Modeling for Optimal Use of RESP

RESP Modeling Process

While the RESP is Canada's most important savings program for post-secondary education, it is complex, and a reason more families do not use it. To get a more comprehensive understanding of how to optimize performance, the author developed a robust model in EXCEL. A total of 300 RESP scenarios were modeled, based on these variables:

- RESP opened by subscribers in 3 income levels - Low, Medium, High
- RESP account started in years 1 through 15
- Six different goals and budget for contributions

Appendix L1 - RESP Scenarios in Modeling

Income	Start Yr.	Contribution Goal and Pattern
High	1	
	2	A.Contribute max. of $50,000 via contributing equal amts. annually
	3	
	4	
	5	B.Contribute max. of $50,000 via contributing increasing amts. annually
Medium	6	
	7	
	8	C.Obtain max. CESG via contributing equal amts. annually
	9	
	10	
Low	11	D.Obtain max. CESG via contributing increasing amts. annually
	12	
	13	
	14	E.Contribute a share of the Canada Child Benefit
	15	Low Income - 19.8%, Medium - 31%, High - 55.4%. Annual inflation increases.
	1 to 15	F.Contribute $500 annually

Abbreviations Used in the Modeling Highlights

CCB	Canada Child Benefit
CESG	Canada Education Savings Grant
IRR	Internal Rate of Return
K	$1,000
Yr.	Year
Max.	Maximum
Min	Minimum

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Assumptions and scenarios

Assumptions Used in RESP Modeling

- All annual and lifetime rules, limits and restrictions are incorporated.
- Subscriber income remains in the same category (high, medium low,) during contribution periods.
- All contributions are made on an annual basis.
- For all low-income scenarios, the receipt of the Canada Learning Bond is included.
- For all scenarios, year-end balances within the RESP earn an annual return of 5%.

Start Date Variable

The start date is defined as the child's age when the account is opened. Because the RESP must be opened before their 15th birthday, there are fifteen start date scenarios, impacting the end value and Internal Rate of Return (IRR) via:

- Earnings, including the multiplier effect.
- Contributions
- CESG received, which is tied to contributions and carry-over provisions.
- CLB received for subscribers in the low-income category - the initial $500 of CLB is received when low-income families open a RESP, followed by $100/year.

Appendix L2 - Number of RESP Scenarios Modeled

Scenario Type	Financial Goals	Income Categories	Year Started	Total Scenarios
General RESP	5	3	15	225
$500/Year RESP	1	1	15	15
CLB only, Low Income	1	1	15	15
Total Scenarios				255

Scenarios Explained in this Appendix

Due to space limitations, the following pages provide explanations and graphics for only 5 scenarios out of the total of 300. These sceanarios demonstrate three of the six broad categories of financial goals:

C. Obtain max. CESG via contributing equal amts. annually

E. Contribute a share of the Canada Child Benefit Low Income - 19.8%, Medium - 31%, High - 55.4%. Annual inflation increases.

F. Contribute $500 annually

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Summary of Select Modeling Results

Appendix L3 - Key RESP Optimizing Conclusions from Modeling

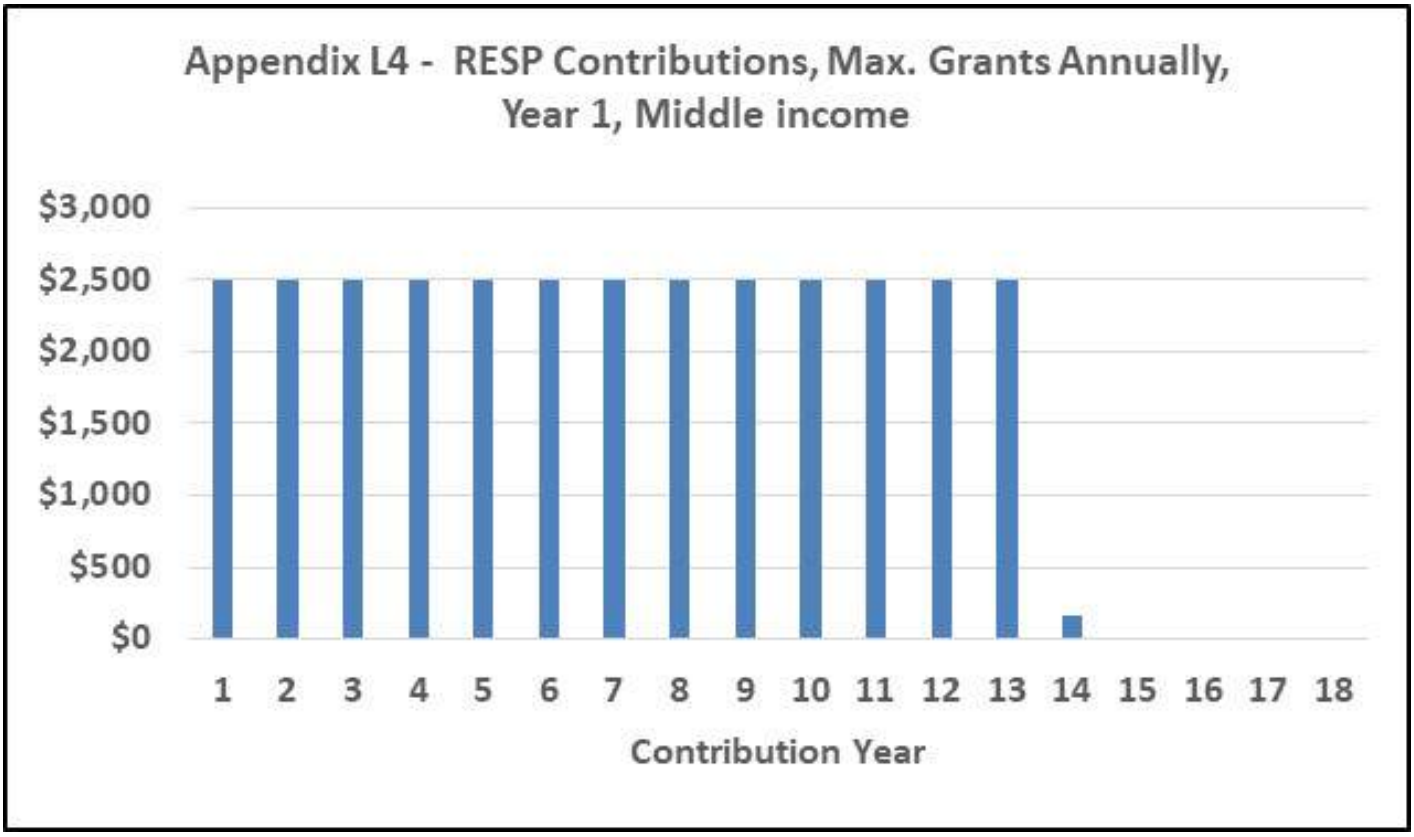
Ref	RESP question / parameter	Start year	Low income	Medium income	High income
C1	To receive max. CESG of $7,200, what is min. total contribution?	1	$30,000	$32,667	$36,000
C1	For above contribution scenario, what is RESP 's Value in Yr 18?	1	$73,132	$72,675	$76,499
C1	For above contribution scenario, what is RESP's IRR?	1	7.15%	6.65%	6.57%
C15	To receive max. CESG of $4K ($1K/Yr) What is the max. total contribution?	15	$18,000	$19,000	$20,000
C15	For above contribution scenario, what is RESP 's Value in Yr 18?	15	$27,316	$26,022	$27,154
C15	For above contribution scenario, what is RESP's IRR?	15	17.40%	12.99%	12.61%
E1	To receive max. CESG of $7,200, what share of CCB is contributed annually?	1	16.80%	31.00%	55.40%
E1	For above contribution scenario, what is RESP 's Value in Yr 18?	1	$58,278	$61,497	$70,779
E1	For above contribution scenario, what is RESP's IRR?	1	8.05%	7.10%	6.75%
F1	If contribution is $500/Year, what is RESP 's Value in Yr 18?	1	$24,379		
F1	If contribution is $500/Year, what is RESP 's IRR in Yr 18?	1	9.74%		
F15	If contribution is $500/Year, what is RESP 's Value in Yr 18?	15	$5,593		
F15	If contribution is $500/Year, what is RESP 's IRR in Yr 18?	15	45.73%		

Modeling for Optimal Use of RESP

Model C1 - Contributions

Explanation of Model C1 If you are in the middle-income category, start year 1, want to contribute annual equal amounts to receive the $7,200 maximum CESG, you:

- You contribute $2500 per year for 13 years, and $167 in year 13, for a total of $32,667.
- Have an RESP valued at $72,675 and you earn 6.65% on your initial investment of $32,667.
- Could spread contributions over 18 years, total contributions can be reduced to $31,500, but RESP value and IRR are also reduced.



