

# Pivot Table: A Tool to Calculate, Summarize, and Analyze Data

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## Abstract

*A **Pivot Table** is one of the most powerful features that Excel has to offer, because it allows the user to instantly group large quantities of data, and the results are almost instantaneous, as well as very easy to obtain. The most accessible method through which we can understand how a **Pivot Table** works and what it has to offer is to analyze one of its many applications. Therefore, we will work with a series of expenses, which are part of the information that already exists in an Excel file, and group this data effortlessly and in a very short time (note that the data can also be imported from other sources, such as an Access file).*

**Key words:** table, pivot, Excel.

**J.E.L. classification :** C3

## 1. Introduction

In economics, data is often required to be grouped, totaled, and sorted, and thus it is necessary to designate certain "**grouping criteria**". For instance, a company's expenses can be grouped by year and, subsequently, by month. If we centralize the costs incurred along the course of one year, we will get two types of totals:

- the total for each month, meaning the sum of the corresponding expenses;
- the total for each year, which we will get by adding up monthly totals.

There is a hierarchical relationship between these two criteria. If more than two criteria are present, then we will also get intermediaries between the major and minor criteria. Consequently, we will be able to calculate more totals:

- minor totals, for each month, for instance;
- intermediary totals, for each year, for instance;
- major totals.

## 2. Theoretical background: Generating a Pivot Table

We will use a table which contains information regarding the expenses incurred during different periods of time. As we will soon notice, the initial table in *Excel* does not tell us much, but a **PivotTable** can be used to query it in various ways.

- a. Create a small table with monthly and yearly costs. It is important that this table does not contain any blank rows.

Figure no. 1. Screenshot

	A	B	C	D
1	Year	Month	Expense type	Expense
2	2017	January	Food	63,13 €
3	2017	January	Entertainment	22,15 €
4	2017	January	Transport	40,75 €
5	2017	January	Other	122,50 €
6	2017	February	Transport	81,13 €
7	2017	February	Entertainment	77,85 €
8	2017	February	Food	145,00 €
9	2017	February	Other	62,00 €
10	2018	January	Transport	70,15 €
11	2018	January	Food	55,00 €
12	2018	January	Other	95,90 €
13	2018	January	Entertainment	65,15 €

Source: (Cosma E., 2019)



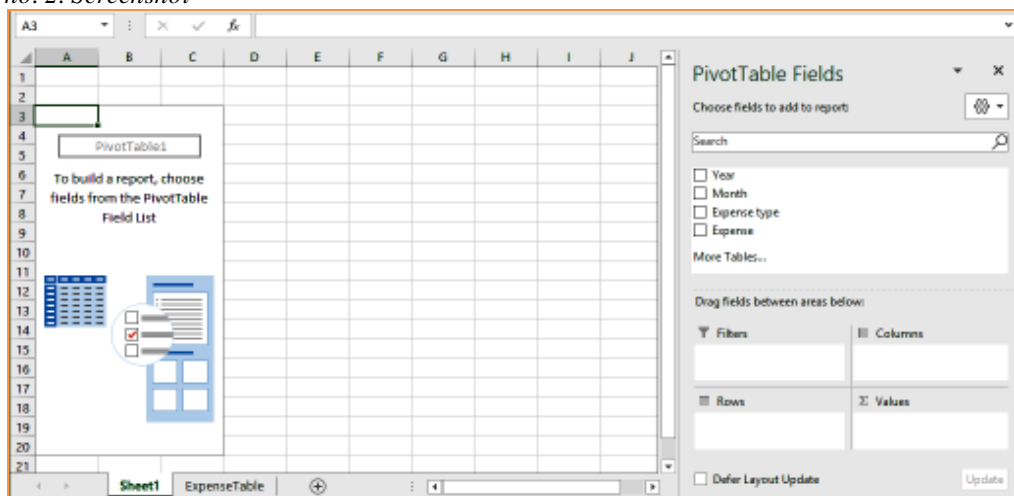
- b. Place your cursor on any cell in the table, and then *click* on the  (**PivotTable**) button from the **INSERT** tab. A dialog box will appear, and we will choose the set of data that we want to group, as well as where we will place the dynamic query that we are creating. Because we had already selected a cell, inserting a **PivotTable** caused the entire area around this cell to be automatically selected (in our case, **\$A\$1:\$D\$13**) from the current worksheet of our *Excel* document. It is also essential to know the location of this extracted data: it could be a **New Worksheet** in our current *Excel* file, or it could be a predefined location in our **Existing Worksheet**. Most of the time, it is advisable to select the **New Worksheet** option, as it is more visually convenient, in terms of available space.
- c. After *clicking* , a new *Excel* sheet will contain an outline of the range of cells that we can fill with information. We may identify an area called **PivotTable Field List**, where we can see the work fields (from the header of the selected table):

