



Chapter 7.2.2
Underwriting syndicates

Outline

- Problem and model assumptions
- Optimal syndicate size for issuers
- Co-underwriters
- Lead underwriter
- Summary

- When underwriting securities, investment banks are commonly collaborating to administer the issue and ensure all securities are sold.
- These groups of investment banks are commonly known as a syndicate.
- Syndicates are assembled only for the purpose of underwriting a single security and are dissolved afterwards, for each security the investment banks form a new syndicate whose membership will generally differ. Therefore syndicates are no long-lasting cooperation between investment banks, but assembled for a very specific task only.
- Investment banks collaborating may cause moral hazard in that they will not exert the optimal amount of effort to further the goal of issuing the security.
- We will look at the reasons for the formation of syndicates and how any such moral hazard is addressed.

- We will first explore the syndicate size from the perspective of the issuer of securities and then focus on the incentives to investment banks.
- While we then assume that there is a distinction in the syndicate between the lead underwriter and co-underwriters and assess their incentives, we will in the end show that in general a lead underwriter should exist.
- The model therefore then provides us with a realistic structure of the syndicate.

■ Problem and model assumptions

■ Optimal syndicate size for issuers

■ Co-underwriters

■ Lead underwriter

■ Summary

- We will first look a bit more at the structure of syndicates and then how the key benefits of syndicates can be modelled.

Benefits of syndicates

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- Syndicates bring together a number of investment banks and there are distinct benefits for issuers of employing more than one investment bank.
- ▶ A key role of investment banks is to attract interest by investors for the securities they are underwriting. They will generally do so by using their network of contact with such investors and induce them to consider purchasing the security. It is these contacts to investors, resulting in indicative bids in book-building, that are the main benefits to investors and hence the reason to employ investment banks in the first place.
- ▶ The network of each investment bank will be limited, some may have a limited geographical range, such as individual countries or regions within larger countries, while other may have access only to investors with certain characteristics, such as hedge funds, pension funds, wealthy individuals, investment funds, and similar.
- ▶ To broaden the reach of their investment banks, issuers may want to appoint multiple investment banks in a syndicate and thereby attract a wider range of investors, increasing the chances of selling all securities and increasing the price due to higher demand.
- ▶ In the vast majority of cases, investors appoint such a syndicate. which suggests that there are significant benefits to investors.
- Syndicates allow investment banks to reach a wider range of investors, increasing the demand for the security underwritten.

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Lead underwriters

- In a syndicate not all investment banks have the same role and we will determine that this to reduce the moral hazard within the syndicate.
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 - As in all cases where a group is performing a task, a moral hazard emerges from this group effort.
 - In this case the moral hazard could manifest itself in investment banks not putting in the effort to make use of their contacts with investors and thereby reducing the overall demand for the issue.
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 - Syndicates have sought to overcome the moral hazard problem with the appointment of a so-called lead underwriter
 - The lead underwriter has the overall responsibility for the success of the underwriting, is the main contact, and the investment banks most prominently associated with the underwriting of the issue.
- ▶ Appointing a lead underwriter can reduce the moral hazard of investment banks working together as we will see.
- We will see how the establishment of a lead underwriter reduces the moral hazard and is therefore a response to this concern.

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- ▶ When appointing a syndicate to manage the underwriting, a **moral hazard** problem emerges

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Search efficiency

- The key role of investment banks in underwriting is to identify potential investors. To this effect they need to exert effort and search for such investors and then convince them to invest into the security. We will therefore model this search and how it affects the offer price of the security.
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 - We assume now that the security has a given value that is known to the investment banks, but whether this value can be realised depends on the effort by investment banks to conduct a search for investors and convincing them to make a bid.
 - The full value can only be realised if all potential investors are contacted and the offer price is such that only the highest bids are considered. This implies that investment banks put the maximum possible effort into the underwriting of the security.
- ▶ In reality search will never be perfect and not all possible investors can be found. Therefore the offer price will only realise a fraction of its full value.
- ▶ We use a very simple format to determine the fraction of the value that is realised.
- ▶ The more investment banks (N) search, the more investors are contacted and the more of the full value can be realised.
- ▶ Searching is not perfect and investment banks will not find all potential investors, this is captured by η ; a higher value of η corresponds to less efficient search. This has no relationship with the effort investment banks exert, we will see that we assume that investment banks either search or they do not search. Hence η is a characteristic of the ability of investment banks. The lower this parameter is, the better investment banks are at identifying potential investors.
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- We can now use this set-up to investigate the optimal syndicate structure.

