government \$61.4 billion in revenue in 2014, but the impact of the catch-up contribution could not be determined. They delve into the financial background of individuals saving for retirement to determine what factors, if any, lead individuals to save more for retirement. They find that individuals who max out their 401(k) savings have an average annual income of \$163,000 and an average net worth of \$439,000. By contrast, individuals who do not max out their 401(k) savings had an average annual income of \$57,000 and an average net worth of \$200,000. The findings suggest that increases in the tax-deferral maximum affect mostly high-income households.

Kawachi, Smith and Toder (2005) determine that most employees do not contribute the maximum allowable amount to retirement plans sponsored by employers. Those contributing the maximum tend to have higher income, more education, are non-Hispanic whites, and are single or married (versus widowed or divorced). Boyd (2002) presents a comprehensive guide about the catch-up relief Act and concludes that it is has much complexity and uncertainty. Perhaps the difficulty in understanding the benefits of the Act plays a role in not everyone exploiting it by maximizing contributions.

The review of the literature on the catch-up contribution provision yields results that focus primarily on the effect of the provision to increase retirement savings. This paper attempts to fill that void by considering the return premium that can be achieved by taking full advantage of the catch-up contribution provision.

DATA

The annual IRS limits for 401(k) savings are obtained from *IRS.gov*. Table 1 presents the annual 401(k) contribution limit for individuals up to age 50, the amount of the catch-up contribution limit, and the annual 401(k) contribution limit for individuals age 50 and over during the period 2002 to 2016. In addition, a column is included to show the required annual earnings using a 15% to 20% of income savings rule if a person age 50 and over takes advantage of the maximum allowable 401(k) contributions. Interestingly, during the period in review the maximum 401(k) contribution allowable for individuals age 50 and over doubled from \$12,000 to \$24,000, which would require the individual's income to double if the 15-20% of income savings rule is applied. The objective of this paper is to measure the impact on marginal returns produced by the catch-up contribution in column 3.

Kiplinger, a periodical specializing in personal financial investing, ranks the 105 most popular 401(k) mutual funds based on total assets under management. The list is compiled by Brightscope Inc., a financial information company that reviews 401(k) plans, mutual funds, and financial advisors, with results published on *Brightscope.com*. All figures listed in the report by Kiplinger are as of September 30, 2016. This study considers the largest mutual funds according to the report. The 10th largest fund, the Vanguard 500 Index (VFINX), is similar in composition and structure to the largest fund, the Vanguard Institutional Index (VINIX). Consequently, VFINX is replaced in this study with the 11th largest fund, the

American Funds Growth Fund of America (AGTHX) to provide a mutual fund sample with greater diversity. Three additional mutual funds (Mid-Cap Blend, Foreign Large Blend, and Small Blend) are included in this study to capture asset types not represented in the largest funds. After selecting the mutual funds, the weekly pricing data for each one was obtained from *finance.yahoo.com* spanning the date range January 1, 2002 to December 31, 2016. This period includes the financial crisis of 2008 and 2009 and the recovery that followed during the next several years. Table 2 presents a list of the funds included in testing.

TABLE 1
ANNUAL IRS 401(k) CONTRIBUTION LIMITS

Year	Annual Limit	Catch-Up Contribution Limit	Annual Limit plus Catch-Up Contribution Limit	Total Income if 401(k) Savings is 15-20% of Income
2016	\$ 18,000	\$ 6,000	\$ 24,000	\$120,000 - \$160,000
2015	\$ 18,000	\$ 6,000	\$ 24,000	\$120,000 - \$160,000
2014	\$ 17,500	\$ 5,500	\$ 23,000	\$115,000 - \$153,333
2013	\$ 17,500	\$ 5,500	\$ 23,000	\$115,000 - \$153,333
2012	\$ 17,000	\$ 5,500	\$ 22,500	\$112,500 - \$150,000
2011	\$ 16,500	\$ 5,500	\$ 22,000	\$110,000 - \$146,666
2010	\$ 16,500	\$ 5,500	\$ 22,000	\$110,000 - \$146,666
2009	\$ 16,500	\$ 5,500	\$ 22,000	\$110,000 - \$146,666
2008	\$ 15,500	\$ 5,000	\$ 20,500	\$102,500 - \$136,666
2007	\$ 15,500	\$ 5,000	\$ 20,500	\$102,500 - \$136,666
2006	\$ 15,000	\$ 5,000	\$ 20,000	\$100,000 - \$133,333
2005	\$ 14,000	\$ 4,000	\$ 18,000	\$90,000 - \$120,000
2004	\$ 13,000	\$ 3,000	\$ 16,000	\$80,000 - \$106,666
2003	\$ 12,000	\$ 2,000	\$ 14,000	\$70,000 - \$93,333
2002	\$ 11,000	\$ 1,000	\$ 12,000	\$60,000 - \$80,000

