Andreas Krause

Chapter 12

Asset management

Outline

- Problem and model assumptions
- Clients investing directly
- Delegated investment
- Clients with equal information
- Summary

Outline

- Investment banks offer to manage the wealth of their clients, mostly wealthy individuals. This comes often under different names for such activities, asset management, wealth management, or private banking.
- While the overall services offered are comprehensive, one aspect of importance is that investment banks offer to make investment decisions for their clients into securities, after agreeing broad principles of the investment strategy, without each transaction being approved by the client.
- The basis of this offer is not only the convenience for wealthy individuals to not having to make investment decisions, but also the informational advantage investment banks have, in addition to their expertise in analysing and interpreting existing information.
- We will investigate how the decisions of investment banks differ from decisions that investors themselves would have made.

Outline

- We will compare the investments that clients would make when investing themselves with the investment decisions made by the investment bank on their behalf.
- We will also take into account the informational advantage investment banks have when making such comparisons.

- Problem and model assumptions
- Clients investing directly
- Delegated investment
- Clients with equal information
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- We will first look at the characteristics of asset management conducted by investment banks.

Delegated portfolio management

Delegated portfolio management

→ The essence at what we will be looking at is the investment decision made by individuals themselves and the investment bank on their behalf, respectively. As the investment bank is not the beneficiary of the investment bank, but makes investment decisions on behalf of their client, this is known as delegated portfolio management.

- Investment banks make these investment decisions on behalf of their clients and should therefore act in their client's interest rather than their own.
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  - Asset management is more than investment banks giving advice on investment to their clients, which they are then able to follow or to ignore.
  - Instead investment bank implement the advice they would provide directly, without the intervention of their client.
- Therefore clients delegate the decisions on their investment to the investment bank.
- The reasons for clients taking this step is similar to the reason they might take advice from the investment bank, the better information investment banks in most cases will have, as well as the skills they have in making investments, for example in terms of their timing of transactions.

→ In addition, of course, asset management provides the convenience for wealthy individuals to not having to spend time and effort in managing their wealth.

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- They do not only give advice on investments, but instead make investment decisions themselves

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Value of asset management

Value of asset management

→ While the benefits of asset management or clear for their clients, it is also an attractive business area for investment banks.

- Investment banks charge a fee for their services and with the wealth of their clients remaining stable or slightly increasing, the income this service generates will also be stable and not fluctuate as much as other business areas typically do. This allows investment banks a firm basis for the profits they generate.
- With many of their wealthy clients having key positions in companies, or holding strategic large stakes in companies, they have access to these companies through their asset management; such contacts can be used to gather additional information, but also to attract additional business from these companies into other divisions.
- There is fierce competition in the asset management industry with not only investment banks competing with each other, but also private banks focussing solely on wealth management and investment consultancies seeking to serve these wealthy individuals.

→ Thus investment banking is a valuable source of income for investment banks and it provides them with access to key decision-makers in companies, which can be used to acess information and acquire additional business.

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Investment banking fees

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- Typically, investment banks will charge a fee that is proportional to wealth they are managing on their clients' behalf. This fee is payable regardless of the investment performance they generate and is commonly known as the management fee.
- In addition, investment banks typically charge a fee on the profits they generate their clients. These profits are evaluated relative to a benchmark return; we here choose the risk-free rate as the benchmark, but it might also be the return of a relevant market index. In the case of hedge funds the benchmark is the highest value the assets ever had.
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  - We only consider the investment into a risk-free asset and a risky portfolio of other assets; we are not concerned about the composition of this risky portfolio. This is a simplification of the investment process, but will allow us to focus on the key results of the risks that are taken.
  - The amount that is not invested into the risky portfolio will be invested into the risk-free asset, which here is the benchmark return and would therefore not yield the investment bank with any fee income.
- The total fee income for the investment bank consists of the fixed fee that is charged on the wealth of the investor, and the performance fee that is based on the profits the investment bank generates.

→ We can now use this fee structure to determine the optimal investment the investment bank will make.

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- As a benchmark, we will first investigate the investment into the riky and risk-free asset that an investor would make if investing directly, that is without help of the investment bank.

