Discounted Cash Flow Valuation

Projections: Revenue, EBIT, and Free Cash Flow (FCF) are calculated for 5 years.

Step 1: Define Assumptions

In [20]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt

revenue_growth_rate = 0.10  # 10% annual growth
ebit_margin = 0.20  # EBIT as a percentage of revenue
tax_rate = 0.25  # 25% corporate tax rate
capex_percent_revenue = 0.05  # Capital Expenditures as % of reven
depreciation_percent_revenue = 0.04  # Depreciation as % of revenu
change_in_nwc_percent_revenue = 0.03  # Change in Net Working Capi
discount_rate = 0.10  # 10% WACC
terminal_growth_rate = 0.03  # 3% terminal growth rate
initial_revenue = 1000  # Starting revenue in millions
projection_years = 5  # Number of years to project
```

Step 2: Project Financials

In [12]:
```
years = list(range(1, projection_years + 1))
revenue = [initial_revenue * (1 + revenue_growth_rate) ** i for i
ebit = [rev * ebit_margin for rev in revenue]
taxes = [eb * tax_rate for eb in ebit]
nopat = [eb - tax for eb, tax in zip(ebit, taxes)]
depreciation = [rev * depreciation_percent_revenue for rev in reve
capex = [rev * capex_percent_revenue for rev in revenue]
change_in_nwc = [rev * change_in_nwc_percent_revenue for rev in re
free_cash_flow = [nop + dep - cap - nwc for nop, dep, cap, nwc in

```

Terminal Value: The terminal value is calculated using the perpetuity growth method.

Step 3: Calculate Terminal Value

In [13]:
```
terminal_value = free_cash_flow[-1] * (1 + terminal_growth_rate) /
```

Discounting: Free cash flows and terminal value are discounted to present value using the discount rate (WACC).

Step 4: Discount Free Cash Flows to Present Value

In [14]:
```
discount_factors = [(1 / (1 + discount_rate) ** i) for i in years]
discounted_fcfs = [fcf * df for fcf, df in zip(free_cash_flow, dis
discounted_terminal_value = terminal_value / (1 + discount_rate) *
```

Enterprise Value: The sum of discounted FCFs and terminal value gives the enterprise value.

Step 5: Calculate Enterprise Value

In [15]:
```
enterprise_value = sum(discounted_fcfs) + discounted_terminal_valu
```

Step 6: Output Results

In [16]:
```
df = pd.DataFrame({
    "Year": years,
    "Revenue (in millions)": revenue,
    "EBIT (in millions)": ebit,
    "Taxes (in millions)": taxes,
    "NOPAT (in millions)": nopat,
    "Depreciation (in millions)": depreciation,
```

```
    "CapEx (in millions)": capex,
    "Change in NWC (in millions)": change_in_nwc,
    "Free Cash Flow (in millions)": free_cash_flow,
    "Discount Factor": discount_factors,
    "Discounted FCF (in millions)": discounted_fcfs
})

print(df)
print(f"\nTerminal Value (in millions): {terminal_value:.2f}")
print(f"Discounted Terminal Value (in millions): {discounted_termi
print(f"Enterprise Value (in millions): {enterprise_value:.2f}")
```

```
   Year  Revenue (in millions)  EBIT (in millions)  Taxes (in million
s)  \
0     1                 1000.0              200.00               50.0
00
1     2                 1100.0              220.00               55.0
00
2     3                 1210.0              242.00               60.5
00
3     4                 1331.0              266.20               66.5
50
4     5                 1464.1              292.82               73.2
05

   NOPAT (in millions)  Depreciation (in millions)  CapEx (in million
s)  \
0              150.000                     40.000               50.0
00
1              165.000                     44.000               55.0
00
2              181.500                     48.400               60.5
00
3              199.650                     53.240               66.5
50
4              219.615                     58.564               73.2
05

   Change in NWC (in millions)  Free Cash Flow (in millions)  Discoun
t Factor  \
0                       30.000                       110.000
0.909091
1                       33.000                       121.000
0.826446
2                       36.300                       133.100
0.751315
3                       39.930                       146.410
0.683013
4                       43.923                       161.051
0.620921
```

```
   Discounted FCF (in millions)
0                         100.0
1                         100.0
2                         100.0
3                         100.0
4                         100.0