To provide a comparison to risky mutual fund returns, the historical money market rate at the beginning of each year is utilized to calculate the benchmark return that would have been earned for catch-up contribution savings. The historical money market rates in Table 3 are obtained from *Quandl.com*.

TABLE 2
401(k) MUTUAL FUNDS TESTED

Fund Rank by Popularity	Fund Name	Symbol	Fund Type
1	Vanguard Institutional Index	VINIX	Large Blend
2	PIMCO Total Return	PTTRX	Intermediate-Term Bond
3	Fidelity Contrafund	FCNTX	Large Growth
4	American Funds EuroPacific Growth	AEPGX	Foreign Large Growth
5	Fidelity Spartan 500 Index	FUSEX	Large Blend
6	Vanguard Total Bond Market Index	VBMFX	Intermediate-Term Bond
7	Fidelity Growth Company	FDGRX	Large Growth
8	Vanguard Wellington	VWELX	Moderate Allocation
9	Dodge & Cox Stock	DODGX	Large Value
11	American Funds Growth Fund of America	AGTHX	Large Growth
15	Vanguard Extended Market Index	VEXMX	Mid-Cap Blend
24	Vanguard Total International Stock Index	VGTSX	Foreign Large Blend
25	Vanguard Small Cap Index	NAESX	Small Blend

TABLE 3
HISTORICAL MONEY MARKET RATES

Year	Annual Money Market Rate
2016	0.08%
2015	0.11%
2014	0.11%
2013	0.06%
2012	0.06%
2011	0.07%
2010	0.13%
2009	0.43%
2008	0.70%
2007	0.69%
2006	0.57%
2005	0.36%
2004	0.34%
2003	0.60%
2002	0.95%

METHODOLOGY AND RESULTS

In order to simulate the contributions to a 401(k) during the period 2002 – 2016, this study makes use of the following assumptions:

1. paychecks are received every other week
2. all 401(k) purchases are made at the market close on the last day of the market week
3. the first purchase is made January 4th, 2002
4. the last purchase is made December 31st, 2016
5. annual returns are calculated at the market close on December 31st, 2016, the last trading day of 2016
6. the historical rate for money market accounts uses the rate at the beginning of each year and holds that rate constant throughout the year.

The total return for each fund is calculated using *Yahoo Finance*'s adjusted close prices. These prices consider dividends and stocks splits. Table 4 presents the annual 401(k) transactions. The table displays the annual catch-up contribution limit each year for 2002 – 2016, the number of 401(k) contributions per year (based on the number of paychecks received each year), and the catch-up expenditure per purchase. The per paycheck contribution in column 4 is the annual catch-up limit (column 3) divided by the number of paychecks (column 2).

**TABLE 4
CATCH-UP CONTRIBUTIONS PER YEAR**

Year	401(k) Contributions per Year	Annual Catch-up Contribution Limit	Catch-up Expenditure per Purchase
2016	26	\$6,000.00	\$230.77
2015	26	\$6,000.00	\$230.77
2014	26	\$5,500.00	\$211.54
2013	26	\$5,500.00	\$211.54
2012	26	\$5,500.00	\$211.54
2011	26	\$5,500.00	\$211.54
2010	26	\$5,500.00	\$211.54
2009	26	\$5,500.00	\$211.54
2008	26	\$5,000.00	\$192.31
2007	26	\$5,000.00	\$192.31
2006	26	\$5,000.00	\$192.31
2005	26	\$4,000.00	\$153.85
2004	26	\$3,000.00	\$115.38
2003	26	\$2,000.00	\$76.92
2002	26	\$1,000.00	\$38.46

Table 5 presents the growth of 401(k) catch-up contributions invested from 2002 through 2016, with the total return calculated on December 31, 2016. The total catch-up contribution invested in each fund is assumed to be the maximum total amount possible of \$70,000 over the 15-year period. For the 13 mutual funds, the best total return of 115.10% is achieved by Fidelity Growth Company (FDGRX). In terms of total dollars, FDGRX grew the \$70,000 investment contributions to \$150,570.69, which represents a total dollar gain of \$80,570.69. This equates to an average annual return of 12.08% over the 15-year period. The worst performer - Vanguard Total International Stock Index (VGTSX) – produced a total return of 25.37% and an average annual return of 3.75%. The average annual return is computed as the IRR of the contribution stream, assuming the annual catch-up contribution is invested on December 31 of each year.