Investment returns and risks

→ We will first characterise the properties of the investment available using the information invstors have access to.

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  - Clients assess that the risky asset will generate a given expected return; this assessment is based on their information.
  - The information they hold will be imperfect and hence the actual return will have some variance with which it will vary around its expected value.
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  - We will now look at the wealth after one time period of investment. The investment in the risk-free asset, with weight $1-\omega$, will grow at the risk-free rate.
  - The investment into the risky asset, with ω, will grow at the rate of the risky asset. Note that this return is random.
- *Formula*
- We can now take expected values and obtain the *formula*.
- To obtain the variance, we note that the risk-free asset provides a certain return and as such has no variance, leaving us with the variance of the risky asset only.

→ This information can now be used to obtain the optimal amount to be held in the risky portfolio.

Investment returns and risks

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- $W_1 = (1-\omega)(1+r)W_0 + \omega(1+R)W_0$

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- $W_1 = (1-\omega)(1+r)W_0 + \omega(1+R)W_0$
- Expected value: $E[W_1] = (1+r)W_0 + \omega(\mu_C - r)W_0$

→ We will first characterise the properties of the investment available using the information invstors have access to.

- - Clients assess that the risky asset will generate a given expected return; this assessment is based on their information.
  - The information they hold will be imperfect and hence the actual return will have some variance with which it will vary around its expected value.
- - We will now look at the wealth after one time period of investment. The investment in the risk-free asset, with weight $1 - \omega$, will grow at the risk-free rate.
  - The investment into the risky asset, with ω, will grow at the rate of the risky asset. Note that this return is random.
- *Formula*
- We can now take expected values and obtain the *formula*.
- To obtain the variance, we note that the risk-free asset provides a certain return and as such has no variance, leaving us with the variance of the risky asset only.

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Investment returns and risks

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Optimal portfolio

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  - We assume that investors are risk averse with risk aversion z and they will seek to maximize their expected utility, which we can approximate as in the *formula*.
  - Investors will seek to maximize this expected utility by choosing the optimal weight of the risk asset.
- We can solve this condition for the optimal weight of the risky asset and obtain the *formula*.
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- Clients maximize expected utility $U_C = E\left[W_1\right] - \frac{1}{2} z Var\left[W_1\right]$

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- We now consider the case where the investment makes the decision on the investment rather than the investor directly.

Maximizing fee income

Maximizing fee income

→ Investment banks will seek to maximize their income from asset management and will thus not necessarily seek to maximize the utility of investors.

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    - We assume here that investment banks have different information compared to investors themselves.
    - This will result in a different expected return and a different variance of these returns. We assume here that investment banks have better information than investors and thus the ir uncertainty about the returns of the risky asset is reduced, resulting in a lower variance.
- Investment banks seek to maximize their income from the fee they obtain, where we assume for simplicity that asset management does not impose any costs on the investment bank.
- Using the fee income as obtained above, we can take the expected value of this fee income,
- as well as the variance, noting that the current amount of wealth is given and hence not risky.

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Maximizing fee income

- Investment banks have different information

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- Investment banks have different information and assess the asset as having expected return μ_B and variance $\sigma_B < \sigma_C$

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- Investment banks have different information and assess the asset as having expected return μ_B and variance $\sigma_B < \sigma_C$
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- Expected fees: $E\left[F\right] = f_0 W_0 + f_1 \omega \left(\mu_B - r\right) W_0$

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Optimal delegated portfolio

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  - If we assume that asset management is competitive, the utility gained from engaging in this activity should be zero, similar to competition eroding any profits that are made.
  - Using this condition we obtain the optimal management fee as in the *formula*.
- The management fee will be negative to counter the positive performance fee. Negative management fees would imply that the investment bank pays the client to let them manage their assets, but it can also be interpreted as investment banks giving clients other benefits, such as better interest on deposits or loans than they would obtain otherwise, or access to IPOs they are underwriting.

→ We can now use this management fee and the optimal management fee to determine the utility clients obtain from using an investment bank to manage their assets.

