

# WealthDefender™

## Client Use Case

## User Story

John Smith was an early employee at Google and is about to sell the majority of his shares. His remaining shares cannot be sold for 10 years after the IPO, so the earliest he can sell them is August 2014. He and his wife Jane are planning for retirement, with both wanting to retire by the age of 50. They both were recently bequeathed an inheritance of approximately \$1.8 million worth of Intel Corp. shares, which was a key factor in their decision to retire early.

Post-retirement expenses include travel and their plans to fully cover their two daughter's college expenses, both of whom have not started yet. In addition, they would like to buy a condo in Lake Tahoe after their youngest daughter begins college. They will also need \$21,000 in the future for unknown expenses. The Smiths would like to donate charitably across multiple non-profit organizations, and will conduct due diligence themselves to determine ideal recipients. In all likelihood they will use the sale of their remaining Google stock to make this donation.

# User Story

**Propose the investment vehicles (Products, Individual Security etc.) based on optimization** which meets -

- Selected Target Asset Allocation
- Propose products from list of available products within each asset class
- Optimize as per user's selected objectives and priority :
  - Minimize Tax Consequences ( Current Holding Tax Lots would be provided)
- Optimize within user specified asset class constraints
- Optimize within user specified investment constraints

# Goal and Cash Flow Modeling

Tell us About Yourself Accounts Balance Sheet **Cashflows** Goals View Risk Configure

**Cash flow at risk calculation**  
 Use Mortality:  Type: -none- Solver: -none- Confidence (%): 5 Calculate all scenarios:  **Start**

Switch scenario: normal :: New scenario:  **Ok** :: Copy normal to:  **Ok** :: Delete normal: **Ok**

**Cash Flows**

**Inflows**

[ add new record ]

Name	Repeat Type	Description	Ccy	Amount	Stochastic	Best Case Amount	Worst Case Amount	Inflation Label	Inflation	Start Date	End Date	Linked Account	Linked Goal
Other Income	No repeat	Other Income	USD	500,000	no	0.0	0.0	Enter rate:	2.5000	2015-Jan-01	2015-Jan-01	JL Retirement Portfolio	-
Salary	Monthly	Salary & Earned Income	USD	10,000	yes	10000	8000	Enter rate:	2.5000	2011-Aug-01	2019-Dec-31	Education Portfolio	-
Salary	Monthly	Salary & Earned Income	USD	10,000	yes	10000	8000	Enter rate:	2.5000	2011-Aug-01	2019-Dec-31	ML Retirement Portfolio	-

[ Download data ]

**Outflows**

[ 5 lines ] [ add new record ]

Name	Repeat Type	Description	Ccy	Amount	Stochastic	Best Case Amount	Worst Case Amount	Inflation Label	Inflation	Start Date	End Date	Linked Account	Linked Goal
Major Goals - Charity	No repeat	Charitable Donations	USD	-500,000	no	-0.0	-0.0	Enter rate:	2.5000	2015-Jan-01	2015-Jan-01	JL Retirement Portfolio	-
Major Goals - Education	Annual	Education - Children	USD	-100,000	no	-0.0	-0.0	CPI-U Education & Communication	-	2011-Jul-09	2011-Jul-09	Education Portfolio	-
Major Goals - One Time Expense	No repeat	Other Expenses - Personal	USD	-250,000	no	-0.0	-0.0	Enter rate:	2.5000	2021-Jan-01	2021-Jan-01	JL Retirement Portfolio	-
Pre-Retirement Living Expenses	No repeat	Household Expenses	USD	-21,000	no	-0.0	-0.0	Enter rate:	2.5000	2013-Jun-01	2013-Jun-01	JL Retirement Portfolio	-
Retirement Living Expenses	Monthly	Household Expenses	USD	-10,000	yes	9,000	15,000	CPI-E Other Goods & Services	-	2020-Jan-01	2050-Dec-31	ML Retirement Portfolio	-

[ Download data ]

Upload your data:  **Browse...** Clear all data first  **Upload**

**With WealthDefender™ the user can model goals & cash flows stochastically and can use different inflation data sets per cash flow for more precise planning.**

