ECO404
WINTER 2025
TOPICS IN MANAGERIAL ECONOMICS

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DEPARTMENT OF ECONOMICS
UNIVERSITY OF TORONTO (STG)

ECO 404, *TOPICS IN MANAGERIAL ECONOMICS*, WINTER 2025
WEDNESDAYS 1 – 4 PM IN OI 8200

COURSE STAFF

INSTRUCTOR: Ajaz Hussain
E-MAIL: sayed.hussain@utoronto.ca (*only for urgent personal matters; otherwise, contact the TA*)
Office Hours: During class (404 is a discussion-based course; as such, you should ask questions *during* class)

COURSE ADMIN/TA: Devin Bissky Dziadyk
E-MAIL: devin.bisskydziadyk@mail.utoronto.ca *(contact Devin for course-related matters)*
Office Hours: TBA on a "case by case" basis

COURSE DESCRIPTION

ECO404 is a fourth-year Socratic method style discussion-based seminar course. Students will work in groups to analyze, model, and present an eclectic variety of real-life "eco" cases for which students will have to "review" concepts, techniques, etc. from previous "eco" courses. Example of an ECO404 case: How do you value a portfolio of LBO bridge loans with credit risk (with multiple ways of "computing" default probabilities) and with/without credit default swaps contracts ((Some) "review items": Computing Expected Value of a Binomial tree (**definitely see the appendix**)

required course materials/tools/platforms

ECO404 Quercus:
For course communication, submitting assignments, plagiarism-detection, and grades (see policies)

Cases
Hard copies of the cases will be distributed to students in class (free of charge!)

Microsoft Office Excel & PowerPoint + StatTools

- You can download Office 365 ProPlus for free from this website. Please install the "Solver" and "Data Analysis" add-ins from "within" Excel.
- Please purchase the "student version" of StatTools from here
- **You must bring a laptop with Office 365 and StatTools to all classes**

COURSE MARKING SCHEME

- **50% of Course Mark: Two Group Presentation + Excel Models + Slides (25% per case)** [See Schedule]
- **20% of Course Mark: Two Group "Critique" Presentations (10% per case)**
- **30% of Course Mark: One Solo Business-Report and Excel Model**
- **Notes:**
  - Details about formatting, structure, grading rubrics, etc. will be posted by class #3.
  - Students will be required to submit assessment materials to Turnitin (via the Quercus course portal) for a review of textual similarity and detection of possible plagiarism. In making a submission, students will allow their assignments to be included as source documents in the reference database. These will be used solely for the purpose of detecting plagiarism. If you have an objection to the use of Turnitin for the submission of your work, please e-mail Devin to book an appointment at least two weeks prior to the submission deadline to discuss alternative arrangements.
- **Penalties:**
  - If you "miss" *any* "Case Discussion session": You will take a restricted-cumulative-comprehensive makeup test from 6 – 8 pm on Friday, April 4th in location TBA. This test will require you to make slides, develop an Excel model, and write a 3 – 5 pages business report on *any* case or cases discussed in the course.
  - If you "fail" to show up for *any* of your group presentation(s) or *any* of your "critique" presentation(s): For each "missed" presentation, you will make a 30 min online-video-presentation of that case, make your *own* Excel model, *and* write a 10 page business report to be submitted through Quercus by 11 PM, Friday, April 4th AND you will take an oral exam with the course staff no later than 3 PM, Friday, April 4th (exact time/location to be arranged with the course staff).
  - If your group members unanimously "vote" that you shirked your duties for *any* "presentation": you will be ejected from the group and no longer allowed to use their materials (i.e. you will do all remaining course-work on your own). You will make a 30 min online-video-presentation of the case that you were rejected from, make your *own* Excel model, *and* write a 10 page business report to be submitted through Quercus by 11 PM, Friday, April 4th AND you will take an oral exam with the course staff no later than 3 PM, Friday, April 4th (exact time/location to be arranged with the course staff).