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- Perfect competition sets management fee such that $U_B = 0$, hence $f_0 = -\frac{(\mu_B - r)^2}{2 z \sigma_B^2 W_0} < 0$
- Investment banks charge a negative management fee

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Optimal delegated portfolio

- Investment banks maximize expected utility $U_B = E[F] - \frac{1}{2} z Var[F]$ and the first order condition $\frac{\partial U_B}{\partial \omega} = 0$ gives
- $\omega^{**} = \frac{\mu_B - r}{z f_1 \sigma_B^2 W_0}$
- Investment bank utility: $U_B = f_0 W_0 + \frac{(\mu_B - r)^2}{2 z \sigma_B^2}$
- Perfect competition sets management fee such that $U_B = 0$, hence $f_0 = -\frac{(\mu_B - r)^2}{2 z \sigma_B^2 W_0} < 0$
- Investment banks charge a negative management fee

Optimal delegated portfolio

→ We can now determine the optimal portfolio, which in the simplified approach taken here will consist only of the risk-free asset and the risky asset and we will thus have to determine the optimal weight of the risky asset.

-
  - We assume that investors are risk averse with risk aversion z and they will seek to maximize their expected utility, which we can approximate as in the *formula*.
  - Investors will seek to maximize this expected utility by choosing the optimal weight of the risk asset.
- We can solve this condition for the optimal weight of the risky asset and obtain the *formula*.
- We now insert this expression back into the expected utility and can determine its value as in the *formula*.
-
  - If we assume that asset management is competitive, the utility gained from engaging in this activity should be zero, similar to competition eroding any profits that are made.
  - Using this condition we obtain the optimal management fee as in the *formula*.
- The management fee will be negative to counter the positive performance fee. Negative management fees would imply that the investment bank pays the client to let them manage their assets, but it can also be interpreted as investment banks giving clients other benefits, such as better interest on deposits or loans than they would obtain otherwise, or access to IPOs they are underwriting.

→ We can now use this management fee and the optimal management fee to determine the utility clients obtain from using an investment bank to manage their assets.

Optimal performance fee

Optimal performance fee

→ Using the utility clients obtain from the portfolio selected by the investment bank, we can now dtermine the performance fee investment banks charge.

- When using the investment bank to manage their assets, the investor will obtain the same final wealth as before, albeit with a different portfolio, and he has to pay the fee the investment bank charges.
- We can insert these variables and can obtain the expected utility of the client as given in the *formula*.
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  - We now assume that investment bank seek to extract all surplus from their clients; thus they will ensure that the utility investor obtain when using the investment bank is identical to that when investing directly.
  - With the management fee set by competition between investment banks, this allows investment banks to determine the performance fee.
- Setting the two utilities equal, we obtain the performance fee as int he *formula*, seeing that the investment bank will take less than half of the profits they generate.

→ In order to compare the investments made by the investment bank and the cleint directly, we need to take into account the different information that is available to both parties.

Optimal performance fee

- Client wealth: $W_1 = (1+r)\,W_0 + \omega^{**}\,(R-r)\,W_0 - F$

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- Client wealth: $W_1 = (1+r)\,W_0 + \omega^{**}\,(R-r)\,W_0 - F$
- Client utility: $\hat{U}_C = (1+r)\,W_0 + 2\frac{(\mu_B - r)^2}{2z\sigma_B^2} - \frac{(\mu_B - r)^2}{2z\sigma_B^2}\left(\frac{1-2f_1}{f_1}\right)^2$

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- Investment banks extract all surplus from clients

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- Investment banks extract all surplus from clients and set the performance fee such that $\hat{U}_C = U_C$

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- $f_1 = \frac{1}{2+\sqrt{2-\frac{\sigma_B^2}{\sigma_C^2}\left(\frac{\mu_C - r}{\mu_B - r}\right)^2}} < \frac{1}{2}$

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→ In order to compare the investments made by the investment bank and the cleint directly, we need to take into account the different information that is available to both parties.

- Problem and model assumptions
- Clients investing directly
- Delegated investment
- **Clients with equal information**
- Summary

- We will now compare the portfolio an investment bank would choose with that the client itself would choose, if he had the same information as the investment bank.