# Target Allocations and Investment Modeling

**Target Allocation Setup**

Portfolio weights in **percentages**. You can click the numbers to edit, then finally click update to calculate the cash portion.  
[\[ add new record \]](#)

Effective Date	Aggressive	Balanced	Conservative	Growth	Short Term	
2011-07-09	25.0	15.0	15.0	25.0	20.0	✕
2014-07-01	15.0	30.0	20.0	15.0	20.0	✕

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**Target Allocation Type Definition**

[\[ 5 lines \]](#) [\[ add new record \]](#)

Name	Type	Level	Expected Return (%)	Volatility (%)	Is Risk Free	Source	Updated	
Aggressive	FUND	1.0000	15.23	9.2000	no	user	2011-Jul-09	✕
Balanced	FUND	1.0000	7.9800	5.9000	no	user	2011-Jul-09	✕
Conservative	FUND	1,300	3.2300	3.6000	no	user	2011-Jul-09	✕
Growth	FUND	1.0000	13.47	8.4000	no	user	2011-Jul-09	✕
Short Term	FUND	1.0000	2.0000	2.0000	yes	user	2011-Jul-09	✕

[\[ Download data \]](#)

Clear all data first

**Correlation Definition**

[\[ 5 lines \]](#) [\[ add new record \]](#)

Alloc	Type 1	Alloc	Type 2	Correlation
▼	Aggressive	▼	Short Term	0.7000
▼	Aggressive	▼	Growth	0.9200
▼	Aggressive	▼	Short Term	0.9200
▼	Aggressive	▼	Conservative	0.7800
▼	Aggressive	▼	Balanced	0.8500
▼	Balanced	▼	Conservative	0.7200

javascript:loadDataAndPrepareContent('target\_alloc','wdf/Servlet.tpy...ta&pk=2013-07-01&key=target\_alloc&action=com&action\_detail=delete');

**With WealthDefender™ the user can set allocations, capital markets projections, and correlations based on age range so that simulated wealth evolution and plan optimization results are more accurate.**

# Portfolio and Plan Optimization

## Cash Flow at Risk report

Probability of Failure Report

Change Sensitivity Parameters

The possibility of you *not* reaching your goal (probability of failure). You don't reach your goal, when at the *evaluation date* your account balance is negative.

Table on the right shows different account balance possibilities (5%, 10%, 20% worst case, median and best case accordingly).

Scenario	Analysis	Prob. of Failure	Optimum	Change	Expected Legacy Value	Expected Shortfall
normal	all goals	0.0	-	-	3,670,010	0.0

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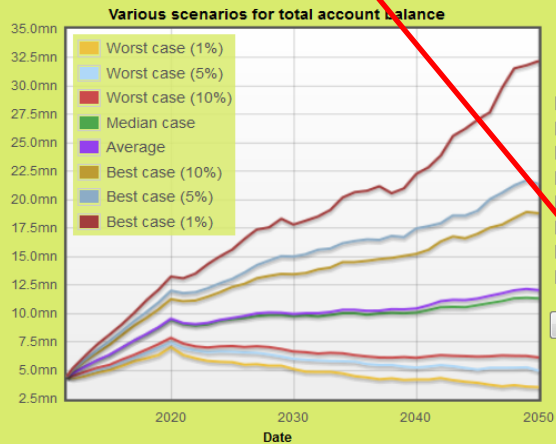
Scenario name	Worst 5%	Worst 10%	Worst 20%	Median	Average	Best 20%	Best 10%	Best 5%
all goals	4,992,570	6,155,650	7,676,160	11,348,500	12,068,100	15,915,700	18,811,500	21,370,000

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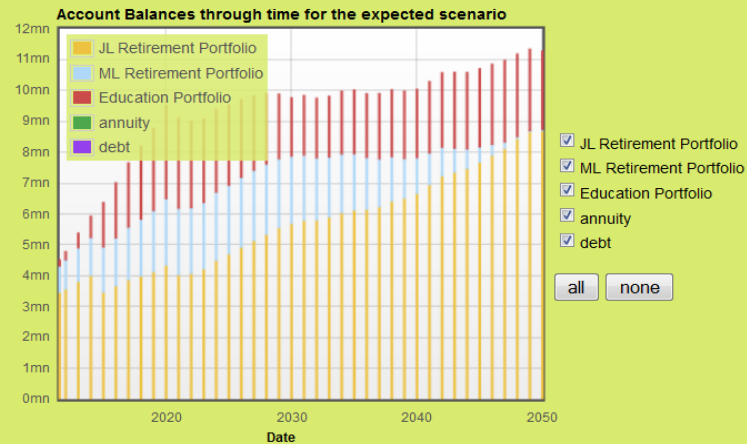
histogram

best case, worst case

Time evaluation of your total account balance for worst case and best case scenarios.