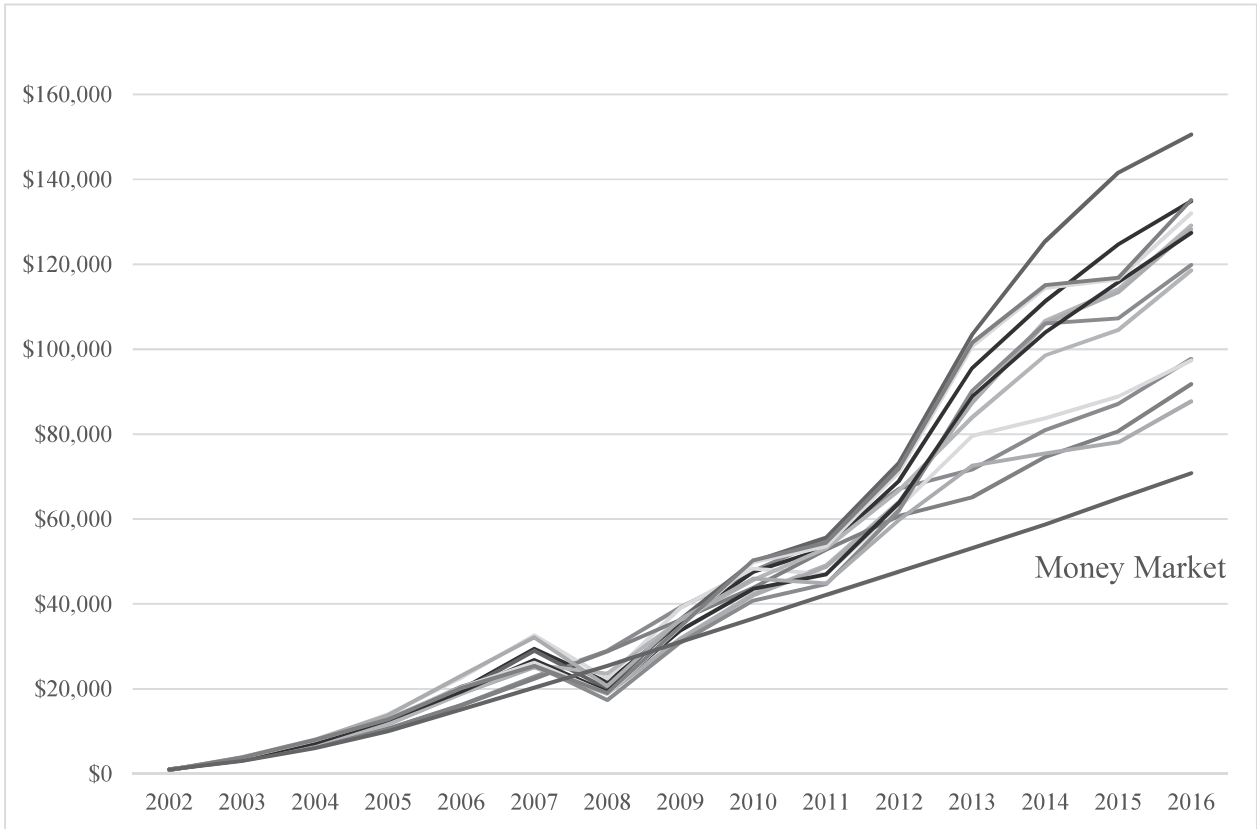
When considering all 13 fund choices, the mean (median) total return is 70.38% (81.95%). The mean (median) average annual return is 8.34% (9.57%). By comparison, the total return for the money market account over the 15 years is 5.38%. The mean (median) annual return for the money market account is 0.35% (0.34%), indicating that the average mutual fund in the sample produced an average premium return of about 8%.