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 - We assume now that the security has a given value that is known to the investment banks, but whether this value can be realised depends on the effort by investment banks to conduct a search for investors and convincing them to make a bid.
 - The full value can only be realised if all potential investors are contacted and the offer price is such that only the highest bids are considered. This implies that investment banks put the maximum possible effort into the underwriting of the security.
- ▶ In reality search will never be perfect and not all possible investors can be found. Therefore the offer price will only realise a fraction of its full value.
- ▶ We use a very simple format to determine the fraction of the value that is realised.
- ▶ The more investment banks (N) search, the more investors are contacted and the more of the full value can be realised.
- ▶ Searching is not perfect and investment banks will not find all potential investors, this is captured by η ; a higher value of η corresponds to less efficient search. This has no relationship with the effort investment banks exert, we will see that we assume that investment banks either search or they do not search. Hence η is a characteristic of the ability of investment banks. The lower this parameter is, the better investment banks are at identifying potential investors.
- ▶ In reality search will never be perfect and hence only a part of the possible value of the security can be realised.
- We can now use this set-up to investigate the optimal syndicate structure.

■ Problem and model assumptions

■ Optimal syndicate size for issuers

■ Co-underwriters

■ Lead underwriter

■ Summary

- We first look at what syndicate size the issuer would prefer. As the number of banks in a syndicate need to be agreed with the issuer, their preferences play an important role in the formation of syndicates.

Issuer proceeds

- Issuers are concerned about the amount they obtain from the issue of their securities. They will consider the proceeds from the sale of the securities, but also any fees they pay to the investment banks.
- ▶ The proceeds from the sale of the securities will be the fraction of the full value, as determined by the search effort of investment banks.
- ▶
 - Investment banks charge a fee in proportion to the value of the proceeds that the issuer raises.
 - This fee is payable to each of the investment banks in a syndicate. Therefore, a larger syndicate will be more expensive to issuers.
- ▶ The amount the issuer obtains after paying the underwriting fees, the net proceeds, is what issuers seek to maximize.
- ▶
 - The first order condition for maximizing the net proceeds over the number of investment banks involved in the syndicate needs to be solved.
 - We need to insert for γ and then solve the resulting equation. The optimal size is smaller the efficient the search is (η) and the higher the underwriting spread.
- ▶ We insert this solution back into the net proceeds the issuer obtains.
- ▶ As long as the number of syndicate members is not too small, forming a syndicate is profitable for issuers.
- We have now established the size of the syndicate that maximizes the proceeds of the issuer, and can now proceed to analyse this result more

Issuer proceeds

- ▶ The issuer receives a fraction γ of the value of the security V
- ▶ Net proceeds: $\Pi_C = \gamma V$

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Preferred syndicate size

- Issuers benefit from more investment banks they can contact more potential investors, but this also imposes additional costs due to having to pay more investment banks for their services. We will look at what this implies for the optimal syndicate size from the perspective of the issuer.
- ▶ If we look at the net proceeds, $\Pi_C = \left(1 - 2 \frac{\eta}{N}\right) V$, we see that this expression is increasing as the syndicate size N increases.
- ▶ The reason is that from the first order condition $fN^2 = \eta$ the underwriting spread f will be reducing in the size of the syndicate. Hence a larger syndicate is optimal for issuers.
- ▶ However, as in every group effort, a larger syndicate size will also increase the moral hazard, making search less effective by not all banks conducting the search for investors diligently.
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 - The idea is to appoint a lead underwriter to overcome this problem of moral hazard as it will change the incentives of investment banks to exert search effort.
 - If the moral hazard problem is reduced, this might allow for larger syndicate sizes, benefitting issuers.
- Having established the preferences of issuers, we will now turn our attention to the incentives of investment banks in a syndicate.

Preferred syndicate size

- ▶ Issuers prefer the **largest** possible syndicate size

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- Problem and model assumptions
- Optimal syndicate size for issuers
- **Co-underwriters**
- Lead underwriter
- Summary

- We first focus on the incentives of the so-called co-underwriters in a syndicate and their incentives to exert effort and search for investors.
- Co-underwriters have lower responsibilities than the lead underwriter and also obtain a smaller share of the fee income.

Investment bank profits with effort

Investment bank profits with effort

- We first have to ensure that exerting effort is profitable for investment banks.
- ▶ We assume that each co-underwriter receives a fraction of the total fee income the syndicate receives from the issuer
- ▶ In order to conduct a search for potential investors, they face costs of doing so. Such costs could be the actual effort and time in identifying them and discussing the issue with them, but it might also include using up goodwill with these investors.
- ▶ The profits of the co-underwriter are then given by their revenue, less the costs of conducting the search. These costs are increasing in the issue size as the larger an issue is, the more investors need to be found.
- Investment banks will only exert effort if it is profitable for them to do so. We will therefore explore the conditions under which they exert this effort.