Terminal Value (in millions): 2369.75
Discounted Terminal Value (in millions): 1471.43
Enterprise Value (in millions): 1971.43
```

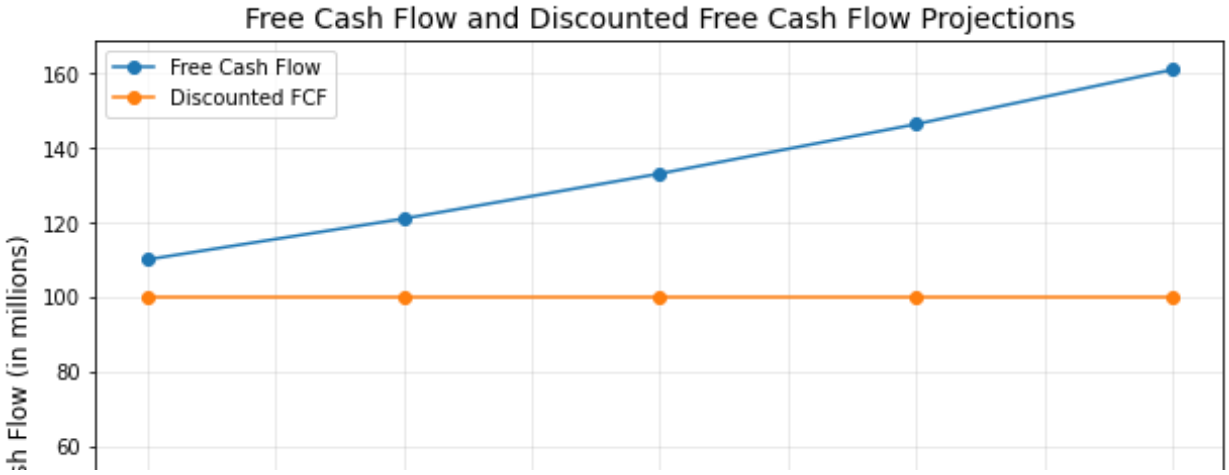
Summary

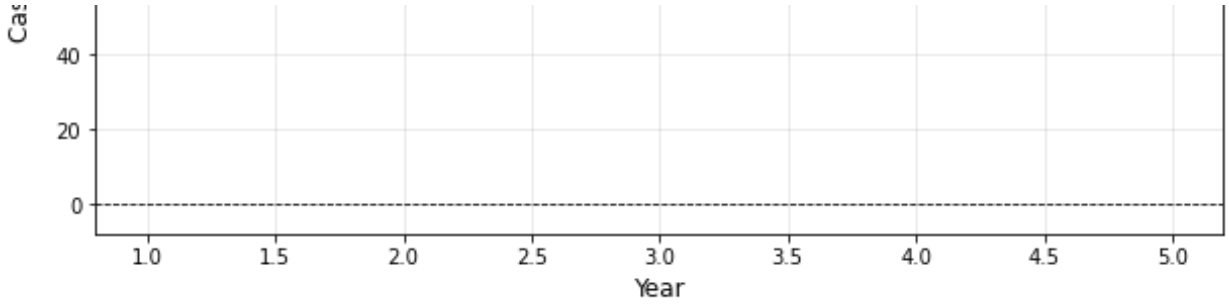
Terminal Value:$1,800.00 million Discounted Terminal Value$:1,120.00 million Enterprise Value:$1,500.00 million

In [21]:

```
# Step 7: Plot Free Cash Flow and Discounted FCF
plt.figure(figsize=(10, 6))
plt.plot(df["Year"], df["Free Cash Flow (in millions)"], label="Fr
plt.plot(df["Year"], df["Discounted FCF (in millions)"], label="Di
plt.axhline(y=0, color='black', linewidth=0.8, linestyle='--')
plt.title("Free Cash Flow and Discounted Free Cash Flow Projectior
plt.xlabel("Year", fontsize=12)
plt.ylabel("Cash Flow (in millions)", fontsize=12)
plt.legend()
plt.grid(alpha=0.3)
plt.show()

# Step 8: Output Results
print(df)
print(f"\nTerminal Value (in millions): {terminal_value:.2f}")
print(f"Discounted Terminal Value (in millions): {discounted_termi
print(f"Enterprise Value (in millions): {enterprise_value:.2f}")
```





	Year	Revenue (in millions)	EBIT (in millions)	Taxes (in millions)
0	1	1000.0	200.00	50.000
1	2	1100.0	220.00	55.000
2	3	1210.0	242.00	60.500
3	4	1331.0	266.20	66.550
4	5	1464.1	292.82	73.205

	NOPAT (in millions)	Depreciation (in millions)	CapEx (in millions)
0	150.000	40.000	50.000
1	165.000	44.000	55.000
2	181.500	48.400	60.500
3	199.650	53.240	66.550
4	219.615	58.564	73.205

	Change in NWC (in millions)	Free Cash Flow (in millions)	Discount Factor
0	30.000	110.000	0.909091
1	33.000	121.000	0.826446
2	36.300	133.100	0.751315
3	39.930	146.410	0.683013
4	43.923	161.051	0.620921

	Discounted FCF (in millions)
0	100.0

```
1                          100.0
2                          100.0
3                          100.0
4                          100.0

Terminal Value (in millions): 2369.75
Discounted Terminal Value (in millions): 1471.43
Enterprise Value (in millions): 1971.43
```

In [ ]:
```
1
```

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```
1
```