Time evaluation of your account balances (different accounts), taking the median scenario.



Results show a high probability of meeting goals – but next the user wants to determine whether this is still the case under different market assumptions and conditions.

# Results With Historical Capital Markets Behavior

**Cash Flow at Risk report**

Probability of Failure Report    Change Sensitivity Parameters

The possibility of you *not* reaching your goal (probability of failure). You don't reach your goal, when at the *evaluation date* your account balance is negative.

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Scenario Analysis	Prob. of Failure	Optimum Change	Expected Legacy Value	Expected Shortfall
realistic all goals	69.00	-	166,080	-150,578

[ Download data ]

Scenario name	Worst 5%	Worst 10%	Worst 20%	Median	Average	Best 20%	Best 10%	Best 5%
all goals	-1,322,790	-1,180,570	-970,740	-419,624	50,974	606,091	1,613,760	2,815,830

[ Download data ]

Target Allocation Type Definition

[ 5 lines ] [ add new record ]

Name	Type	Level	Expected Return (%)	Volatility (%)	Is Risk Free	Source	Updated
Aggressive	FUND	1.0000	2.5000	22.50	no	user	2011-Jul-09
Balanced	FUND	1.0000	6.4000	13.50	no	user	2011-Jul-09
Conservative	FUND	1.3000	4.3000	8.0000	no	user	2011-Jul-09
Growth	FUND	1.0000	3.3000	17.00	no	user	2011-Jul-09
Short Term	FUND	1.0000	-1.0000	3.0000	yes	user	2011-Jul-09

[ Download data ]

Time evaluation of your total account balance for worst case and best case scenarios.

Time evaluation of your account balances.

The user enters capital markets assumptions that reflect actual historical behavior leading to a vastly different result a much lower probability of goal success.

# Optimized Portfolio with Variable Annuity

## Cash Flow at Risk report

Probability of Failure Report    Change Sensitivity Parameters

The possibility of you *not* reaching your goal (probability of failure). You don't reach your goal, when at the *evaluation date* your account balance is negative.

Table on the right shows different account balance possibilities (5%, 10%, 20% worst case, median and best case accordingly).

Scenario	Analysis	Prob. of Failure	Optimum Change	Expected Legacy Value	Expected Shortfall
realistic with VA all goals	7.2000	-	-	4,012,590	-32,956

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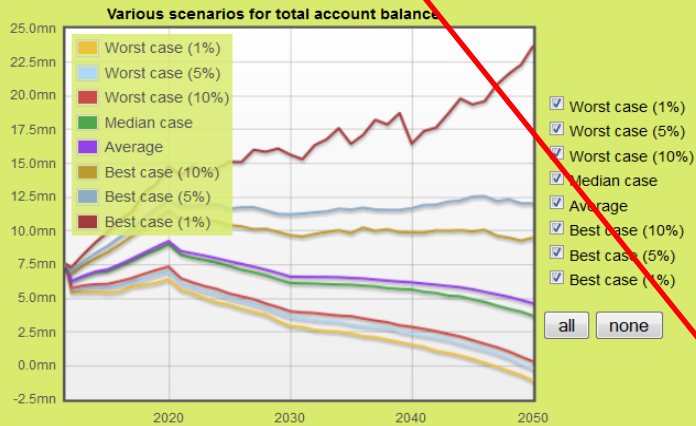
Scenario name	Worst 5%	Worst 10%	Worst 20%	Median	Average	Best 20%	Best 10%	Best 5%
all goals	-214,075	316,574	1,336,410	3,699,940	4,625,790	6,936,100	9,502,320	12,051,000