TABLE 5
TOTAL RETURNS 2002 - 2016 OFG CATCH-UP CONTRIBUTIONS ACROSS
MUTUAL FUNDS TESTED

Rank by Fund Popularity	Fund Name	Total Value at 12/31/16	Total Return	Average Annual Return
1	Vanguard Institutional Index	\$129,165.40	84.52%	9.78%
2	PIMCO Total Return	\$97,697.69	39.57%	5.47%
3	Fidelity Contrafund	\$134,897.31	92.71%	10.44%
4	American Funds EuroPacific Growth	\$97,403.73	39.15%	5.42%
5	Fidelity Spartan 500 Index	\$128,256.17	83.22%	9.68%
6	Vanguard Total Bond Market Index	\$91,779.40	31.11%	4.48%
7	Fidelity Growth Company	\$150,570.69	115.10%	12.08%
8	Vanguard Wellington	\$118,575.25	69.39%	8.48%
9	Dodge & Cox Stock	\$119,854.26	71.22%	8.65%
11	American Fund Growth Fund of America	\$127,365.69	81.95%	9.57%
15	Vanguard Extended Market Index	\$132,034.03	88.62%	10.12%
24	Vanguard Total International Stock Index	\$87,758.03	25.37%	3.75%
25	Vanguard Small Cap Index	\$135,141.03	93.06%	10.46%

Figure 1 shows the year-over-year growth of catch-up contribution investments in each fund. All funds see steady growth up to 2007, when the foreshock of the financial crisis began. Most funds experienced a significant decline through 2008, followed by a resumption of the advance from 2009 through 2016. In 2013, the Fidelity Growth Company fund (FDGRX) began to pull away as the leading fund in the group, perhaps due to the increasing risk appetite by investors as the economy and the markets strengthened in the recovery. Figure 1 also shows the money market return as a steady linear rise in value during the 15-year period, although it underperformed the other funds over the period. This is not surprising since the mutual funds represent higher risk than is exhibited in the money market. Nevertheless, investors during 2002-2016 were better off exploiting the catch-up contribution provision and steadily investing in any of the largest mutual funds with each paycheck

**FIGURE 1
GROWTH OF CATCH-UP CONTRIBUTIONS BY FUND**



It is interesting to investigate by how much the catch-up contributions can pad the retirement account of a typical retiree. For this purpose, Table 6 shows the amount available at retirement for both maximum regular 401(k) contributions and maximum catch-up contributions. Table 6 assumes information for a retiree who is 65 years old in 2016 and 70 years old in 2021. As shown in the Table, for the highest yielding fund in Table 5, this retiree would have accumulated \$546,082 at age 65 and \$1,080,155 at age 70 from maximizing their primary 401(k) contributions. Moreover, the retiree would have accumulated an additional \$150,464 from catch-up contributions at age 65 and \$304,238 at age 70. The lower part of Table 6 shows the amounts that would have accumulated from investing in the lowest yielding fund (VGTSX), which yielded an average of 3.75% during this period. In both parts of the Table, it is obvious that the catch-up contributions can add substantially to a retirement account.

One consideration when studying mutual funds is whether the fund has a load fee. A review of the 13 mutual funds included in the study determined that two of the mutual funds, AEPGX and AGTHX, have a front-load fee of 5.75%. Another consideration is 12b-1 fees. Four of the funds charge 12b-1 fees of 0.02% (VWELX, VEXMX, VGTSX, NAESX), and two charge 0.24% (AEPGX, AGTHX). Both fees may reduce the returns achieved when investing catch-up contributions in a 401(k) plan. Our study did not consider the effects of these fees when the 15-year and 5-year returns were calculated.

TABLE 6
RETIREMENT ACCOUNTS FOR HIGHEST AND LOWEST YIELDING FUNDS

Amount Available at Retirement for Highest Yielding Fund		
Return	12.08%	
	Retire at Age	
	65	70
Primary Contribution Only	\$546,082.34	\$1,080,155.14
Catch-Up Contribution	<u>\$150,463.91</u>	<u>\$304,238.21</u>
Total	\$696,546.25	\$1,384,393.36
Amount Available at Retirement for Lowest Yielding Fund		
Return	3.75%	
	Retire at Age	
	65	70
Primary Contribution Only	\$299,679.36	\$457,344.70
Catch-Up Contribution	<u>\$87,740.51</u>	<u>\$137,836.21</u>
Total	\$387,419.87	\$595,180.91

Table 7 displays the annual income the accumulated amounts from Table 6 provide, given various age assumptions and years spent in retirement. For each scenario, a maximum lifetime of 90 years is assumed. For example, for a retiree who invested in the highest-yielding fund earning 12.08% per year (and continuing to do so) and spending 15 years in retirement, the accumulated primary contributions from Table 6 would provide an annual income of \$80,502. The catch-up contributions would provide an additional \$22,181 in this scenario.