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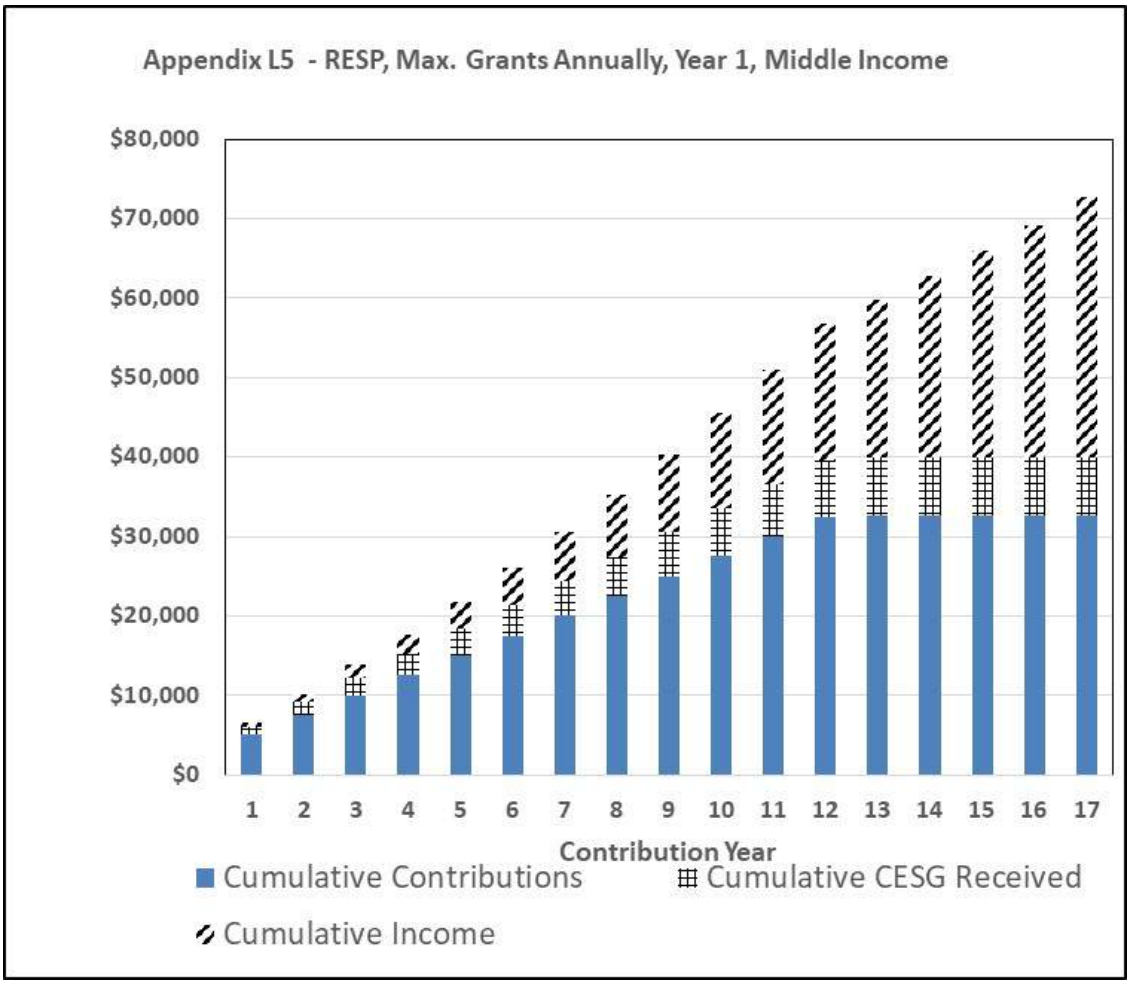
Model C1 - Account growth



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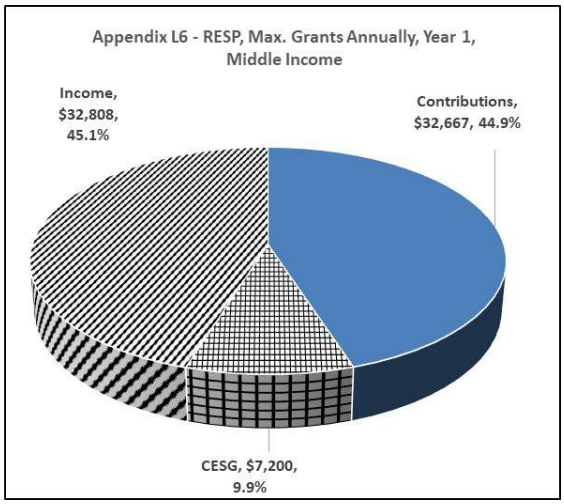
Model C1 - Composition and inputs



Appendix L7 - Assumptions & Inputs, Model D1

Assumption / input	Value
Optimal Contribution, to Maximize Grants	$32,667
Based on Income, Eligible for Addtl CESG on 1st $500	10%
Based on Income, Eligible for Canada Learning Bond (CLB)?	No
Timing of Contributions, CESG Received	Start of yr.
Annual CESG - Basic & as % of Eligible Contributions	20%
Maximum Annual Contribution eligible for CESG	$4,750
Annual Rate of Return on Contributions, CESG	5%
Maximum CESG Available	$7,200
No of years for Plan Growth	18
Average Contribution/year over Plan Period	$1,815
Performance:	
Actual Contributions as share of Optimal Contributions	100%
CESG Received as a share of Maximum	100%
Carry Over Balance, End of Plan Period	$0
Annual Internal Rate of Return over Plan Period	6.65%
Future Value, End of Plan Period	$72,675
Average Gain/Year over Plan Period	$2,223

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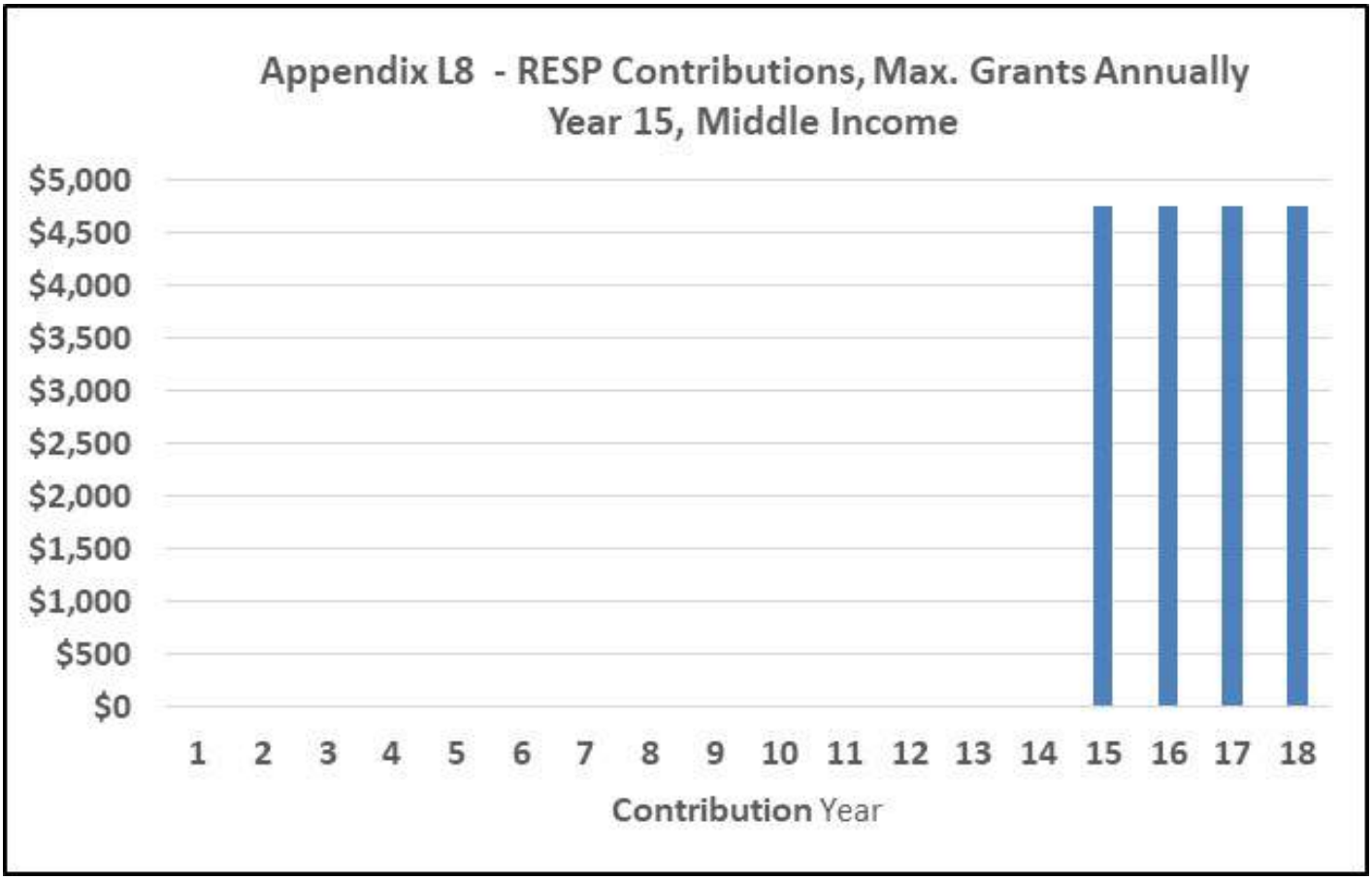
Model C15 - Contributions