Optimal portfolio

Optimal portfolio

→ We can now determine the optimal portfolio the client wishes the investment bank to choose.

- - We firstly assume that the expected returns of the investment bank and its client are the same. Thus the content of the information they hold is identical.
  - We secondly assume that the variance of returns of the investment bank and its client are the same. Thus the precision of the information is identical.
  - We therefore consider a case where the client holds the same information as the investment bank to make the comparison of portfolios chosen on the same basis.
- The wealth of the client is again the wealth generated from the investment, less the fee paid to the investment bank. This fee consists of the management fee and the performance fee, whicha re separated in the *formula*.
- Using the expected value and variance of this wealth, we can obtain the expected utility of the client and then determine the optimal weight of the investment into the risky asset from the first order condition.
- Solving from this first order condition we obtain the optimal investment into the risky asset as given in the *formula*.

→ We can now compare this portfolio with the portfolio chosen by the investment bank.

Optimal portfolio

- To compare the optimal portfolios, assume that $\mu_B = \mu_C$

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- To compare the optimal portfolios, assume that $\mu_B = \mu_C$ and $\sigma_B^2 = \sigma_C^2$

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- Client utility:
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Excess risks taken

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→ When comparing the investments into the risky asset as chosen by investment banks and as would be optimal for their clients, we can make inferences on the riskiness of the respective investment strategies.

- Using our assumptions that $\mu_B = \mu_C$ and $\sigma_B = \sigma_C$, easily gives us that the performance fee is one third and inserting this,w e see that the investment bank would invest twice as much into the risky asset than is optimal for their client.
- We have established that investment banks invest too much into the risky asset.
- The reason for this result is that the performance fee generates an income only from the risky asset and hence in order to maximize the fee income the investment bank will invest as much as possible into the risky asset, limited only by the increase in risk due to their risk aversion.
- While the risky asset also increases the return of the client, the risk exposures are not symmetric; the investment bank only puts the income from the performance fee at risk if the return outcome is adverse, while the client will lose its entire investment. This implies that the investment bank will seek higher risks as their losses are more limited.

→ We thus see that investment banks seek higher risks than what is optimal for their client.

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- As $f_1 = \frac{1}{3}$, we have $\omega^{**} = 2\omega^{***}$

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- As only the fee is exposed to risk, not their investment, investment banks seek higher risks

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- Problem and model assumptions
- Clients investing directly
- Delegated investment
- Clients with equal information
- Summary

- We can now summarise the key results of our model.

Distorted asset allocation

Distorted asset allocation

→ We have seen that the investment of funds when conducted by investment banks into risky assets, also referred as asset allocation, is not optimal for their clients; the allocation is distorted towards risky assets.

- By investment banks investing more into the risk asset than is optimal for their client, they make the entire investment more risky as the risk-free component is reduced. Thus investment decisions delegated to investment bank increases the risks clients are exposed to.
- From the client's perspective this distortion might seem even larger if their information precision is less, thus $\sigma_C > \sigma_B$; a larger risk would reduce the investment into the risky asset. Some of this additional risk-taking can, however, be explained with the better information investment banks have, crucially the distortion remains even if we adjust for the different information.
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  - The better information investment banks have, will increase the utility of investors as they hold a better portfolio, based on more precise information.
  - These benefits are at least partially offset by the distorted allocation into more risky assets.

→ Investment banks with better information increase the utility of clients, but their excessive risk-taking reduces this benefit again.

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Consequences of biased asset allocation

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→ With the allocation of investments biased in favour of risky assets, the investment bank exposes themselves to additional risks.

- By taking higher risks, the performance of the portfolio will vary more and hence losses might occur more frequently or may be larger. This will make it more important for the investment bank to assess investment accurately and avoid such losses, which will ultimately lead to clients withdrawing funds to competitors and it will damage their reputation to attract new clients.
- The skills of investment banks in choosing appropriate risky assets and time investing optimally becomes ever more important to generate consistently high returns for their clients.
- A consequence is that investment bank have to invest more into the skills of their advisors to counter these additional risks. While we have not considered costs of asset management here, this suggests that costs will be increasing and this might provide an additional limit to the risks taken by investment banks with their clients' investments.

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