Embedding excel spreadsheets in your experiment

Christian Peters
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In many judgment and decision-making experiments, participants are asked to make judgments about complex valuations that are computed using financial models. For instance, Elliott, Fanning, and Peecher (2019) ask participants to derive the fundamental value of a firm using a Residual Earnings Model. Next to that, in a recent study of Bart Dierynck and myself we ask auditor participants to audit a Level 3 Fair Value Estimate of a patent that was computed using a Discounted Cash Flow model. As such models are computationally complex, experimenters need to offer the participants the right tools to compute the value of interest. As it can be challenging to embed calculating tools in an experiment, most researchers resort to pen-and-paper experiments or ask participants to open Excel outside of the experimental environment. In this post, I show how you can easily embed a working spreadsheet in your experimental environment.

	B	C	D	E	F	G	H	I
2				DISCOUNTED CASH FLOW ANALYSIS				
3				ROBOFER				
4	2018 Revenue of CMG Machines	€ 40,000,000		Growth Rates			Royalty Rate	
5				Years 1-3	15%		Years 1-3	12%
6	Discount rate	10%		Years 4-5	-5%		Years 4-5	9%
7				Years 6-7	-12%		Years 6-7	7%
8								
9	Year	1	2	3	4	5	6	7
10	Agrifirm	2019	2020	2021	2022	2023	2024	2025
11	Revenues of CMG Machines	€ 46,000,000	52,900,000	60,835,000	57,793,250	54,903,588	50,858,060	44,755,093
12		=C4+F5*C4	=C11+F5*C11	=D11+F5*D11	=E11+F6*E11	=F11+F6*F11	=F11+F7*F11	=H11+F7*H11
13	Patent Royalty	€ 5,520,000	6,348,000	7,300,200	5,201,392.50	4,941,323	4,577,225	3,132,856
14		=I5*C11	=I5*D11	=I5*E11	=I6*F11	=I6*G11	=I6*H11	=I7*I11
15								
16	Present Value of Cash Flow from Royalty	€ 5,018,182	5,246,281	5,484,748	3,552,621	3,068,173	2,583,724	2,139,783
17		=C13/(1+C6)^(C9)	=D13/(1+C6)^(D9)	=E13/(1+C6)^(F9)	=F13/(1+C6)^(F9)	=G13/(1+C6)^(G9)	=H13/(1+C6)^(H9)	=I13/(1+C6)^(F9)
18								
19	Total Present Value of Cash Flow	€ 27,093,512	=SUM(C16:I16)					

An example of a spreadsheet embedded in the experiment of Dierynck and Peters (2019)

Preparing your Spreadsheet Using OneDrive

In order to embed an Excel spreadsheet in your experiment, we use the embed-function of OneDrive. If you do not have a OneDrive account yet, you can sign up for free. Upload the Excel sheet that you would like to use to 'Files'. Once the file is uploaded, you can right-click on the file and subsequently click on 'Embed'. A sidebar will open in which a link is provided that you can use in your experiment, as you may want to customize how your spreadsheet appears to others you can