Explanation of Model C15 If you are in the middle-income category, start year 15, want to contribute annual equal amounts to receive as much CESG as possible you:

- Have only 4 years to make your contributions.
- Can only receive $4,000 in CESG, because the CESG limit is $1,000 per year.
- You contribute $4,750 per year for 4 years, for a total of $19,000.
- Have an RESP valued at $26,022 and you earn 12.99% on your initial investment of $19,000.



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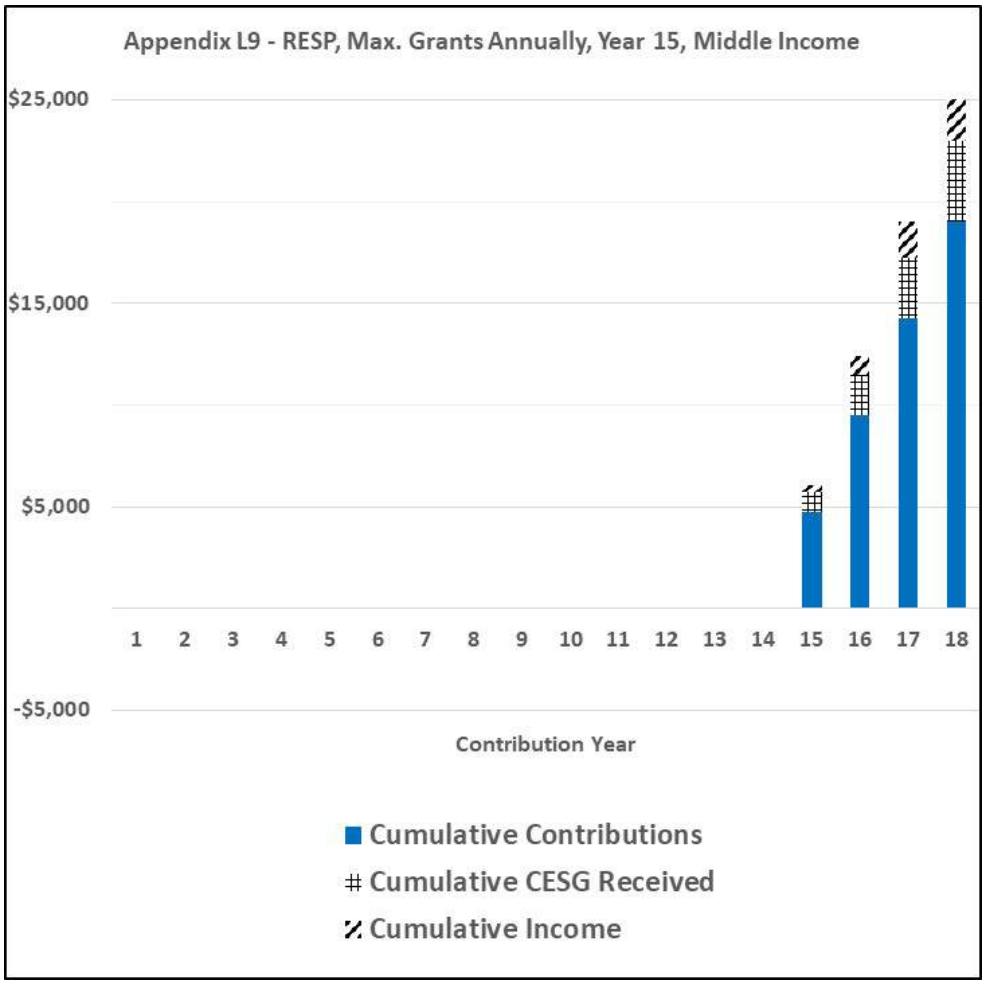
Model C15 - Account growth



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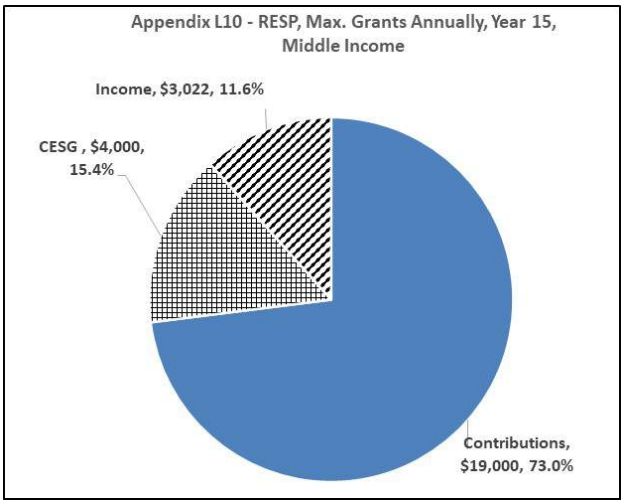
Model C15 - Composition and inputs



Appendix L11 - Assumptions & Inputs, Model C15

Assumption / input	Value
Optimum Contribution, to Maximize Grants	$19,000
Based on Income, Eligible for Addtl CESG on 1st $500?	10%
Based on Income, Eligible for Canada Learning Bond (CLB)?	No
Timing of Contributions, CESG Received	Start of yr.
Annual CESG - Basic & as % of Eligible Contributions	20%
Additional CESG as % of First $500 in Contributions	10%
Annual Maximum Contribution Eligible for CESG	$4,750
Annual Rate of Return on Contributions	5%
Maximum CESG Available	$7,200
No. of years for plan growth	4
Average Contribution/year over Plan Period	$4,750
Performance:	
Actual Contributions as share of Optimal Contributions	100%
CESG Received as a share of Maximum	56%
Carry Over Used	$26,000
Annual Internal Rate of Return over Plan Period	12.99%
Future Value, End of Plan Period	$26,022
Average Gain/Year over Plan Period	$1,756