Investment bank profits with effort

- ▶ Co-underwriters receive a fraction λ of the total fee income $Nf\gamma V$
- ▶ Profits: $\Pi_B^H = \lambda Nf\gamma V$

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Investment bank profits with effort

- ▶ Co-underwriters receive a fraction λ of the total fee income $Nf\gamma V$
- ▶ Investment banks exerting efforts to identify potential investors face costs c_H
- ▶ Profits: $\Pi_B^H = \lambda Nf\gamma V - c_H V$

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Investment bank profits without effort

Investment bank profits without effort

- After having established the profits of investment banks exerting effort, we now seek to determine the profits investment banks not exerting any effort.
- ▶ If an investment bank does not exert effort, they still face some costs of participating in the syndicate as certain tasks need to be performed. Investment banks may also face a loss of reputation if it becomes known they did not exert effort and will therefore be less likely selected to be a syndicate member in the future. We assume that these costs of not exerting effort are lower than if they exert effort.
- ▶ If an investment bank does not exert any effort, it is like this bank did not exist and the value that can be realised will reduce as effectively one bank less is conducting the search.
- ▶ The profits of an investment bank not exerting effort is then given by the lower revenue the syndicate generates and the lower costs they face.
- Having determined the profits of those investment banks exerting effort and those exerting no effort, we can now continue to establish conditions under which they will exert effort.

Investment bank profits without effort

- ▶ An investment bank exerting no effort faces **lower costs** $c_L < c_H$

Investment bank profits without effort

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- ▶ If an investment bank does not exert effort, they still face some costs of participating in the syndicate as certain tasks need to be performed. Investment banks may also face a loss of reputation if it becomes known they did not exert effort and will therefore be less likely selected to be a syndicate member in the future. We assume that these costs of not exerting effort are lower than if they exert effort.
- ▶ If an investment bank does not exert any effort, it is like this bank did not exist and the value that can be realised will reduce as effectively one bank less is conducting the search.
- ▶ The profits of an investment bank not exerting effort is then given by the lower revenue the syndicate generates and the lower costs they face.
- Having determined the profits of those investment banks exerting effort and those exerting no effort, we can now continue to establish conditions under which they will exert effort.

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- ▶ An investment bank exerting no effort faces lower costs $c_L < c_H$
- ▶ As it exerts **no effort**, a smaller fraction of the value is realized: $\hat{\gamma} = 1 - \frac{\eta}{N-1}$

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- ▶ Profits: $\Pi_B^L = \lambda N f \hat{\gamma} V - c_L V$

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Inducing effort for co-underwriters

Inducing effort for co-underwriters

- We want to ensure that co-underwriters exert effort in the underwriting effort.
- ▶ Investment banks will exert effort if the profits of doing so are then when not exerting effort.
- ▶ We can solve this condition for the *formula*.
- ▶
 - Investment banks need to make profits to join a syndicate.
 - This condition solves for the *formula*.
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 - As we are only interested in situations where investment banks are joining a syndicate, the first condition is assumed to be more binding.
 - The first condition being more restrictive gives this *formula*.
- ▶ We can solve this condition for the minimum number of investment banks in a syndicate that are required such that investment banks exert effort.
- Thus for co-underwriters to exert effort, the syndicate cannot be too small.

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Minimum syndicate size

- We need to balance the size of the syndicate to induce co-underwriters to exert effort with its profitability.
- ▶
 - We have established that the syndicate size needs a minimum size for co-underwriters to exert any effort.
 - If they are exerting effort, investment banks are also making profits from joining the syndicate, hence the solution is viable.
 - ▶
 - Syndicates need to be sufficiently large as small syndicates will only raise a small fraction of the issue value, which reduces the amount of revenue available.
 - This is not compensated for by having to share the fee income with less syndicate members.
 - ▶ As the conditions show, in order to exert any effort, investment banks need a minimum share of the underwriting spread. It is only then that the loss of revenue from having a lower fraction of the security value realised due to the lack of effort, exceeds the cost savings.
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 - Thus far we looked at the incentives of the co-underwriters, but the lead underwriter also needs to join the syndicate, but we have excluded his considerations so far.
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- We will therefore now turn to assessing the lead underwriter's incentives and combine our results.

Minimum syndicate size

- ▶ We have a **minimum syndicate size** N^* that is compatible with co-underwriters exerting effort

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Minimum syndicate size

- ▶ We have a minimum syndicate size N^* that is compatible with co-underwriters exerting effort and in this case always making **profits**

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Minimum syndicate size

- ▶ We have a minimum syndicate size N^* that is compatible with co-underwriters exerting effort and in this case always making profits
- ▶ Too **small syndicates** do not raise enough proceeds from the issue

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- ▶ We have a minimum syndicate size N^* that is compatible with co-underwriters exerting effort and in this case always making profits
- ▶ Too small syndicates do not raise enough proceeds from the issue, despite having to **share** the fee income among fewer members

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- ▶ Too small syndicates do not raise enough proceeds from the issue, despite having to share the fee income among fewer members
- ▶ The exertion of effort requires a **minimum share** of the **underwriting fee**

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- ▶ The exertion of effort requires a minimum share of the underwriting fee
- ▶ **Lead underwriters** must also be induced to participate in the syndicate

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- Problem and model assumptions
- Optimal syndicate size for issuers
- Co-underwriters
- **Lead underwriter**
- Summary

- Lead underwriters take additional responsibilities with the syndicate. They are the most prominent investment bank and are in charge of organising the whole underwriting process.
- As lead underwriters they are also responsible for agreeing the allocation of fees within the syndicate and will naturally seek to retain the maximal feasible share of the fee income for themselves.
- We will now look at the incentives of the lead underwriter.

