Documentazione di progetto
Business Intelligence per i Servizi Finanziari

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1 Sommario dei dati utilizzati

1.1 Presentazione e descrizione dei titoli selezionati

Per questo progetto sono stati presi in considerazione 6 titoli azionari, appartenenti a 3 settori diversi:

- **Settore tecnologico**: Meta Platforms, Inc. (FB), Alphabet Inc. (GOOG)
- **Settore militare**: Raytheon Technologies Corporation (RTX), Lockheed Martin Corporation (LMT)
- **Settore bancario**: Bank of America Corporation (BAC), JPMorgan Chase & Co. (JPM)

1.2 Funzioni utilizzate per download e fusione

Per il download dei dati da Yahoo! Finance[1] è stata utilizzata la nota libreria di python yfinance[2] dove attraverso la funzione *download()* ha permesso di scaricare i dati di interesse nel periodo rilevante per questo progetto.

```
# Esempio di download da Yahoo! Finance dello storico prezzi di FB
import yfinance as yf

fb_df = yf.download('FB', start='2011-11-30', end='2021-11-30')
```

Relativamente alla fusione dei dati scaricati in un unico DataFrame di Pandas[3] è stata utilizzata la funzione *DataFrame()* per creare un nuovo dataframe vuoto, sono stati poi usati i costrutti base di python per popolare il dataframe con i nostri dati di interesse.

```
# Esempio di fusione dei dati da due indici scaricati precedentemente
import pandas as pd

adj_close_tot = pd.DataFrame()
adj_close_tot["Meta Price"] = fb_df[["Adj Close"]]
adj_close_tot["Alphabet Price"] = goog_df[["Adj Close"]]
```

[1] https://finance.yahoo.com
[2] Libreria FOSS per download di dati finanziari da Yahoo! finance, https://pypi.org/project/yfinance/
[3] Libreria per data analysis e manipulation, https://pandas.pydata.org/

1.3 presentazione dei dati

Rappresentiamo i dati ottenuti tramite un grafico a linee che si trova alla figura 1 dove si mostra la variazione di prezzo di tutti gli stock considerati in questo progetto[4] nel periodo da 30-11-2011 a 30-11-2021.

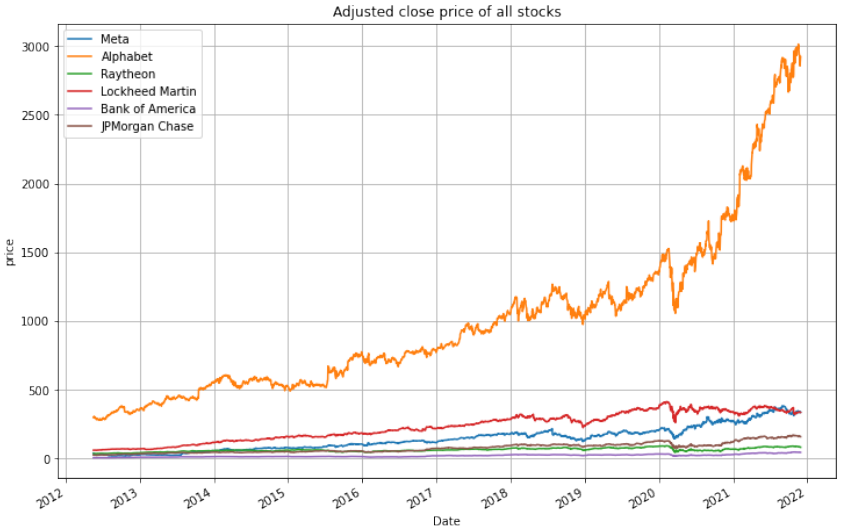

Figura 1: grafico con prezzo degli stock da 18/05/2012 a 30/11/2021

Tutti i grafici del progetto sono stati generati utilizzando la libreria di python *matplotlib*[5] che tramite apposite funzioni ha permesso la quasi totale personalizzazione dei grafici per semplificare la lettura dei dati.

Rappresentiamo ora alla figura 2 le prime 10 righe della tabella che contiene il prezzo combinato di tutti gli stock considerati (stessa tabella utilizzata per il plot del grafico qui sopra), fusi in un solo *DataFrame* grazie a *Pandas*.

Date	Meta Price	Alphabet Price	Raytheon Price	Lockheed Martin Price	Bank of America Price	JPMorgan Chase Price
2012-05-18	38.230000	299.078979	36.082355	60.931610	6.052373	25.427305
2012-05-21	34.029999	305.908386	36.740398	61.557266	5.888562	24.683229
2012-05-22	31.000000	299.278229	36.860043	61.601433	6.017887	25.822113
2012-05-23	32.000000	303.592072	36.919865	61.351143	6.181696	26.011929
2012-05-24	33.029999	300.702881	36.640682	61.365898	6.155832	25.791744
2012-05-25	31.910000	294.660553	36.401409	60.880070	6.164454	25.434896
2012-05-29	28.840000	296.060303	37.433334	61.579334	6.414482	25.533600
2012-05-30	28.190001	293.016693	36.760330	61.683636	6.215916	25.024893
2012-05-31	29.600000	289.345459	36.944771	61.683636	6.345415	25.169157
2012-06-01	27.719999	284.423920	35.902882	60.506592	6.060519	24.242868

Figura 2: tabella con prezzo degli stock da 18/05/2012 a 30/11/2021 (prime 10 righe)

Nota: Meta Platforms, Inc. (FB) è stata quotata in borsa solo a partire dal 18/05/2012, a causa di ciò i dati aggregati partono solo da quella data.