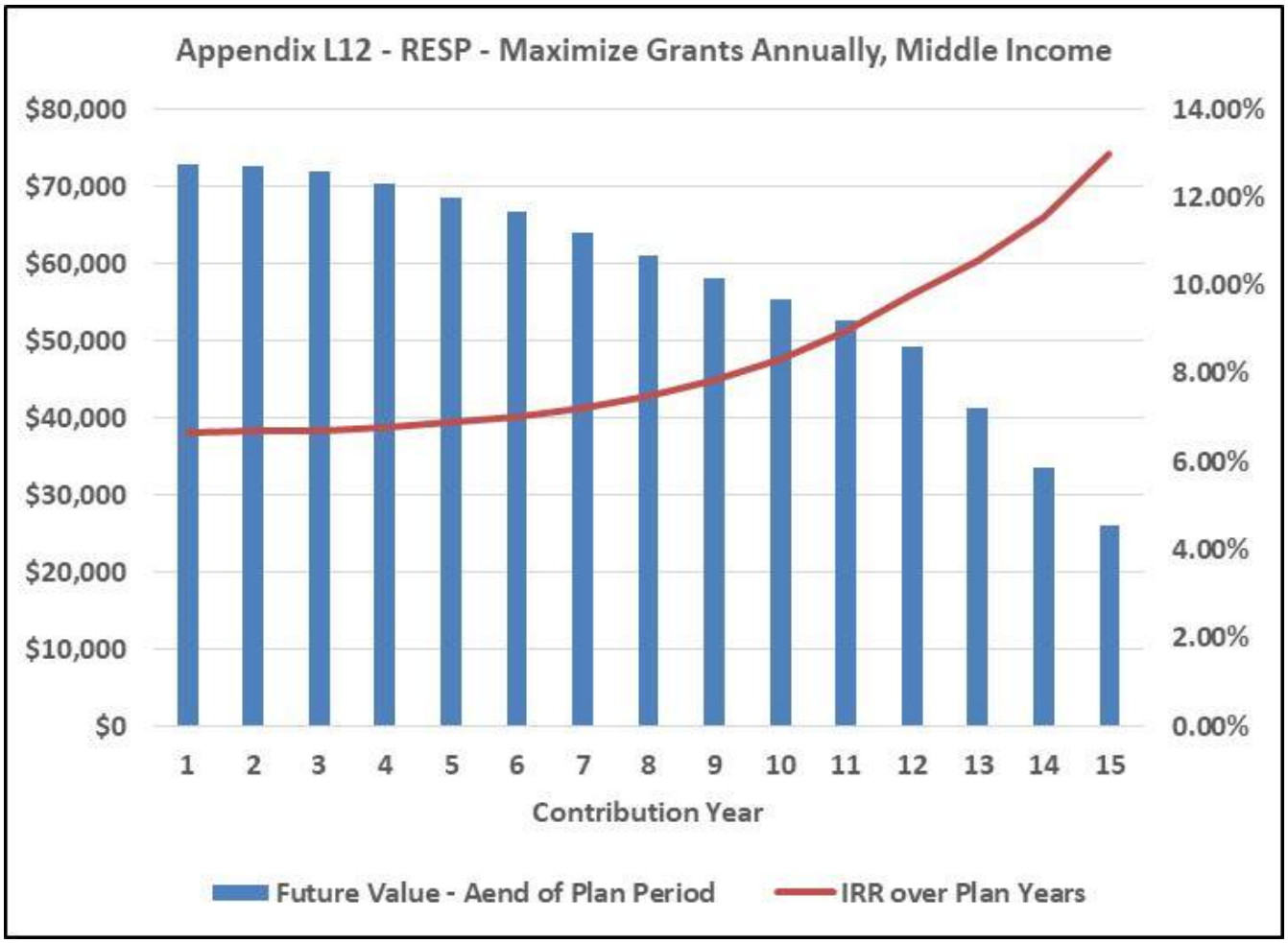
Modeling for Optimal Use of RESP

The Big Picture - Model C

The graphic below compares performance for all 15 start years of the C scenarios:

- Future RESP values range from a low of about $26K for C15 to a high of about $73K for C1.

- IRR ranges from a low of 6.65% for C1 to a high of 12.99% for C15



Modeling for Optimal Use of RESP

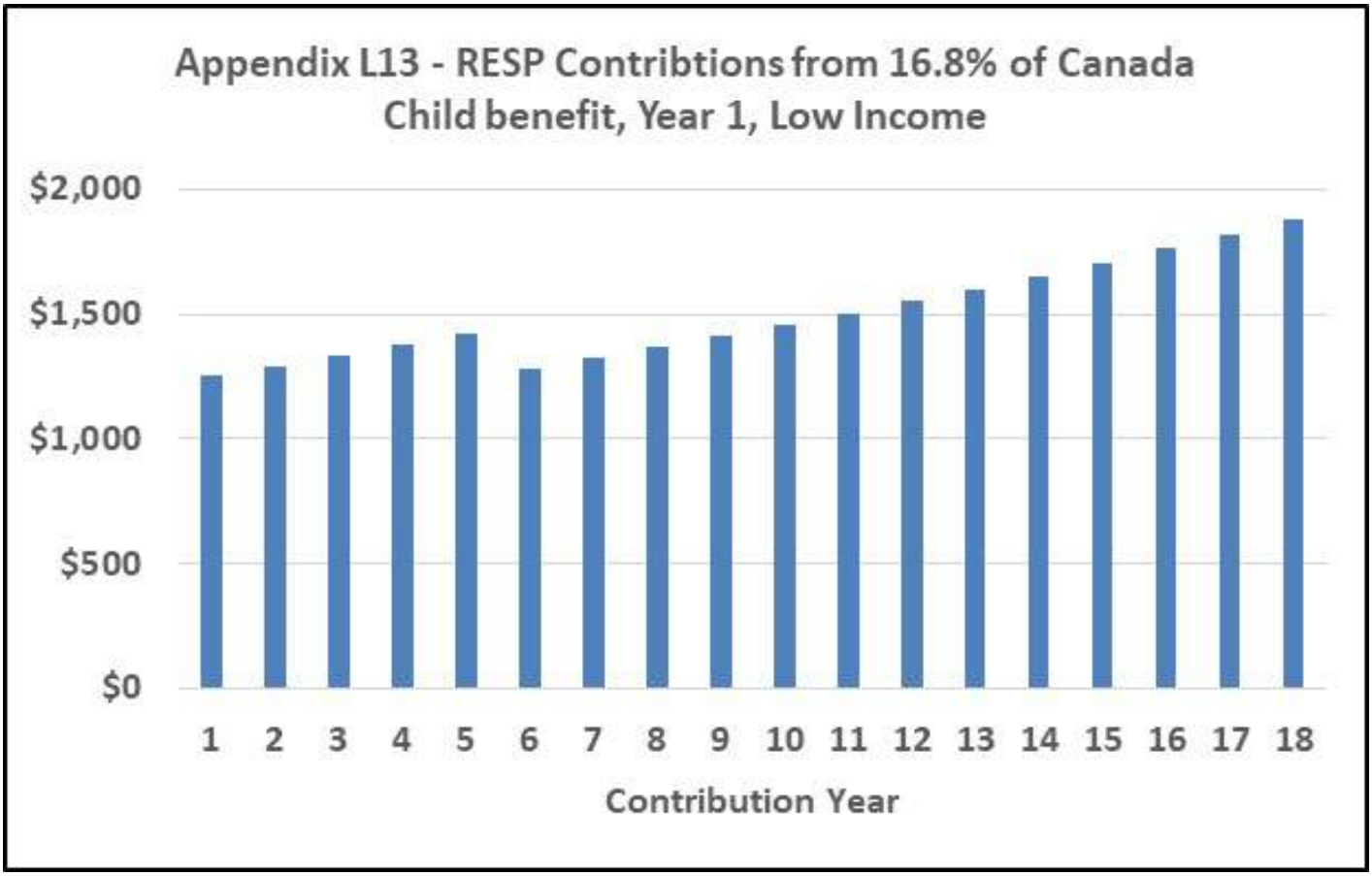
Model E1 - Contributions

Explanation of Model E1 - If you are in the low-income category, start year 1 and want to allocate a share of Canada Child Benefit payments for RESP contributions, to get the $7,200 of CESG, you:

- You contribute 16.8% of the Canada Child Benefit (CCB), for all 18 years; totals $27,000.