click on this link. In this option menu there are several options, such as whether you want to show the entire spreadsheet or only a certain range. Also, you can adjust whether you want participants to be able to edit the spreadsheet. Once you have customized the spreadsheet, you can copy the code in either HTML or JavaScript format.
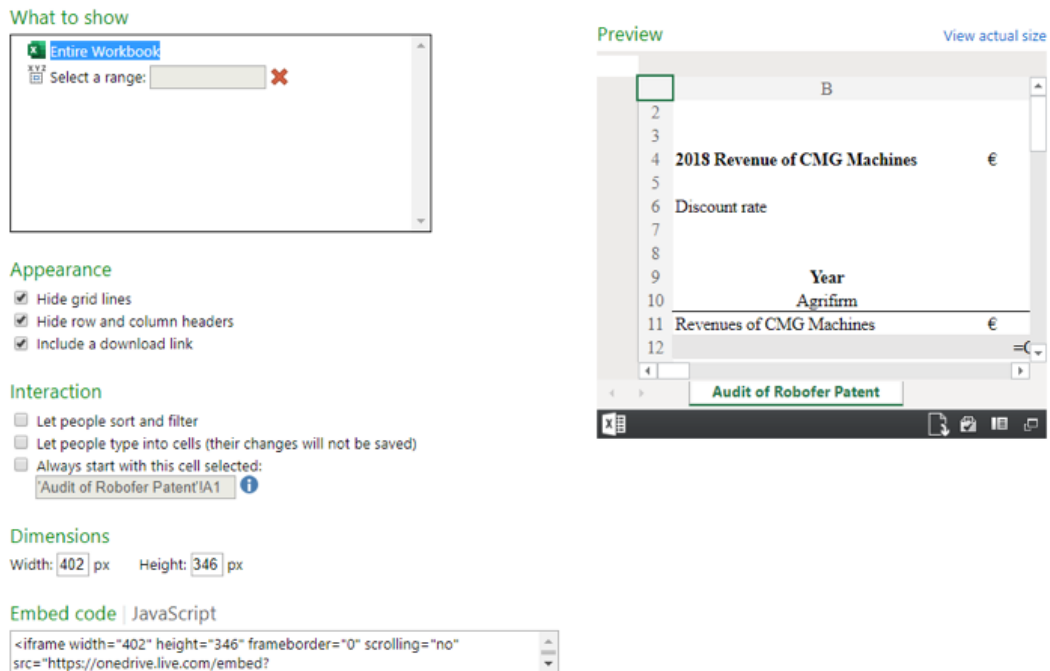
Options in OneDrive for Customizing your Spreadsheet

Embedding the Spreadsheet in your Experiment

When you are ready preparing your spreadsheet in OneDrive and copied the link to your (customized) spreadsheet, you can insert the spreadsheet into your experiment. In your experimental software you can insert your spreadsheet by using the HTML code of your spreadsheet:

```
<div align="center>
<iframe width="125%" height="430" frameborder="0" scrolling="no" src="https://onedrive.live.com/embed?resid=
</div>
```

If your experimental software uses JavaScript instead, you can use the following syntax:

```
<div id="myExcelDiv" style="width: 125%; height: 430px"></div>
<script type="text/javascript" src="https://onedrive.live.com/embed?resid=2FB8EDA965ED41FA%216017&authkey=%2
```

Below, you can see an example of the embedded spreadsheet used in Dierynck and Peters (2019) for demonstration purposes. You can go ahead and try to edit some numbers.

	B	C	D	E
2				**DISCOUNTED CASH FLOW**
3				**ROBOFER**
4	**2018 Revenue of CMG Machines**	€ 40.000.000		**Growth Rates**
5				Years 1-3
6	Discount rate	10%		Years 4-5
7				Years 6-7
8				
9	**Year**	**1**	**2**	**3**
10	Agrifirm	2019	2020	2021
11	Revenues of CMG Machines	€ 46.000.000	52.900.000	60.835.000
12		=C4+F5*C4	=C11+F5*C11	=D11+F5*D11
13	Patent Royalty	€ 5.520.000	6.348.000	7.300.200
14		=I5*C11	=I5*D11	=I5*E11
15				
16	Present Value of Cash Flow from Royalty	€ 5.018.182	5.246.281	5.484.748
17		=C13/(1+C6)^(C9)	=D13/(1+C6)^(D9)	=E13/(1+C6)^(E9)
18				

The spreadsheet embedded in Dierynck and Peters (2019)

Some Tips and Tricks

It is important to note that since you are working with an embedded file – presumably with multiple participants at the same time – the spreadsheet cannot be saved. Hence, instead you should create variables using your experimental software in which you can ask your participants to fill in the variables of interest. Also, in order to show the embedded spreadsheet participants need to be connected to the internet as the spreadsheet is retrieved from the OneDrive server.

References

Dierynck, B., & Peters, C.P.H. (2019). Auditor Task Selection under Time Pressure. *Available at SSRN 3450363*.

Elliott, W. B., Fanning, K., & Peecher, M. E. (2019). Do Investors Value Higher Financial-Reporting Quality, and Can Expanded Audit Reports Unlock This Value?. *The Accounting Review, In-Press*.

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Christian Peters
PhD Researcher

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