2 Statistiche descrittive

2.1 Settore tecnologico

Statistiche descrittive dei due titoli relativi al settore tecnologico FB e GOOG.

2.1.1 Rendimenti semplici e composti

osserva i due grafici 3 e 4, sono importanti

[4] FB, GOOG, RTX, LMT, BAC, JPM

[5] Libreria per creare visualizzazioni dei dati anche interattive in Python, https://matplotlib.org

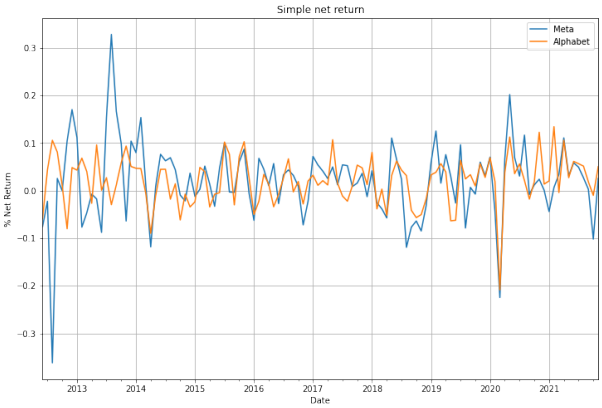

Figura 3: Rendimenti semplici netti FB e GOOG

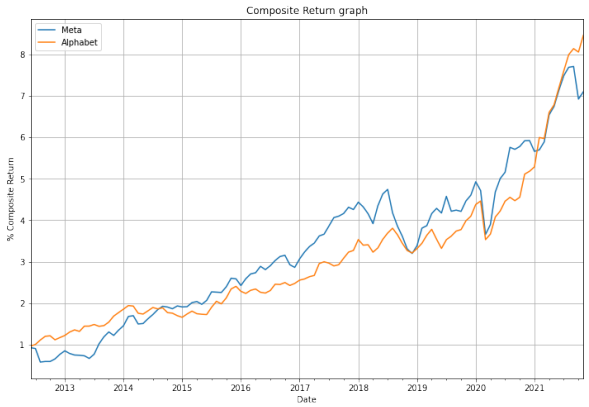

Figura 4: Rendimenti compositi FB e GOOG

Item	Quantity
Widgets	42
Gadgets	13

Tabella 1: An example table.

2.2 How to include Figures

First you have to upload the image file from your computer using the upload link in the file-tree menu. Then use the includegraphics command to include it in your document. Use the figure environment and the caption command to add a number and a caption to your figure. See the code for Figure **??** in this section for an example.

Note that your figure will automatically be placed in the most appropriate place for it, given the surrounding text and taking into account other figures or tables that may be close by. You can find out more about adding images to your documents in this help article on including images on Overleaf.

2.3 How to add Tables

Use the table and tabular environments for basic tables — see Table 1, for example. For more information, please see this help article on tables.

2.4 How to add Comments and Track Changes

Comments can be added to your project by highlighting some text and clicking “Add comment” in the top right of the editor pane. To view existing comments, click on the Review menu in the toolbar above. To reply to a comment, click on the Reply button in the lower right corner of the comment. You can close the Review pane by clicking its name on the toolbar when you’re done reviewing for the time being.

Track changes are available on all our premium plans, and can be toggled on or off using the option at the top of the Review pane. Track changes allow you to keep track of every change made to the document, along with the person making the change.

2.5 How to add Lists

You can make lists with automatic numbering . . .

1. Like this,
2. and like this.

. . . or bullet points . . .

- Like this,
- and like this.

2.6 How to write Mathematics

LaTeX is great at typesetting mathematics. Let $X_1, X_2, \ldots, X_n$ be a sequence of independent and identically distributed random variables with $\mathrm{E}[X_i] = \mu$ and $\mathrm{Var}[X_i] = \sigma^2 < \infty$, and let

$$S_n = \frac{X_1 + X_2 + \cdots + X_n}{n} = \frac{1}{n}\sum_{i}^{n} X_i$$

denote their mean. Then as n approaches infinity, the random variables $\sqrt{n}(S_n - \mu)$ converge in distribution to a normal $\mathcal{N}(0, \sigma^2)$.

2.7 How to change the margins and paper size

Usually the template you're using will have the page margins and paper size set correctly for that use-case. For example, if you're using a journal article template provided by the journal publisher, that template will be formatted according to their requirements. In these cases, it's best not to alter the margins directly.

If however you're using a more general template, such as this one, and would like to alter the margins, a common way to do so is via the geometry package. You can find the geometry package loaded in the preamble at the top of this example file, and if you'd like to learn more about how to adjust the settings, please visit this help article on page size and margins.

2.8 How to change the document language and spell check settings

Overleaf supports many different languages, including multiple different languages within one document.

To configure the document language, simply edit the option provided to the babel package in the preamble at the top of this example project. To learn more about the different options, please visit this help article on international language support.

To change the spell check language, simply open the Overleaf menu at the top left of the editor window, scroll down to the spell check setting, and adjust accordingly.

2.9 How to add Citations and a References List

You can simply upload a `.bib` file containing your BibTeX entries, created with a tool such as JabRef. You can then cite entries from it, like this: [Gre93]. Just remember to specify a bibliography style, as well as the filename of the `.bib`. You can find a video tutorial here to learn more about BibTeX.

If you have an upgraded account, you can also import your Mendeley or Zotero library directly as a `.bib` file, via the upload menu in the file-tree.

2.10 Good luck!

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Riferimenti bibliografici

[Gre93] George D. Greenwade. The Comprehensive Tex Archive Network (CTAN). *TUGBoat*, 14(3):342–351, 1993.