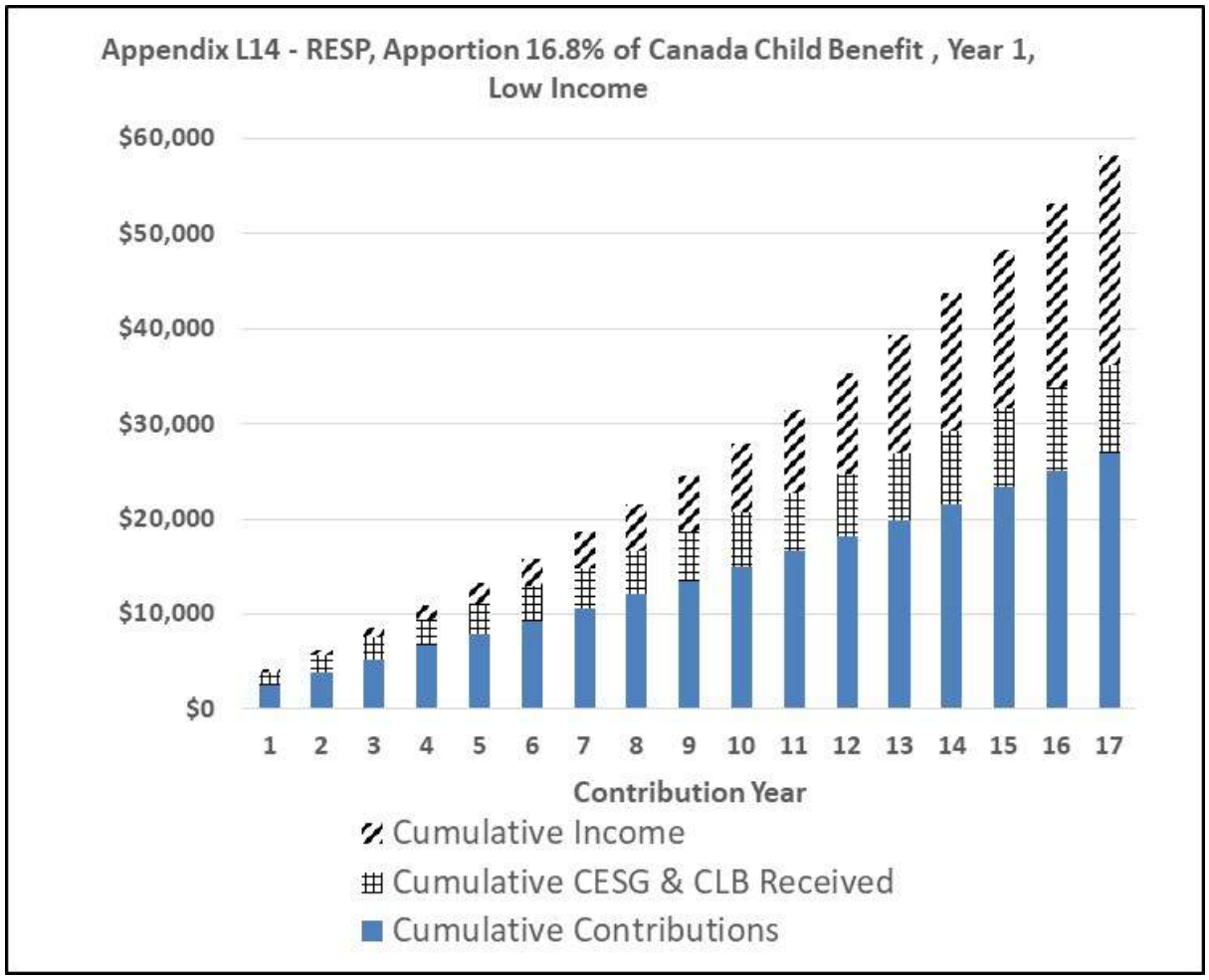
- At the end of year 18, your RESP value is $58,278 and you earn 8.05% on your initial investment.

- Remember that CCB increases annually for inflation, so your payments increase automatically.



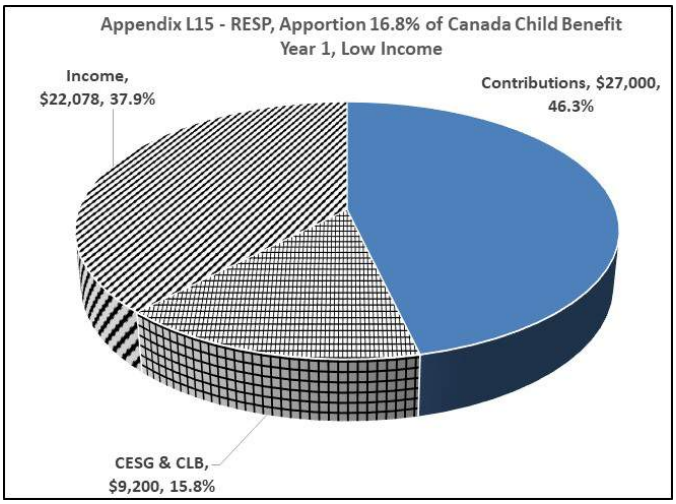
Modeling for Optimal Use of RESP

Model E1 - Account growth



Modeling for Optimal Use of RESP

Model E1 - Composition and inputs



Appendix L16 - Assumptions & Inputs, Model E1

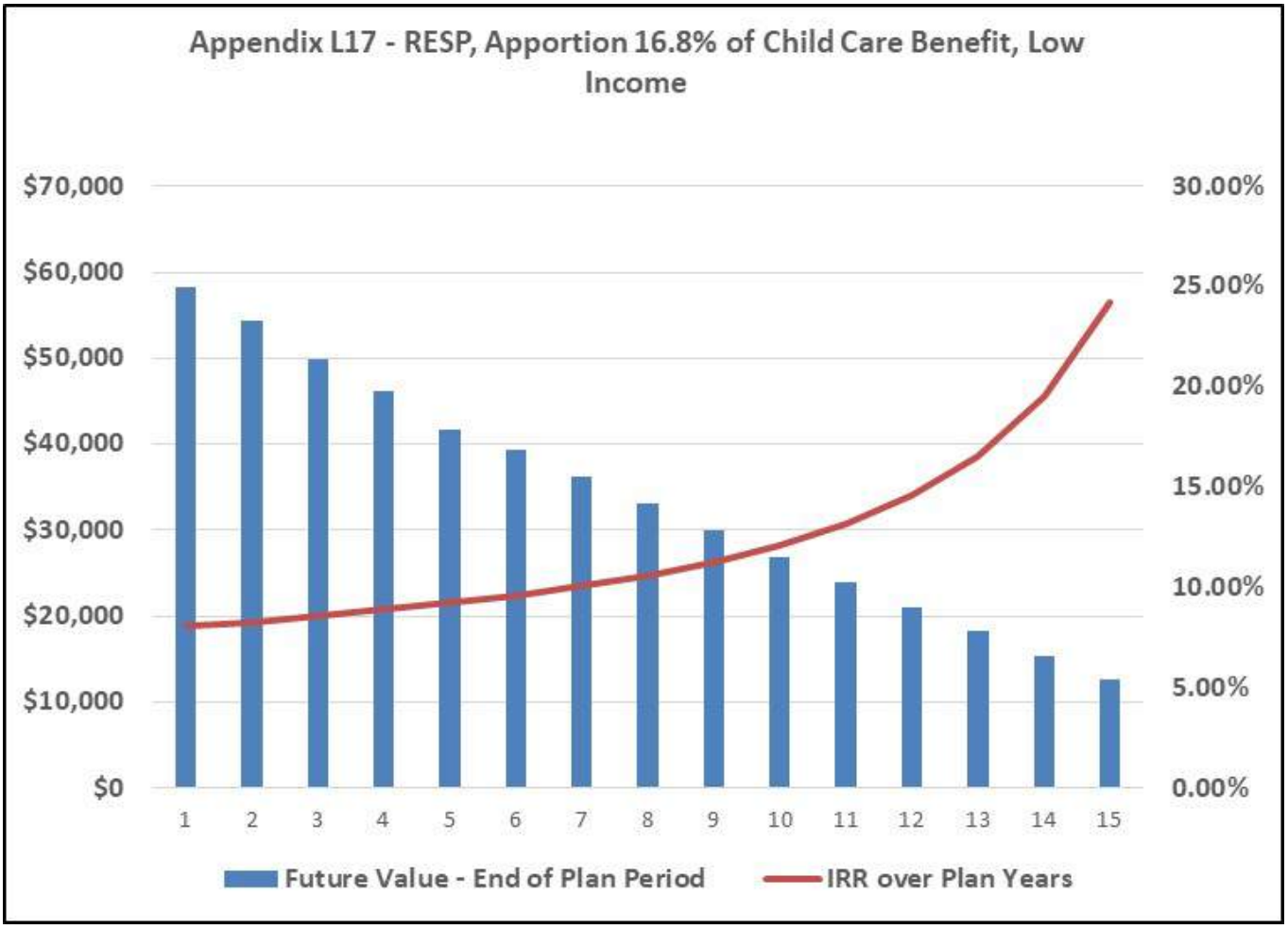
Assumption / input	Value
Total Contributions to Maximize Grants	$27,000
Based on Income, Eligible for Additional CESG, 1st $500	20%
Based on Income, Eligible for Canada Learning Bond (CLB)?	$2,000
Timing of Contributions, CESG, Received	Start of yr.
Annual CESG - Basic as % of Eligible Contribution	20%
Annual Rate of Return on Contributions, CESG, CLB	5%
Maximum CESG Available	$7,200
No of years for Plan Growth	18
Average Contribution/year over Plan Period	$1,500
Performance:	
Actual Contributions as share of Optimal Contributions	100%
CESG Received as a share of Maximum	100%
Carry Over Balance, End of Plan Period	$18,000
Annual Internal Rate of Return over Plan Period	8.05%
Future Value, End of Plan Period	$58,278
Average Gain/Year over Plan Period	$1,738