Figure no. 2. Screenshot

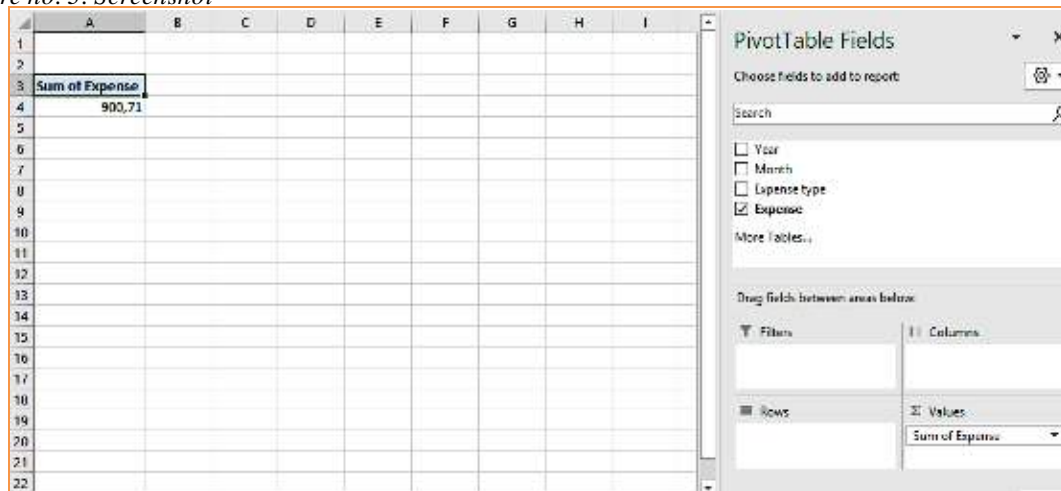


Source: (Microsoft, *Excel - Office Support*)

- d. Under this list, there are four square areas, which contain no information. There we will specify how we want our data to be grouped and filtered. For now, these areas contain no information and therefore the main area of our **PivotTable** lacks useful information as well. In what follows, we will choose the fields listed above, drag them into the four square areas, and the **PivotTable** from our *Excel* worksheet will display the information accordingly. If the field's position is considered inconvenient, we can simply drag it away and place it in another area.

- e. **VALUES** is the box which will contain and generate the most important information. The field placed in this area will represent the sort of data that we want to analyze: the **sum**, **average**, **maximum** or **minimum** among the entries. In general, this field (or column) contains numeric data. In our case, a good choice is the **Expense** field. If we **drag&drop** this field into the **VALUES** area, the **PivotTable** will display the required information (**Sum of Expense**).

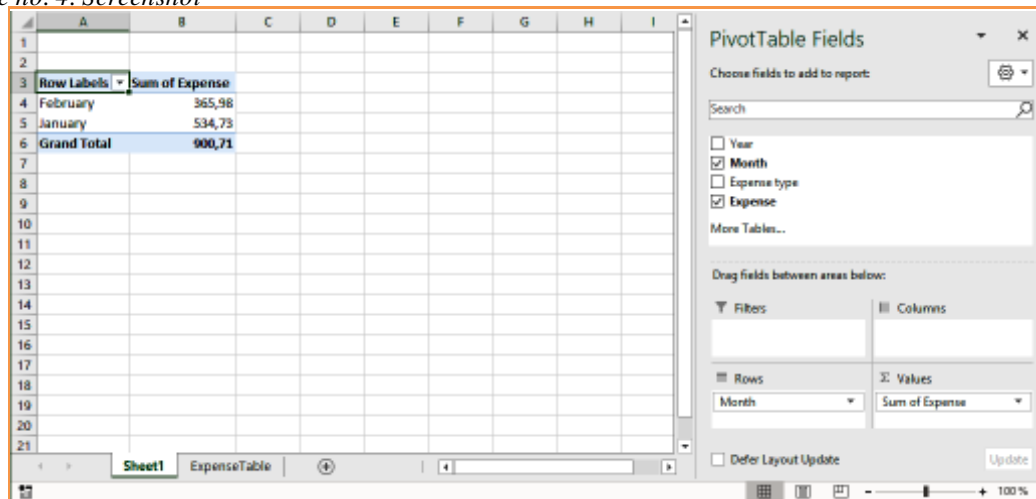
Figure no. 3. Screenshot



Source: (Microsoft, Excel - Office Support)