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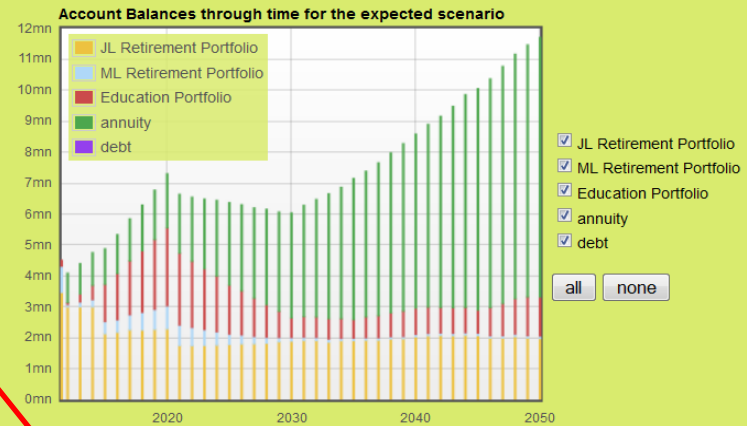
● histogram

● best case, worst case

Time evaluation of your total account balance for worst case and best case scenarios.



Time evaluation of your account balances (different accounts), taking the median scenario.



**Introducing a \$1 million Jackson variable annuity with a guaranteed lifetime income benefit with step up and lock ins brings the probably of success back up.**

# The Variable Annuity Input Screen

<b>General</b>						
purchase price	1,000,000					
start date	1 Jan 2011					
accumulation end name	31 Dec 2050					
name	Jackson VA					
contribution since	0					
investment gain since	0					
current income base	1,000,000					
<b>Tax Policy</b>						
income tax rate	10%					
life expectancy	80.00					
allowed withdrawal	10%					
IRS min age	59.5					
IRS penalty rate	10%					
Contract age	0	1	2	3	4	5
Surrender rate	8%	8%	7%	6%	5%	0%
<b>Guaranteed Income Base</b>						
step up	Y	lock in	Y	eval freq	4	
step up rate	5.00%	lock in age limit	85	apply freq	1	
step up age limit	85	lock in time limit	7	cap	8.00%	
step up time limit	7	lock in can reset	Y			
step up can reset	N	initial lock in	0.00%			
<b>Subaccounts</b>						
weight	100%					
linked index	SP500					
cap	7%					
positive floor	1%					
floor						
<b>Distribution</b>						
select policy	N	Y	N	N	N	
policy type	Fixed Period	GLIB	Fixed Amount	Inflation Protected	Lump Sum	
pay amount	200,000		50,000	40,000		
period length	7					
start date	28 Apr 2029	1 Jan 2020	28 Apr 2029	28 Apr 2029	28 Apr 2029	
inflation type				Housing		
payments per year	12	12	12	12	0	
age group enhancement		Y				
<b>Fee</b>						
name	mortality & expense fee	investment fee	handling fee			
based on	Account Value	Account Value	Account Value			
rate	0.40%	0.00%	0.90%			
start date	25 Jun 2011	25 Jun 2011	25 Jun 2011			
end date	28 Apr 2100	28 Apr 2100	28 Apr 2100			
pay frequency	12	12	12			
reset frequency	1	1	1			
<b>Other</b>						
age band age	0	55	65	75		
age band income ratio	0%	4%	5%	6%		

# Stress Test Results

## Cash Flow at Risk report

Probability of Failure Report

Change Sensitivity Parameters

The possibility of you *not* reaching your goal (probability of failure). You don't reach your goal, when at the *evaluation date* your account balance is negative.

Table on the right shows different account balance possibilities (5%, 10%, 20% worst case, median and best case accordingly).

