

Lab 7: Parking Garage Case Study

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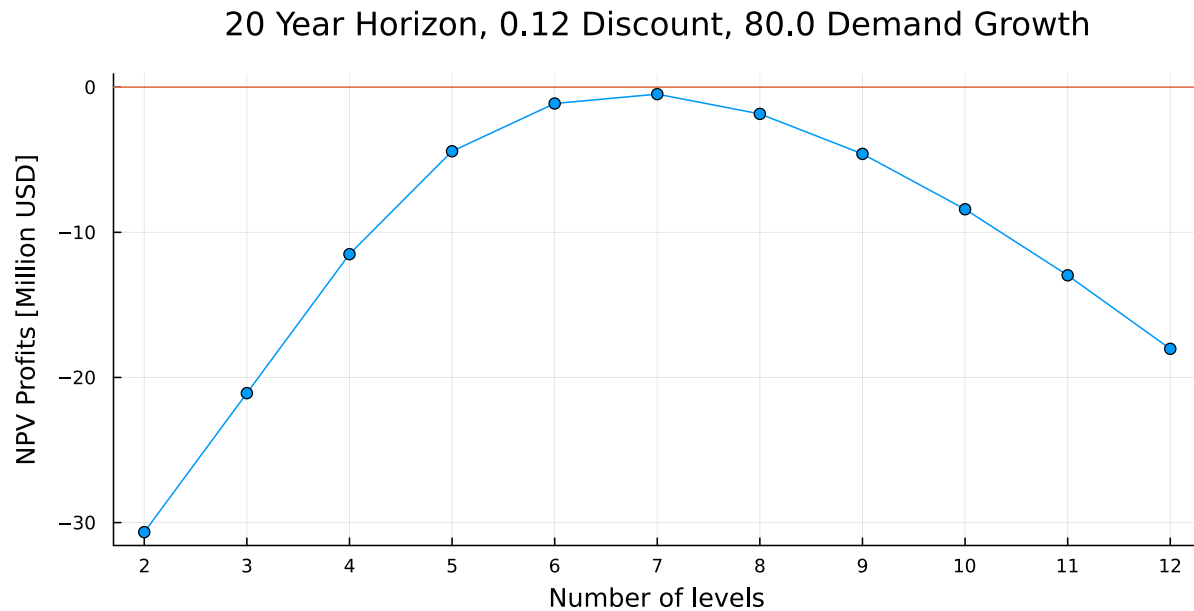
1 Load Packages

```
1 using Revise
2 using ParkingGarage

1 using Plots
2 Plots.default(; margin=5Plots.mm)
```

2 Static Deterministic Case

```
1 let
2     sow = ParkingGarageSOW(; demand_growth_rate=80.0, n_years=20, discount_rate=0.12)
3     n_levels = 2:12
4     policies = [StaticPolicy(i) for i in n_levels]
5     profits = [simulate(sow, policy) for policy in policies]
6     plot(
7         n_levels,
8         profits;
9         ylabel="NPV Profits [Million USD]",
10        xlabel="Number of levels",
11        legend=false,
12        title="$(sow.n_years) Year Horizon, $(sow.discount_rate) Discount, $(sow.demand_growth_rate) Demand Growth",
13        size=(800, 400),
14        marker=:circle,
15        xticks=n_levels,
16    )
17     hline!([0])
18 end
```



3 Static Stochastic Case

```

1  let
2      n_years = 20
3      discount_rate = 0.12
4      sow1 = ParkingGarageSOW(; demand_growth_rate=70.0, n_years, discount_rate)
5      n_levels = 2:12
6      policies = [StaticPolicy(i) for i in n_levels]
7      profits1 = [simulate(sow1, policy) for policy in policies]
8
9      sow2 = ParkingGarageSOW(; demand_growth_rate=80.0, n_years, discount_rate)
10     profits2 = [simulate(sow2, policy) for policy in policies]
11
12     sow3 = ParkingGarageSOW(; demand_growth_rate=90.0, n_years, discount_rate)
13     profits3 = [simulate(sow3, policy) for policy in policies]
14
15     profits_mean = [0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0]
16     for i in 1:length(profits1)
17         profits_mean[i] = (profits1[i] + profits2[i] + profits3[i]) / 3
18     end
19
20     profits_mean_plot = transpose(profits_mean)
21     plot(
22         n_levels,
23         profits_mean_plot;
24         ylabel="Mean NPV Profits [Million USD]",
25         xlabel="Number of levels",
26         legend=false,

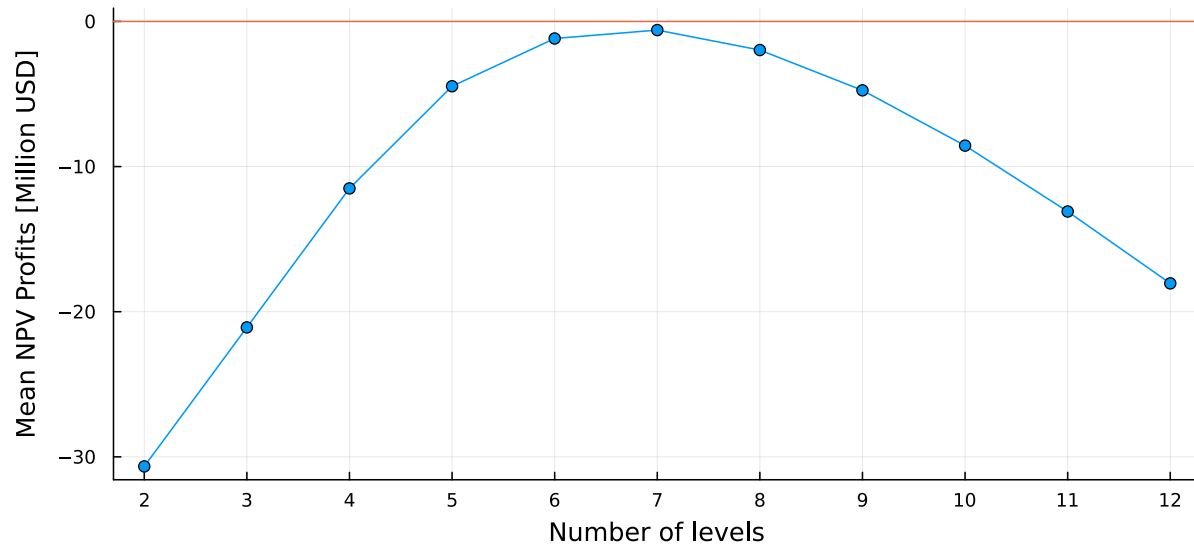
```

```

27     title="20 Year Horizon, 12% Discount, Average of 70, 80, and 90% Demand Growth",
28     size=(800, 400),
29     marker=:circle,
30     xticks=n_levels,
31 )
32 hline!([0])
33 end