Course Marking Scheme

Course Schedule

Class	Date	First-Half	Second-Half	Groups A grade	Groups B grade
1	Wed-Jan-8	Introduction			
2	Wed-Jan-15	We will discuss two/three demo-cases & StatTools Demo			
3	Wed-Jan-22	Students assigned into Groups A and B.	Everyone "Discusses Case 1"		
4	Wed-Jan-29	Groups A make Excel-model and present case 1. (Groups A submit slides and Excel to Quercus prior to class) Groups B provide constructive feedback and engage in Socratic-Method Q&A during presentations. After Class, Groups A to send their materials to Groups B.		**Case 1** Presentation = 15% Excel = 5% Slides = 5%	
5	Wed-Feb-5	Groups B present their "own and/or critical view of Groups A Case-1 solutions" (Groups B submit slides to Quercus prior to class). Groups A engage in Socratic-style Q&A	Everyone "Discusses Case 2"		**Case 1** Critique Presentation = 10%
6	Wed-Feb-12	Groups B make Excel-model and present case 2. (Groups B submit slides and Excel to Quercus prior to class) Groups A provide constructive feedback and engage in Socratic-Method Q&A during presentations. After Class, Groups B to send their materials to Groups A.			**Case 2** Presentation = 15% Excel = 5% Slides = 5%
7	Wed-Feb-26	Groups A present their "own and/or critical view of Groups B Case-2 solutions" (Groups A submit slides to Quercus prior to class). Groups B engage in Socratic-style Q&A	Everyone "Discusses Case 3"	**Case 2** Critique Presentation = 10%	
8	Wed-Mar-5	Groups A make Excel-model and present case 3. (Groups A submit slides and Excel to Quercus prior to class) Groups B provide constructive feedback and engage in Socratic-Method Q&A during presentations. After Class, Groups A to send their materials to Groups B.		**Case 3** Presentation = 15% Excel = 5% Slides = 5%	
9	Wed-Mar-12	Groups B present their "own and/or critical view of Groups A Case-3 solutions" (Groups B submit slides to Quercus prior to class). Groups A engage in Socratic-style Q&A	Everyone "Discusses Case 4"		**Case 3** Critique Presentation = 10%
10	Wed-Mar-19	Groups B make Excel-model and present case 4. (Groups B submit slides and Excel to Quercus prior to class) Groups A provide constructive feedback and engage in Socratic-Method Q&A during presentations. After Class, Groups B to send their materials to Groups A.			**Case 4** Presentation = 15% Excel = 5% Slides = 5%
11	Wed-Mar-26	Groups A present their "own and/or critical view of Groups B Case-4 solutions" (Groups A submit slides to Quercus prior to class). Groups B engage in Socratic-style Q&A	Everyone "Discusses Case 5"	**Case 4** Critique Presentation = 10%	
12	Wed-Apr-2	Everyone "Discusses Case 5".			
	Fri-Apr-4	Each student makes Excel model and writes a business report on Case 5. (This is a solo assessment). Students must submit Excel model and business-report through Quercus by 11 PM		**Case 5** Excel + Business Report = 30%	

COMMUNICATIONS

Communications: Students & UofT Staff → ECO404:

- Course-related e-mails should be sent from your UofT e-mail account to Devin's e-mail with your Student ID # and name in the subject line. Advice: write short, to-the-point, e-mails.
- You should ONLY contact us by e-mail with regards to official, urgent, or personal/confidential matters. In particular:
    - DO NOT e-mail us questions about information that is readily available on the syllabus (we will not reply to such e-mails)
    - DO NOT e-mail us questions about course-related items.
    - DO NOT e-mail assessment files (such as Slides and Excel models). If you experience a glitch submitting through Quercus, upload the files to *your* UofT OneDrive account and fill out a form (posted on Quercus) and wait for instructions.
    - Unless specifically requested, DO NOT e-mail medical notes etc.
    - DO NOT send messages from the Quercus "messaging system".
- Students registered with accessibility/accommodations services must inform that office to e-mail Devin.
- **Reminder:** University of Toronto email accounts are governed by the institution's codes of conduct, meaning that the University has recourse to address any inappropriate communications (e.g., racist, aggressive, threatening, harassing, etc.) between students and to the course staff.