Modeling for Optimal Use of RESP

The Big Picture - Model E

The graphic below compares performance for all 15 start years of the E scenarios, while steadily maintaining the allocation of only 16.8% of the Child Canada Benefit for one child:

- Contributions range from $27K, if started in year 1, to about $7K if started in Year 15
- Future RESP values range from a low of about $12K for E15 to a high of $58K for E1.
- IRR ranges from a low of 8.05% for E1 to a high of 24.24% for E15

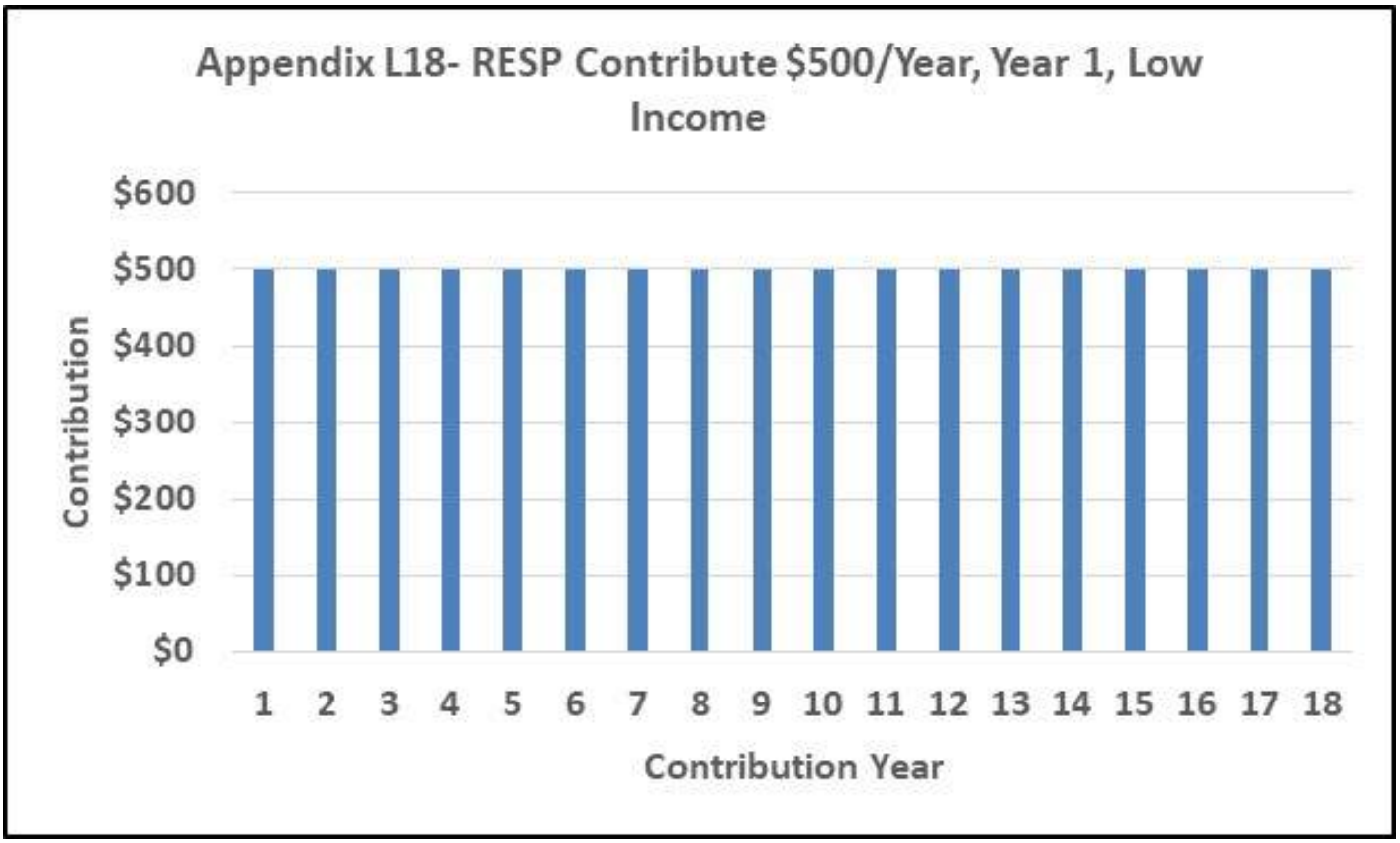


Modeling for Optimal Use of RESP

Model F1 - Contributions

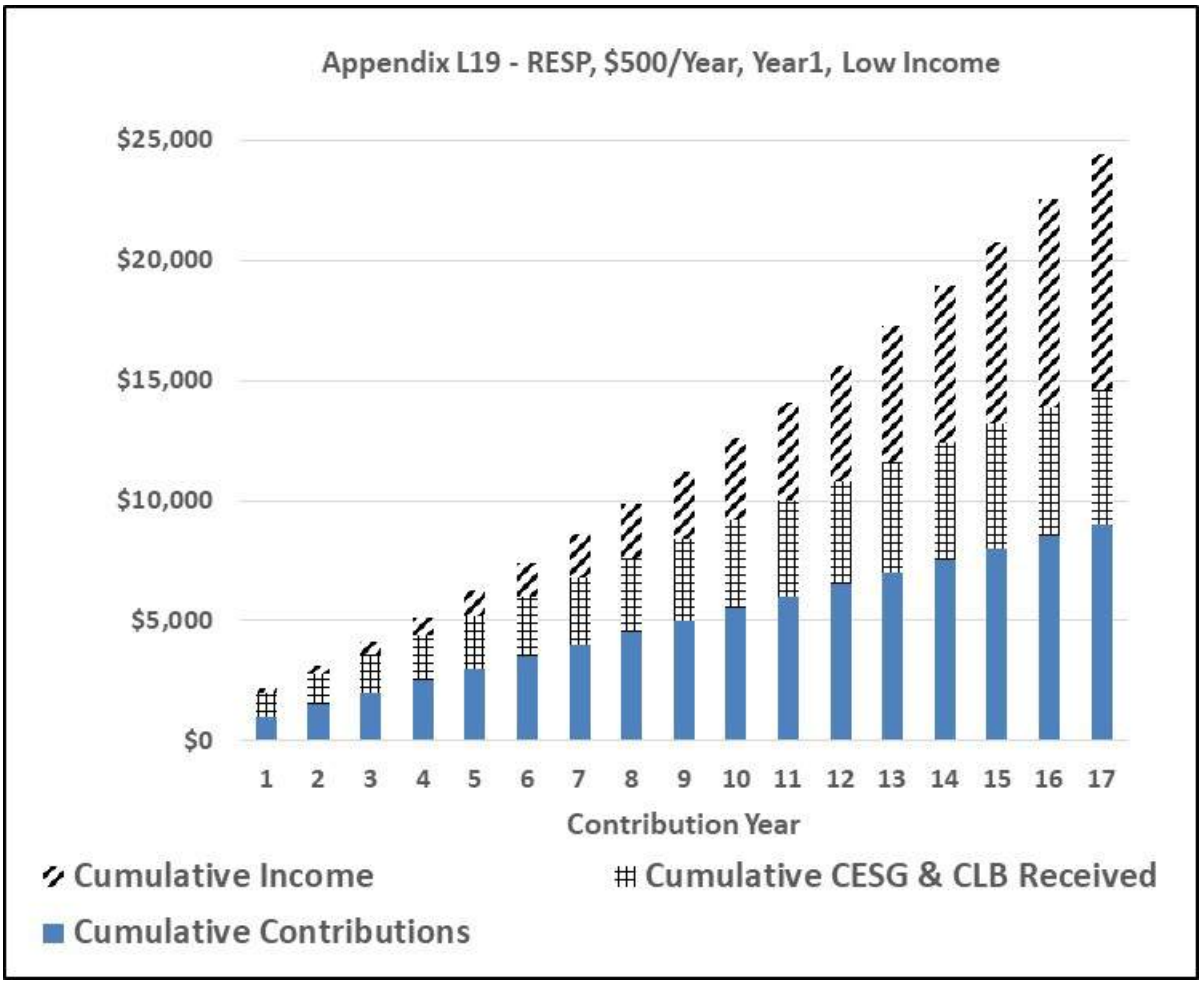
Explanation of Model F1 - If you are in the low-income category, start year 1 and contribute $500/year for all 18 years:

- Your RESP value will be $24,379 and you earn 9.74% on your initial investment $9,000.



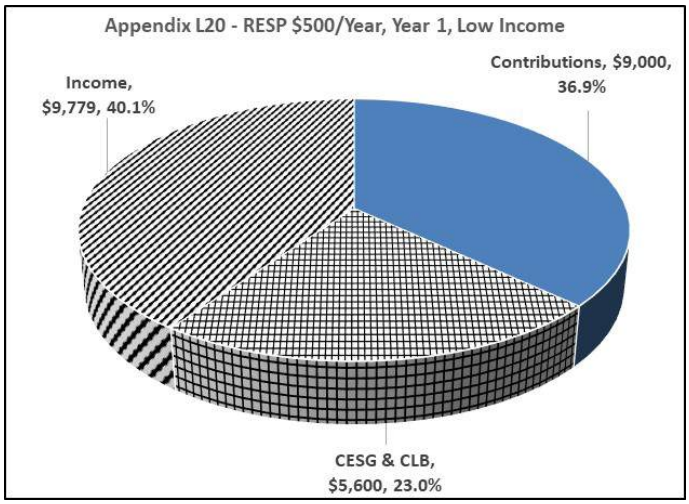
Modeling for Optimal Use of RESP

Model F1 - Account growth



Modeling for Optimal Use of RESP

Model F1 - Composition and inputs



Appendix L21 - Assumptions & Inputs, Model G1

Assumption / input	Value
Total Contributions to Maximize Grants	$27,000
Based on Income, Eligible for Additional CESG, 1st $500	20%
Based on Income, Eligible for Canada Learning Bond (CLB)?	$2,000
Timing of Contributions, CESG, Received	Start of yr.
Annual Rate of Return on Contributions, CESG, CLB	5%
Maximum CESG Available	$7,200
No of years for Plan Growth	18
Average Contribution/year over Plan Period	$500
Performance:	
Actual Contributions as share of Optimal Contributions	33%
CESG Received as a share of Maximum	50%
Carry Over Balance, End of Plan Period	$36,000
Annual Internal Rate of Return over Plan Period	9.74%
Future Value, End of Plan Period	$24,379
Average Gain/Year over Plan Period	$854

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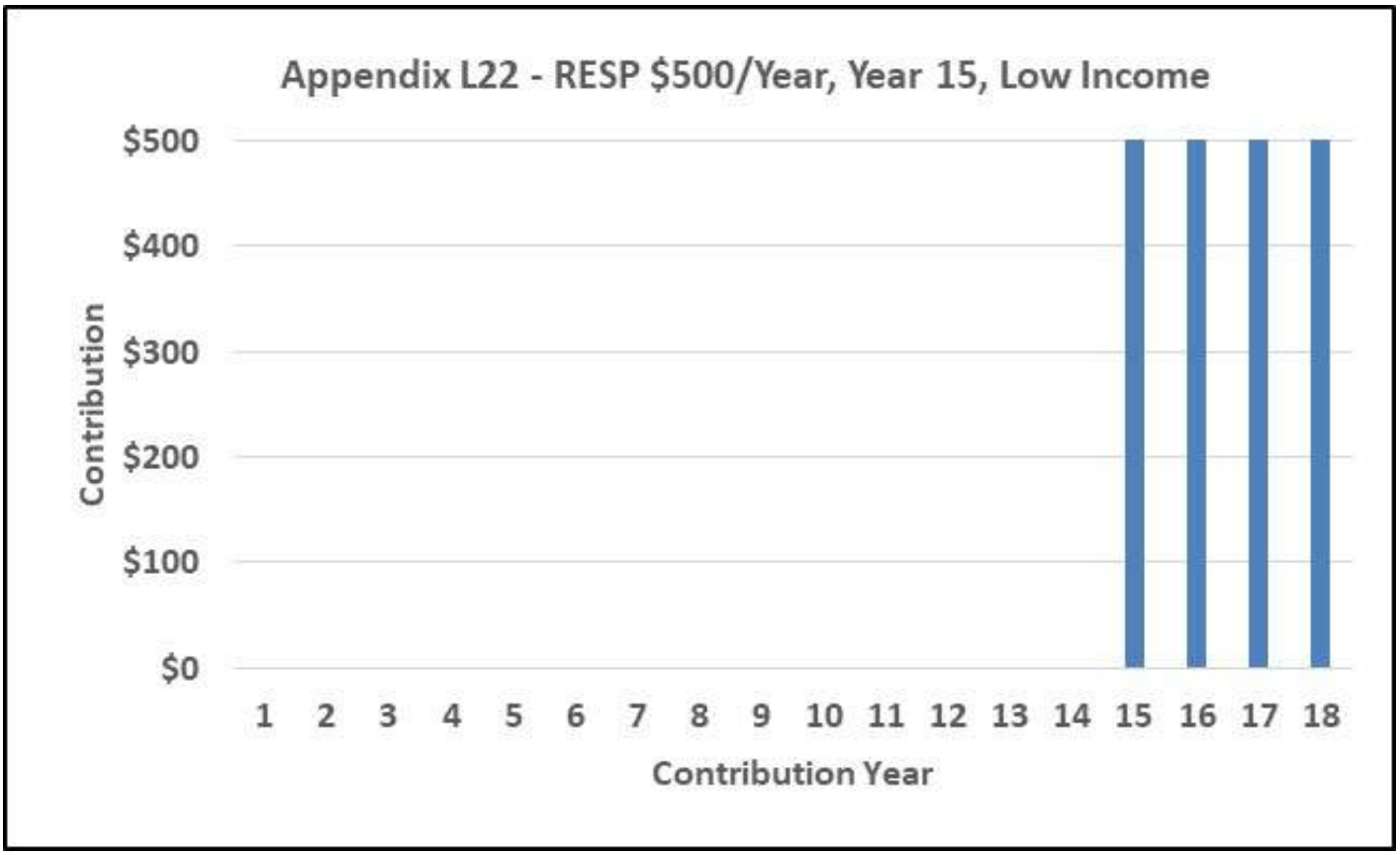
Model F15 - Contributions