Not surprisingly, the retiree will be able to draw the largest annual income at the retirement age of 70 and draws down over a ten-year period, having invested in the highest yielding fund. In this case, the draw in annual income from the catch-up contributions only is \$54,012. The lowest income scenario is retirement at age 65 and drawing down for 25 years, having invested in the lowest-yielding fund. In this case, the annual income from catch-up contributions only will be much lower (\$5,472).

To address the impact of inflation on the annual income, we assume a 3% annual inflation rate and 26 payouts per year. Under these assumptions, retiring at 65 years old, drawing down for 25 years and continuing to earn the low yield of 3.75% per year will be produce an annual income in today's dollars of \$3,854, which translates to a withdrawal of \$148 every two weeks. The retiree who retires at 70 and draws down for 10 years and continues earning the high yield of 12.08% will be able to draw an annual income in today's dollars of \$21,299, or \$819.21 every two weeks. Once again, these figures are for the catch-up contribution only.

TABLE 7
ANNUAL INCOME FOR HIGHEST AND LOWEST YIELDING FUNDS FOR
VARIOUS RETIREMENT AGES

Annual Income for Highest Yielding Fund (Retire at 65)				
Return	12.08%	FDGRX		
	Years in Retirement			
	10	15	20	25
Primary Contribution Only	\$96,946.85	\$80,501.64	\$73,455.13	\$69,990.51
Catch-Up Contribution	<u>\$26,712.09</u>	<u>\$22,180.89</u>	<u>\$20,239.34</u>	<u>\$19,284.72</u>
Total	\$123,658.94	\$102,682.53	\$93,694.46	\$89,275.23
Annual Income for Lowest Yielding Fund (Retire at 65)				
Return	3.75%	FGTSX		
	Years in Retirement			
	10	15	20	25
Primary Contribution Only	\$36,498.10	\$26,493.38	\$21,574.79	\$18,689.09
Catch-Up Contribution	<u>\$10,685.96</u>	<u>\$7,756.76</u>	<u>\$6,316.69</u>	<u>\$5,471.81</u>
Total	\$47,184.06	\$34,250.14	\$27,891.48	\$24,160.90
Annual Income for Highest Yielding Fund (Retire at 70)				
Return	12.08%	FDGRX		
	Years in Retirement			
	10	15	20	
Primary Contribution Only	\$191,761.63	\$159,232.87	\$145,294.81	
Catch-Up Contribution	<u>\$54,011.88</u>	<u>\$44,849.78</u>	<u>\$40,923.97</u>	
Total	\$245,773.51	\$204,082.65	\$186,218.78	
Annual Income for Lowest Yielding Fund (Retire at 70)				
Return	3.75%	FGTSX		
	Years in Retirement			
	10	15	20	
Primary Contribution Only	\$55,700.24	\$40,431.90	\$32,925.57	
Catch-Up Contribution	<u>\$16,787.14</u>	<u>\$12,185.51</u>	<u>\$9,923.23</u>	
Total	\$72,487.38	\$52,617.41	\$42,848.80	

CONCLUSIONS

Our analysis shows that retirement savers who meet the eligibility requirements to benefit from catch-up contributions would do well to take advantage of the opportunity to save the additional tax deferred dollars. This broad statement is garnered support by the timing of our study, 2002 to 2016, which includes a financial crisis, a stock market collapse, and a recovery. Even a major negative market event does not yield a negative return for any of the funds in the study. At a minimum, an employee taking advantage of the catch-up contribution rule can expect an average annual return of at least 3.75%. At best, a riskier saver can expect an average annual return of up to 12.08% with the Fidelity Growth Company fund. However, most savers will experience an average return that falls within these two extremes due to diversification within their 401(k) portfolios.

One noteworthy observation is that nine of the eleven equity mutual funds outperformed the two bond mutual funds included in the study. Assuming a person taking advantage of the catch-up contribution is doing so due to a perceived lack of retirement savings, they may consider allotting a larger percentage of their portfolio to equity investments. However, it should be noted that the two equity funds that underperformed the bond funds are both comprised of foreign stocks. Nevertheless, the results provide strong evidence that the 401(k) catch-up provision can greatly enhance the income stream for retirees.

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