QUERCUS

- ECO404 uses the University's learning management system Quercus to collect and grade assignments.
- Submissions in "pdf" format *must allow for OCR* (Optical Character Recognition): do not submit pdf files generated, for example, from Canva.com.
- Quercus/Turnitin Plagiarism Detection Tool: Students will be required to submit their writing assignments (ex: projects) to Turnitin (via the Quercus course portal) for a review of textual similarity and detection of possible plagiarism. In making a submission, students will allow their assignments to be included as source documents in the reference database. These will be used solely for the purpose of detecting plagiarism. If you have an objection to the use of Turnitin for the submission of your work, please e-mail Devin and book an appointment with him at least two weeks prior to the submission deadline to discuss alternative arrangements.
- SPECIAL NOTE ABOUT GRADES POSTED ONLINE: Please also note that any grades posted are for your information only, so you can view and track your progress through the course. No grades are considered official, including any posted in Quercus at any point in the term, until they have been formally approved and posted on ACORN at the end of the course.

CROWDMARK

- *"This course may use Crowdmark, a collaborative online grading tool for marking and providing feedback on assessments in conjunction with Quercus. Crowdmark provides efficiencies with grading, data recording, returning term assessments and handling regrade requests. Copies of student work marked in Crowdmark, including grading and feedback, will be available online to students for at least one year. Digital (i.e., online) copies will serve as the authoritative record for course administrative purposes, and paper copies of assessments scanned and uploaded to Crowdmark will be destroyed after the term has ended and final grades are approved. If you have questions about how your information is stored on Crowdmark, please contact Devin"*

MISSED CLASSES

- It is the Faculty's policy that students who miss classes, for legitimate reasons or otherwise, are responsible for making up the missed material and should not expect an instructor or TA to re-teach them the material. See Penalties in marking scheme.

RE-GRADE REQUESTS

- Re-grade requests can submitted to Devin one week after the assessment has been returned to students and no later than ten days afterwards. Re-grade requests will not be accepted before or after this window.
- It is important that you clearly articulate why your response merits additional marks. Pointing to specific passages in either the "chapters", lecture videos, or notes is highly recommended. We will re-read your entire assessment.
- **Your mark could go up, down, or remain unchanged.**

GENERATIVE AI

- You may use generative artificial intelligence tools (e.g., ChatGPT, Gemini, etc.) for learning and practicing the concepts in this course, but these tools may NOT be used for completing assignments in this course.
- The use of generative artificial intelligence tools or apps for assignments in this course, including tools like ChatGPT, Gemini, Microsoft Copilot and other AI writing or coding assistants, is prohibited.
- The knowing use of generative artificial intelligence tools, including ChatGPT, Gemini, Microsoft Copilot and other AI writing and coding assistants, for the completion of, or to support the completion of, an examination, term test, assignment, or any other form of academic assessment, may be considered an academic offense in this course.
- Representing as one's own idea, or expression of an idea, that was AI-generated may be considered an academic offense in this course.
- Students may not copy or paraphrase from any generative artificial intelligence applications, including ChatGPT, Gemini, Microsoft Copilot and other AI writing and coding assistants, for the purpose of completing assignments in this course.
- The use of generative artificial intelligence tools and apps is strictly prohibited in all course assignments unless explicitly stated otherwise by the instructor in this course. This includes ChatGPT, Gemini, Microsoft Copilot and other AI writing and coding assistants. Use of generative AI in this course may be considered use of an unauthorized aid, which is a form of cheating.
- This course policy is designed to promote your learning and intellectual development and to help you reach the course learning outcomes. See The Vice-Provost's Generative Artificial Intelligence in the Classroom: FAQ's

CELL PHONES AND LAPTOP USAGE

- Technology can support student learning, but it can also become a distraction. Research indicates that multi-tasking during class time can have a negative impact on learning.
- Out of respect for your fellow students in this class, please refrain from using laptops or mobile phones for purposes unrelated to the class. Do not display any material on a laptop which may be distracting or offensive to your fellow students.