Scenario	Analysis	Prob. of Failure	Optimum Change	Expected Legacy Value	Expected Shortfall
realistic with VA stressed	all goals	18.60	-	2,725,790	-131,733

[ Download data ]

Scenario name	Worst 5%	Worst 10%	Worst 20%	Median	Average	Best 20%	Best 10%	Best 5%
all goals	-1,148,900	-670,648	133,272	1,864,700	3,015,240	4,524,260	6,883,710	9,435,910

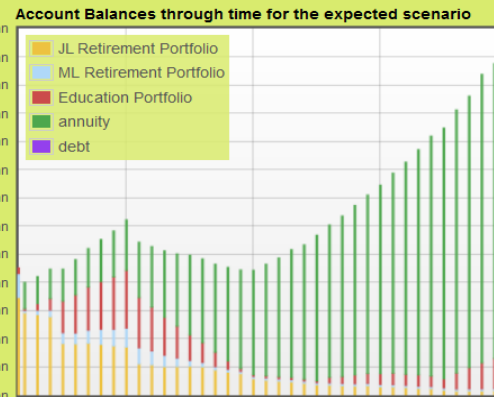
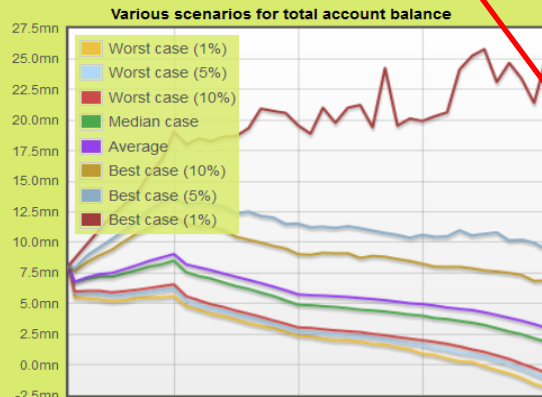
[ Download data ]

● histogram

● best case, worst case

Time evaluation of your total account balance for worst case and best case scenarios.

Time evaluation of your account balances (different accounts), taking the median scenario.



In a *stressed market* with higher income volatility, sustained lower returns, higher asset volatility, and more correlation among asset classes the probability of success drops but not past 80%.

# Rebalancing

## Cash Flow at Risk report

Probability of Failure Report

Change Sensitivity Parameters

The possibility of you *not* reaching your goal (probability of failure). You don't reach your goal, when at the *evaluation date* your account balance is negative.

Table on the right shows different account balance possibilities (5%, 10%, 20% worst case, median and best case accordingly).

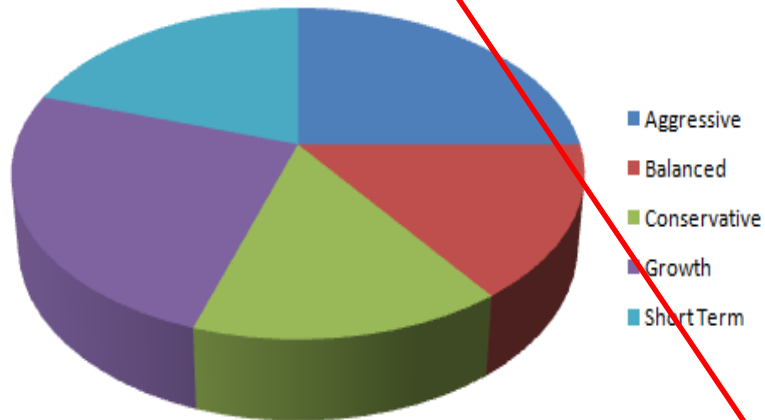
Scenario	Analysis	Prob. of Failure	Optimum Change	Expected Legacy Value	Expected Shortfall
realistic with VA stressed optimized	all goals	13.40	-	3,869,260	-81,824

[ Download data ]

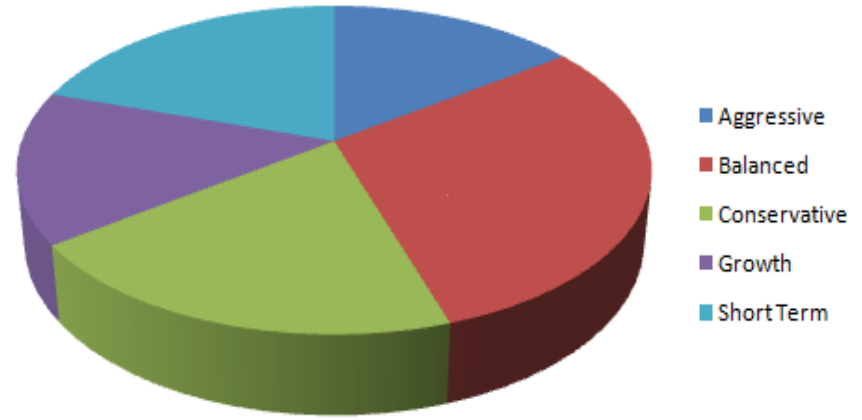
Scenario name	Worst 5%	Worst 10%	Worst 20%	Median	Average	Best 20%	Best 10%	Best 5%
all goals	-790,485	-260,448	694,609	2,834,900	4,402,380	6,673,160	9,827,400	13,811,500