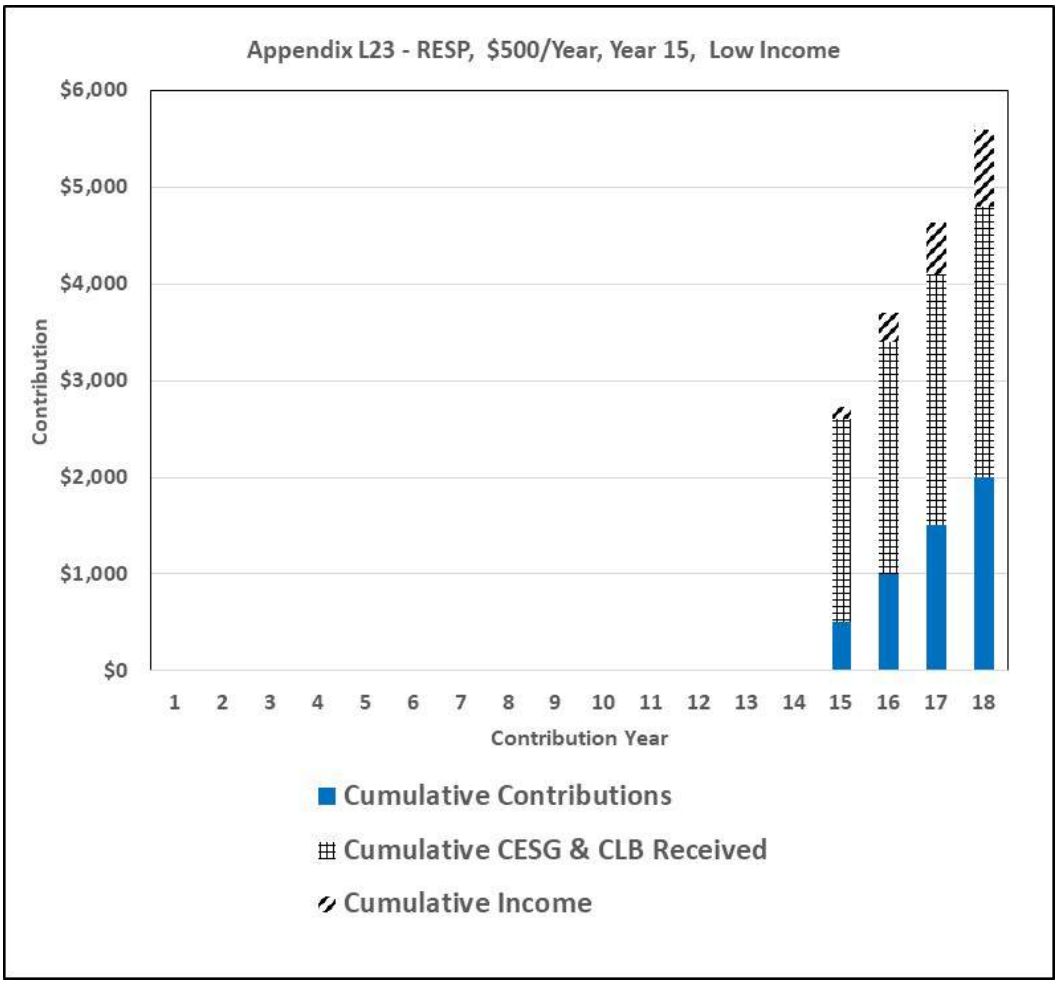
Explanation of Model F15 - If you are in the low-income category, start year 15 and contribute $500/year for all 4 years remaining:

- Your RESP value will be $5,593 and you earn 24.24% on your initial investment $2,000.



Modeling for Optimal Use of RESP

Model F15 - Account growth



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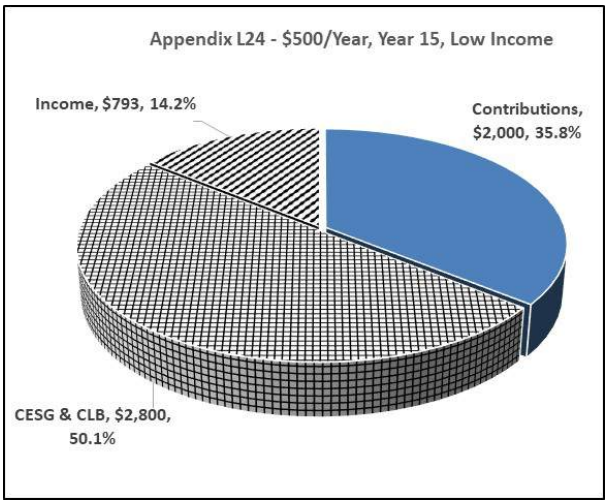
Model F15 - Composition and inputs



Appendix L25 - Assumptions & Inputs, Model G15

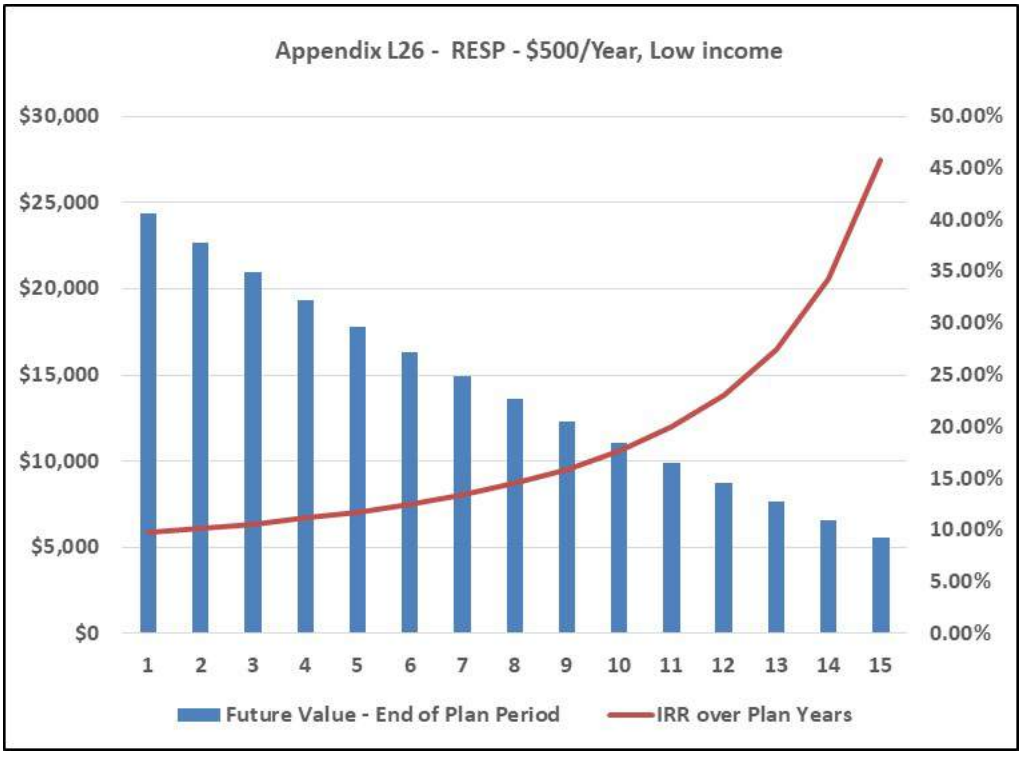
Assumption / input	Value
Total Contributions to Maximize Grants	$27,000
Based on Income, Eligible for Additional CESG, 1st $500	20%
Based on Income, Eligible for Canada Learning Bond (CLB)?	$2,000
Timing of Contributions, CESG Received	Start of yr.
Annual Rate of Return on Contributions, CESG	5%
Maximum CESG Available	$7,200
No of years for Plan Growth	4
Average Contribution/year over Plan Period	$500
Performance:	
Actual Contributions as share of Optimal Contributions	7%
CESG Received as a share of Maximum	11%
CLB Received as a share of Maximum	100%
Carry Over Balance, End of Plan Period	$43,000
Annual Internal Rate of Return over Plan Period	45.73%
Future Value, End of Plan Period	$5,593
Average Gain/Year over Plan Period	$898

Modeling for Optimal Use of RESP

The Big Picture - Model F

The graphic below compares performance for all 15 start years of the F scenarios, while steadily maintaining the annual contribution of $500:

- Contributions range from $9K, if started in year 1, to $2K if started in Year 15
- Future RESP values range from $5,593 for F15 to a of $24,379 for F1.
- IRR ranges from 9.74% for F1 to 45.73% for F15



General Conclusions

- The sooner you start, the higher the end value and the lower the return
- The later you start, the lower the end value and the higher the return
- The gains from CESG (and CLB, where applicable), make RESPs attractive even if you start late