COPYRIGHTS

- Students are reminded that all course materials are the intellectual property of the instructor and are protected by copyright law.
- Do not download, copy, or share any course/student materials/videos without the explicit permission of the instructor.
- You cannot tape, record, nor photograph lectures -- see Section 3.2 in the A&S Academic Handbook and CTSI Guidelines on Recording Lectures and Class Sessions .

ACCESSIBILITY ACCOMMODATIONS

- The University provides academic accommodations for students with disabilities in accordance with the terms of the Ontario Human Rights Code. This occurs through a collaborative process that acknowledges a collective obligation to develop an accessible learning environment that both meets the needs of students and preserves the essential academic

requirements of the University's courses and programs. Students with diverse learning styles and needs are welcome in this course. If you have a disability that may require accommodations, the first step is to contact Accessibility Services.

RELIGIOUS ACCOMMODATIONS

- As a student at the University of Toronto, you are part of a diverse community that welcomes and includes students and faculty from a wide range of cultural and religious traditions. I will make every reasonable effort to avoid scheduling tests and compulsory activities on religious holidays not captured by statutory holidays.
- Further to University Policy, if you anticipate being absent from class or missing a major course activity (such as a test or in-class assignment) due to a religious observance, please let us know by e-mail as early as possible, and with sufficient notice (at least two to three weeks), so that we can work together to make alternate arrangements.

STUDENTS WITH DISABILITIES OR ACCOMMODATION REQUIREMENTS

- Students with diverse learning styles and needs are welcome in this course.
- If you have an acute or ongoing disability issue or accommodation need, you should register with Accessibility Services (AS) at the beginning of the academic year.
- Without registration, you will not be able to verify your situation with your instructors, and instructors will not be advised about your accommodation needs.
- AS will assess your situation, develop an accommodation plan with you, and support you in requesting accommodation for your course work. Remember that the process of accommodation is private: AS will not share details of your needs or condition with any instructor, and your instructors will not reveal that you are registered with AS.

MENTAL HEALTH AND WELL-BEING

- As a student, you may experience challenges that can interfere with learning, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating and/or lack of motivation, financial concerns, family worries and so forth. These factors may affect your academic performance and/or reduce your ability to participate fully in daily activities. Everyone feels stressed now and then and is a normal part of university life. Some days are better than others, and there is no wrong time to reach out. An important part of the University experience is learning how and when to ask for help. Please take the time to inform yourself of the available resources listed at http://studentlife.utoronto.ca and http://www.studentlife.utoronto.ca/feeling-distressed.

"ACADEMIC INTEGRITY": FOR *ANYTHING* WHICH COUNTS TOWARDS YOUR COURSE GRADE

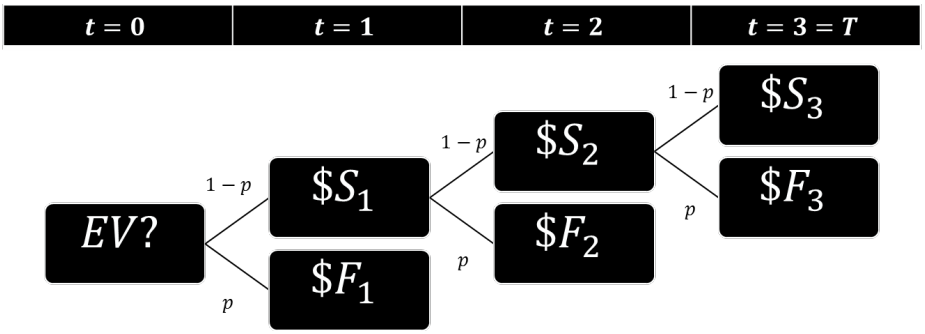
- It is a course requirement that you have read the *Code of Behaviour on Academic Matters* (a complete outline of the University's policy and expectations).
- All suspected cases of academic dishonesty will be investigated following procedures outlined in *Code of Behaviour on Academic Matters* and the consequences of an academic offense can be severe. **Being unaware of the policies or what is considered unauthorized collaboration (e.g., plagiarism) is not a defense and you are expected to seek out additional information on academic integrity.** If you have questions or concerns about what constitutes appropriate academic behavior or appropriate research and citation methods, please contact Devin or visit the Academic Integrity website.
- In ECO404:
  - For any deliverable, you cannot collaborate with nor receive assistance from an individual "outside" your group. You cannot "consult" a tutoring agency nor "purchase/obtain" the assessment online (even if you submit a "paraphrased" version)
  - For the business-report and Excel model, cannot collaborate with nor receive assistance from any other individual. You cannot "consult" a tutoring agency nor "purchase/obtain" the assessment online (even if you submit a "paraphrased" version)