[ Download data ]

### Starting Allocation



### Optimized Allocation



The user can ask WealthDefender™ to run its optimization algorithms to rebalance investments, leading to a higher probability of goal success even under stressed markets.

# Plan Optimization – Retirement Expenses

Switch client: long before reti ▾

Tell us About Yourself Accounts Balance Sheet Cashflows Goals View Risk Configure

**Cash flow at risk calculation :**  
 Use Mortality:  Type: none- ▾ Solver: Retirement Living Expenses (a) ▾ Confidence (%): 5 ▾ Calculate all scenarios:  **Start**

Scenario	Analysis	Prob. of Failure	Optimum Change	Expected Legacy Value	Expected Shortfall
realistic with VA stressed optimized all goals		13.40	-	3,869,260	-81,824
realistic with VA stressed optimized all goals chg. cf. am. Retirement Living Expenses	4.9000	8,551	-1,449	4,779,120	-18,411

[ Download data ]

For more, visit Risk Page

Switch scenario realistic with VA stressed optimized ▾ :: New scenario  **Ok** :: Copy realistic with VA stressed optimized to  **Ok** :: Delete realistic with VA stressed optimized **Ok**

**Current Goals**  
 You can include more than one goal into the calculation, by setting the 'include in Calculation' property for each goals, and then starting the Cash flow at risk calculation

[ 5 lines ] [ add new record ]

Goal	Flows include in Calculation	Force End Date	Funding Account / Pool
charity	yes	-	master
pre-retirement living expenses	yes	-	master
retirement	yes	-	master
education	yes	-	master
condo purchase	yes	-	master

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target allocation

**Target Allocation Setup**

The user can ask WealthDefender™ to run its optimization algorithms to restructure cash flow amounts and timing – in this case, reducing planned monthly retirement expenses by \$1,500 (with the variable annuity) brings probability of success to 95% even under stressed market conditions.

# Plan Optimization – Retirement Timing

Switch client: long before reti ▾

Tell us About Yourself Accounts Balance Sheet Cashflows Goals View Risk Configure

**Cash flow at risk calculation :**  
Use Mortality:  Type: none ▾ Solver: Salary (d) ▾ Confidence (%): 5 ▾ Calculate all scenarios:  **Start**

Scenario	Analysis	Prob. of Failure	Optimum	Change	Expected Legacy Value	Expected Shortfall
stressed optimized retirement duration all goals		13.20	-	-	3,856,910	-82,398
stressed optimized retirement duration all goals chg. cf. dur. Salary 4.1000		4.1000	-	53.00	5,420,440	-18,205

[ Download data ]

For more, visit Risk Page

Switch scenario: stressed optimized retirement duration ▾ :: New scenario:  **Ok** :: Copy stressed optimized retirement duration to:  **Ok** :: Delete stressed optimized retirement duration **Ok**

**Current Goals**  
You can include more than one goal into the calculation, by setting the 'Include in Calculation' property for each goals, and then starting the Cash flow at risk calculation

[ 5 lines ] [ add new record ]

Goal	Flows	Include in Calculation	Force End Date	Funding Account / Pool			
charity	▾	yes	-	master	▴	▾	✕
pre-retirement living expenses	▾	yes	-	master	▴	▾	✕
retirement	▾	yes	-	master	▴	▾	✕
education	▾	yes	-	master	▴	▾	✕
condo purchase	▾	yes	-	master	▴	▾	✕