```

20 Year Horizon, 12% Discount, Average of 70, 80, and 90% Demand Grow

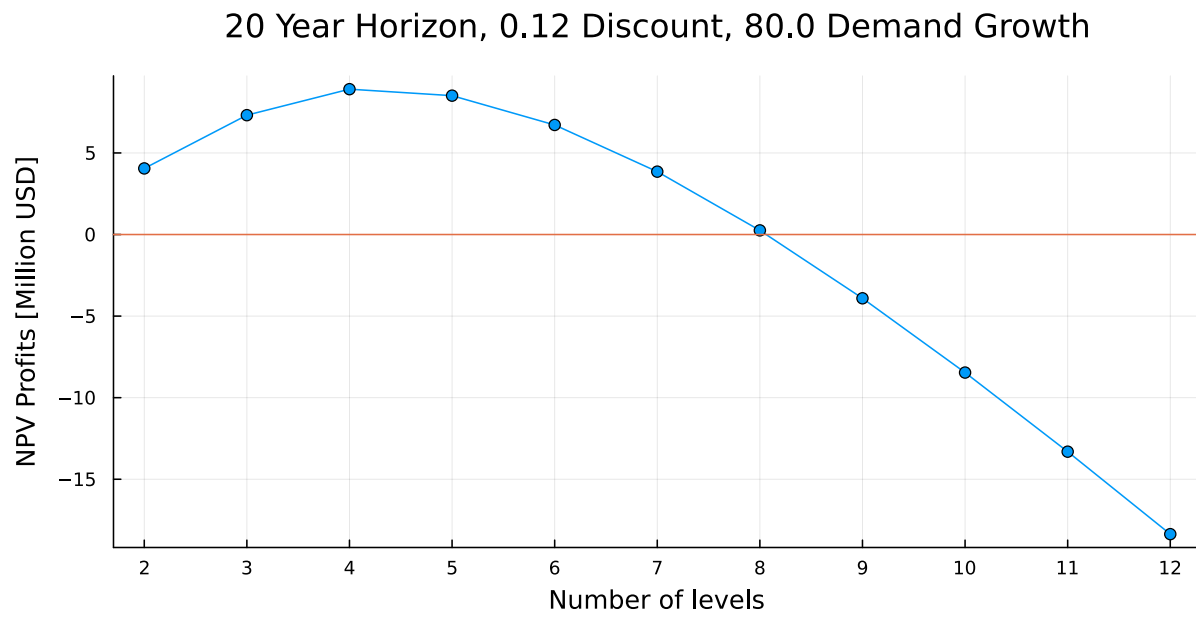


4 Adaptive Deterministic Case

```

1  let
2      sow = ParkingGarageSOW(; demand_growth_rate=80.0, n_years=20, discount_rate=0.12)
3      n_levels = 2:12
4      policies = [AdaptivePolicy(i) for i in n_levels]
5      profits = [simulate(sow, policy) for policy in policies]
6      plot(
7          n_levels,
8          profits;
9          ylabel="NPV Profits [Million USD]",
10         xlabel="Number of levels",
11         legend=false,
12         title="$(sow.n_years) Year Horizon, $(sow.discount_rate) Discount, $(sow.demand_growth_rate) Demand Growth",
13         size=(800, 400),
14         marker=:circle,
15         xticks=n_levels,
16     )
17     hline!([0])
18 end

```



5 Adaptive Stochastic Case