EQUITY, DIVERSITY, AND INCLUSION

- The University of Toronto is committed to equity, human rights, and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. U of T does not condone discrimination or harassment against any persons or communities.

Appendix: Three ways to calculate Total *EV* of a binary probability tree

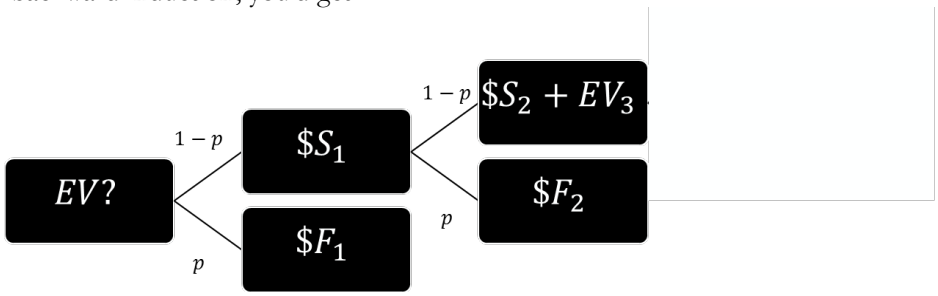
For tractability, consider a tree consisting of 3-bninomial-annual-events:



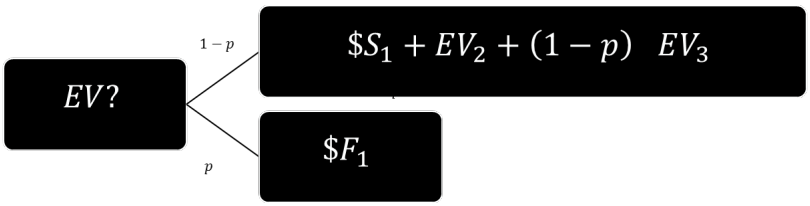
Here are three ways to compute the "Grand Total *EV*".

Method #1 for Calculating Total *EV*

If you solved this tree by backward induction, you'd get



But this is equivalent to:



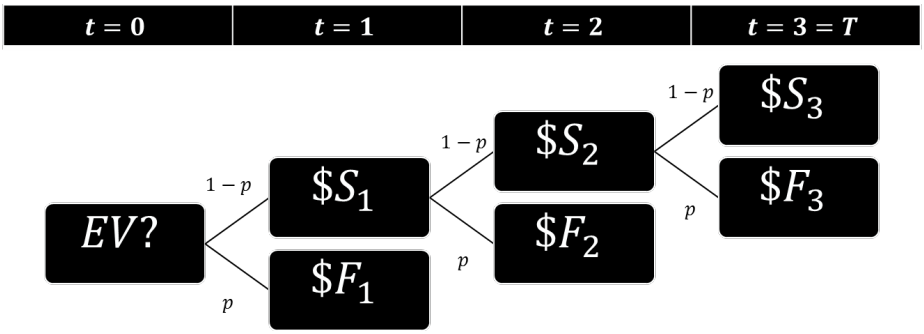
The final answer:

$$EV = \$EV_1 + (1-p)EV_2 + (1-p)^2 EV_3$$

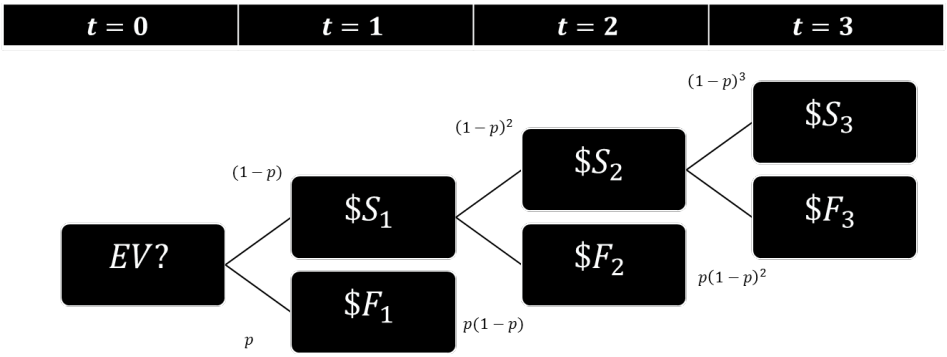
Summary Method #1 to Calculate Total $EV = \sum_{t=1}^{T} P(S)^{t-1} EV(t)$ where $EV(t) = P(S)\$S_t + P(F)\$F_t$

Method #2 for Calculating Total *EV*

Some people like to transform the "original tree" (below) into the following tree (below below):



The Original Tree



The Transformed Tree

For these transformers, the "advantage" of working with the second tree is that you can compute the EV by listing all \$S and \$F outcomes and computing $EV = EV(\$S) + EV(\$F)$ (the list of "outcomes" does *not* comprise the sample space):

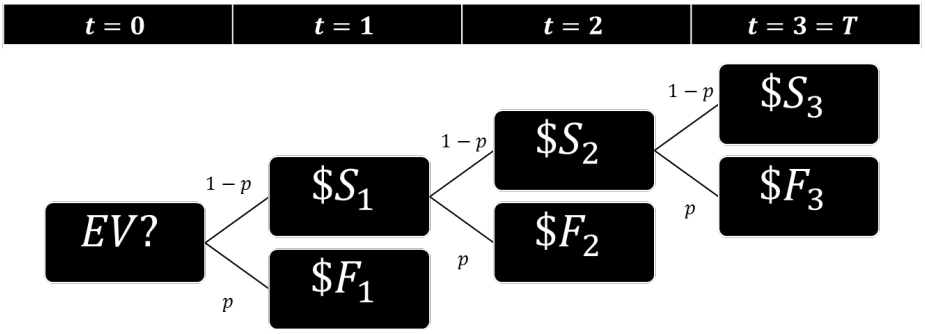
All S and F Outcomes	Probability
$\$S_1$	$(1-p)$
$\$S_2$	$(1-p)^2$
$\$S_3$	$(1-p)^3$
$\$F_1$	p
$\$F_2$	$(1-p)p$
$\$F_3$	$(1-p)^2p$

$$EV = EV(\$S) + EV(\$F) = \sum_{t=1}^{3}(1-p)^t\$S_t + \sum_{t=1}^{3}p(1-p)^{t-1}\$F_t$$

Summary Method #2 to Calculate Total $EV = \sum_{t=1}^{T}P(S)^t\$S_t + \sum_{t=1}^{T}P(S)^{t-1}P(F)\$F_t$

Method #3 for Calculating Total *EV*

Take another look at the original tree:



This time, let's list the *sample points in the sample space* (finest grain, mutually exclusive, collectively exhaustive "outcomes") – in this case, list the sequence of S and F along the pathway to every "node" (branch end) [for simplicity, I've dropped the "$" sign]:

Sample Space	Probability
F_1	p
S_1F_2	$(1-p)p$
$S_1S_2F_3$	$(1-p)^2p$
$S_1S_2S_3$	$(1-p)^3$

Notice only <u>one</u> branch terminates in "all failures" and only <u>one</u> branch terminates in "all successes"; the remainder are a mixture of S and F. Put another way, 3 branches terminate with a F and 1 branch terminates with a S.

Exercise: To "verify" this is a sample space, show that all the probabilities add up to 1. Do the same for the general case with T periods.