- f. From the list of values (**Choose fields to add to report**), which can be combined, choose the **Month** field and drag it to the **ROWS** area:

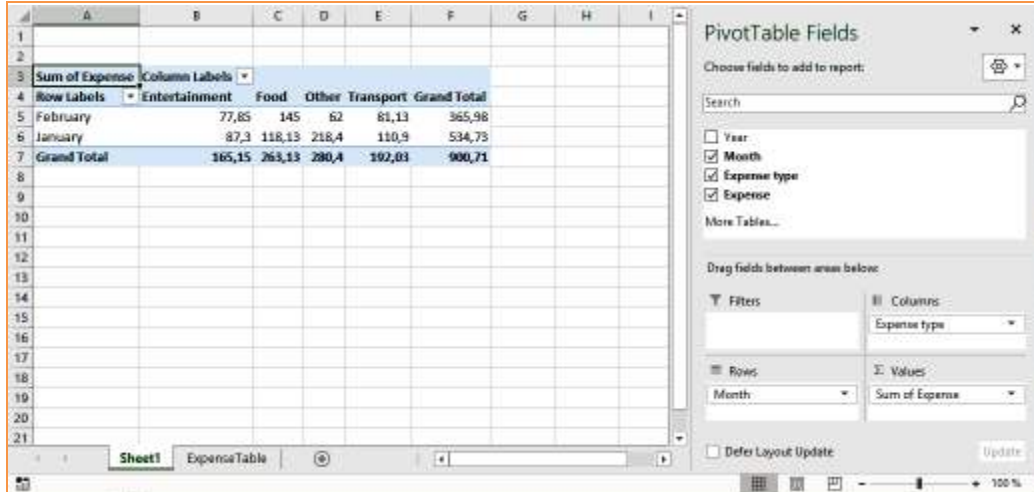
Figure no. 4. Screenshot



Source: (Weterings, Excel Easy)

- g. Continue to develop the report that you have created: add a **Two-Variable Data Table**, in which you will group monthly expenses. Drag and drop the **Expense type** field into the **COLUMNS** area:

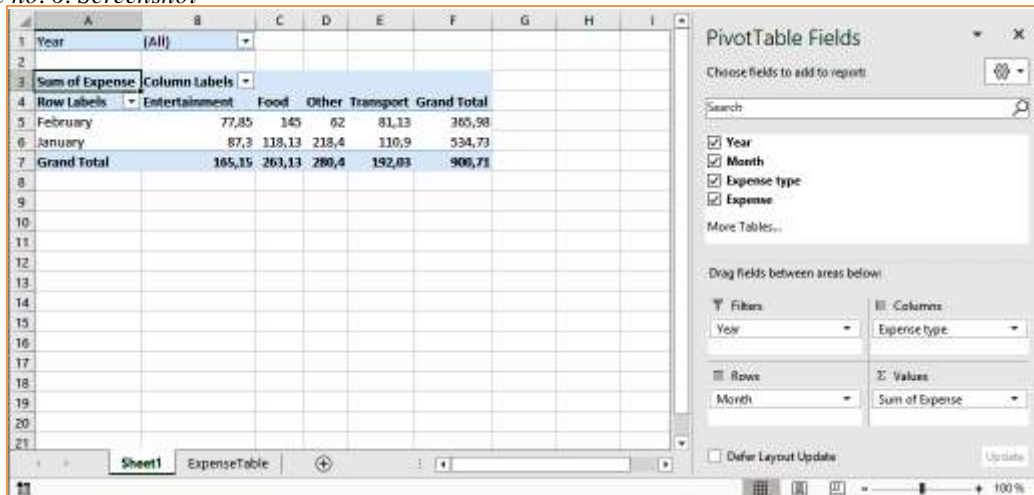
Figure no. 5. Screenshot



Source: (Weterings, Excel Easy)

- h. Add a **Three-Variable Data Table** in which the data will be displayed – drag and drop the **Year** field into the **FILTERS** area:

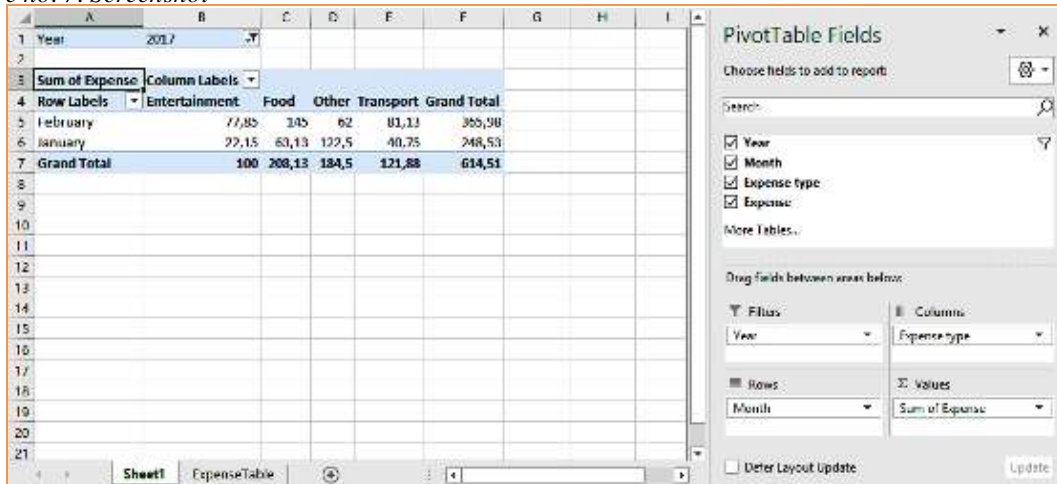
Figure no. 6. Screenshot



Source: (Cosma E., 2019)

- i. Filter the expenses for the year **2017** – open the drop-down list from the **Year** filter, click on **2017**, and then click **OK** :

Figure no. 7. Screenshot

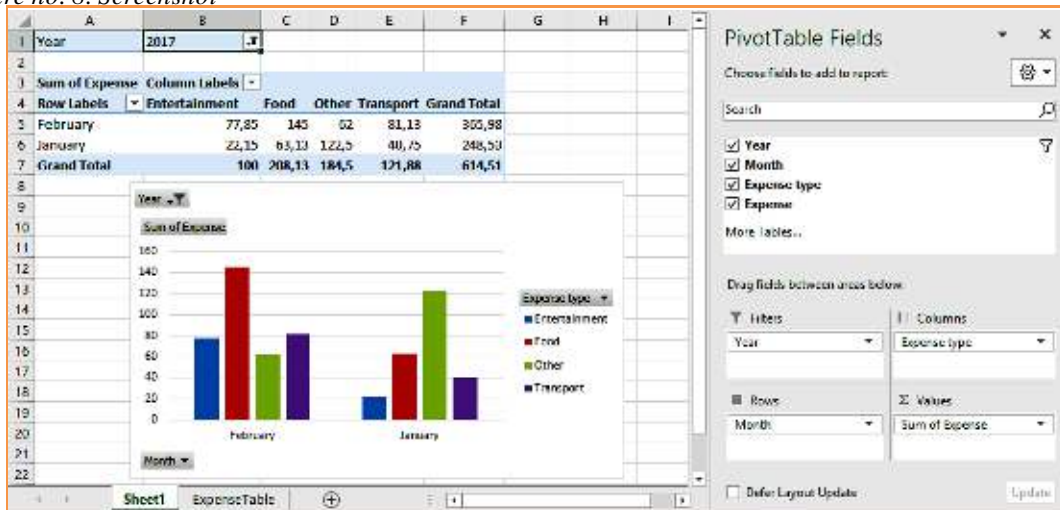


Source: (Cosma E., 2019)

### 3. Generate a Graph

Generating a graph can be done using the  (PivotChart) button, located in the **Charts** section of the **INSERT** tab:

Figure no. 8. Screenshot



Source: (Cosma E., 2019)

### 4. Conclusions

Excel's **PivotTable** feature is a very fast, straightforward way to extract relevant information from complex sets of data. Even though it may seem complicated at a first glance, **PivotTable** can soon find itself among anyone's favorite working methods. What is special about this tool is that it supports an accessible variety of querying methods for a table: you may choose to display data in a certain way, at first, but, if you change your mind and wish to sort it in a different manner, all you have to do is change the settings. "**Pivot**" is, in fact, the keyword here: the idea behind this method. Data can be analyzed from a variety of perspectives, which can be changed at any moment. Among others, the user can transpose columns and rows or adjust the filtering criteria.

## 5. References

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