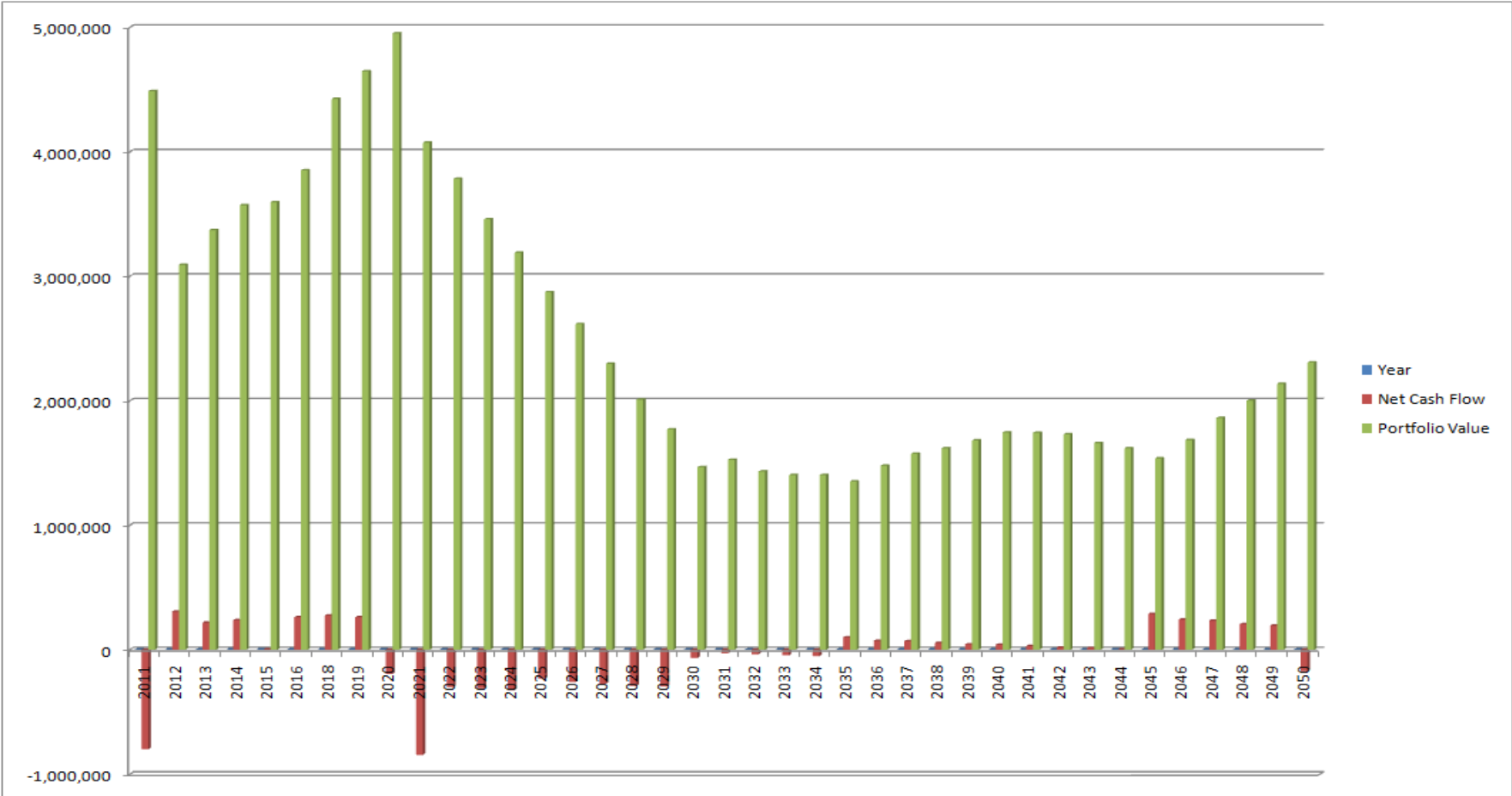
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target allocation  
inflation and mortality

Alternatively, the user can see that putting off retirement by nearly 4.5 years (and keeping retirement expenses as planned) will bring probability of goal success up to 95% even under stressed markets.

# Simulated Cash Flow and Portfolio Evolution



The user can see simulated net cash flows and portfolio value year by year.