To calculate EV, we need to multiply the probability of each sample point by its pecuniary value:

Sample Space	Probability	$ Sample Point
F_1	p	$\$F_1$
S_1F_2	$(1-p)p$	$\$S_1 + \$F_2$
$S_1S_2F_3$	$(1-p)^2p$	$\$S_1 + \$S_2 + \$F_3$
$S_1S_2S_3$	$(1-p)^3$	$\$S_1 + \$S_2 + \$S_3$

Thus, the EV is:

$$EV = p\$F_1 + (1-p)p[\$S_1 + \$F_2] + (1-p)^2p[\$S_1 + \$S_2 + \$F_3] + (1-p)^3[\$S_1 + \$S_2 + \$S_3]$$

At first glance this looks orthogonal to the earlier expressions. Fear not. Check it:

$$EV = p\$F_1 + (1-p)p[\$S_1 + \$F_2] + (1-p)^2p[\$S_1 + \$S_2 + \$F_3] + (1-p)^3[\$S_1 + \$S_2 + \$S_3]$$

Open the brackets and collect all $\$F$ terms followed by $\$S_1, \$S_2, \$S_3$ terms:

$$EV = p\$F_1 + p(1-p)\$F_2 + p(1-p)^2\$F_3 + (1-p)\left[\underbrace{p + (1-p)p + (1-p)^2}_{1}\right]\$S_1 + (1-p)^2\left[\underbrace{p + (1-p)}_{1}\right]\$S_2 + (1-p)^3\$S_3$$

The terms in $\$F$ "collapse" into a familiar expression while the terms in the [...] brackets attached to $\$S_1$ and $\$S_2$ add up to 1 so that:

$$EV = \sum_{t=1}^{3} p(1-p)^{t-1}\$F_t + \ (1-p)\$S_1 + (1-p)^2\$S_2 + (1-p)^3\$S_3$$

From which we get the exact same expression as method #2:

$$EV = \sum_{t=1}^{3} p(1-p)^{t-1}\$F_t + \sum_{t=1}^{3}(1-p)^t\$S_t$$

When $T = 3$, we saw that 3 branches terminated with a F and 1 branch terminated with a S. Thus, for the general case, T branches end with F and 1 branch ends with (all) S. Thus, in general:

	Sample Space, Sum of Outcomes, Probability, *EV* of Binomial Tree					
	$\boldsymbol{t=1}$	$\boldsymbol{t=2}$	$\boldsymbol{t=3}$	..	$\boldsymbol{t=T}$	
Sample Space:	F_1	S_1F_2	$S_1S_2F_3$	..	$S_1S_2S_3 \ldots . S_{T-1}F_T$	$S_1S_2S_3 \ldots . S_T$
Probability:	p	$(1-p)p$	$(1-p)^2p$		$(1-p)^{T-1}p$	$(1-p)^T$
Sum Outcomes	$\$F_1$	$\$F_2 + \$S_1$	$\$F_3 + \$S_1 + \$S_2$		$\$F_T + \sum_{j=1}^{T-1}\$S_j$	$\sum_{t=1}^{T}\$S_t$

$$\text{Probability of column } t = p(1-p)^{t-1}, t = 1,2,\ldots,T-1$$

$$\text{Sum of Outcomes in column } t = \$F_t + \sum_{j=1}^{t-1}\$S_j\,, t = 1,2,\ldots,T-1$$

$$EV \text{ column } t = \{p(1-p)^{t-1}\}\left\{\$F_t + \sum_{j=1}^{t-1}\$S_j\right\}$$

$$EV \text{ tree} = \sum_{t=1}^{T} EV \text{ column } t = \sum_{t=1}^{T}\left[\{p(1-p)^{t-1}\}\left\{\$F_t + \sum_{j=1}^{t-1}\$S_j\right\}\right]$$

Summary Method #3 to Calculate Total *EV* $= \sum_{t=1}^{T}\left[\{P(F)P(S)^{t-1}\}\{\$F_t + \sum_{j=1}^{t-1}\$S_j\}\right]$