Investment bank profits

- We will first determine the profits of the lead underwriter when exerting effort and when not exerting effort.
- ▶ The role of the lead underwriter is to manage the syndicate and ensure all tasks are completed. They also manage the agreement within the syndicate on how the fee income is distributed.
- ▶ With each of the co-underwriters receiving a fraction λ of the fee income and there being $N - 1$ co-underwriters, in addition to the single lead underwriter, the lead underwriter obtains the remainder of the fee.
- ▶ The profits of the lead underwriter is determined in the same way as that of the co-underwriters, we only need to change the share of the fee income
- ▶ The profits when exerting effort are then given by *formula*.
- ▶ The profits when not exerting effort are then given by *formula*.
- We can now compare these profits to obtain the conditions under which lead underwriters exert effort.

Investment bank profits

- ▶ Lead underwriters **allocate** tasks and **distribute** the revenue among syndicate members

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- ▶ The profits when exerting effort are then given by *formula*.
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Investment bank profits

- ▶ Lead underwriters allocate tasks and distribute the revenue among syndicate members
- ▶ They obtain the fraction of the fee not distributed, $1 - (N - 1) \lambda$

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Incentives to exert effort

- We now need to ensure that the lead underwriter exerts effort in the underwriting process.
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 - Lead underwriters exert effort if it is more profitable to do so than to not exert effort.
 - In addition, we also require that lead underwriters make a profits when joining the syndicate.
 - ▶ Conducting the analysis, gives us the same conditions as for co-underwriters if we replace λ with $1 - (N - 1) \lambda$. The condition on the fraction of fees co-underwriters obtain, λ , is opposite though, as a higher fraction of fees to co-underwriters reduces the fraction of fees the lead-underwriter obtains.
 - ▶ We can combine the conditions for co-underwriters and lead underwriters and obtain that the share of the fee income going to co-underwriters has to be with a certain range. A lower share of the fees will induce co-underwriters to not exert effort and a higher share will induce the lead underwriter to not exert effort.
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Optimality for issuers

- We will now look at the optimal size of the syndicate from the perspective of the issuer of securities.
- ▶ The condition for the syndicate to be optimal for an issuer was that the fee paid to each member has to be decreasing in the syndicate size.
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 - The lead underwriter determines the allocation of fees within the syndicate, therefore will not pay the co-underwriters more than is necessary for them to break even. By paying them a larger proportion of the fee income, their own profits would reduce.
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- ▶ While we cannot solve this expression easily for the number of syndicate members, we see that the syndicate cannot become too big for this conditions to be fulfilled.
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Optimality for issuers

- ▶ If we want the syndicate to be optimal for issuers then we need $f = \frac{\eta}{N^2}$
- ▶ The lead underwriter will extract all surplus from the co-underwriters, hence $\Pi_B^H = 0$
- ▶ This gives $\lambda = \frac{N^2 c_H}{\eta(N-\eta)}$
- ▶ The lead underwriter will also not provide more incentives than necessary for co-underwriters to exert effort, hence $\Pi_B^H = \Pi_B^L$, this gives $N = N^*$

- We will now look at the optimal size of the syndicate from the perspective of the issuer of securities.
- ▶ The condition for the syndicate to be optimal for an issuer was that the fee paid to each member has to be decreasing in the syndicate size.
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 - The lead underwriter determines the allocation of fees within the syndicate, therefore will not pay the co-underwriters more than is necessary for them to break even. By paying them a larger proportion of the fee income, their own profits would reduce.
 - Therefore we set the profits of co-underwriters equal zero.
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Need for lead underwriters

- We now focus our attention on the share of the fee income allocated to each co-underwriter.
- ▶ A lead underwriter has additional responsibilities and we would therefore expect them to receive a larger share of the fee income and co-underwriters a smaller share. Let us now assume that the fee income is allocated equally and hence that there is no lead underwriter as all underwriters are identical.
- ▶ If this allocation is consistent with the optimal share of the fee income from above, the condition becomes as in this *formula*.
- ▶ While possible to be fulfilled, it would require a very specific parameter constellation. Therefore an equal allocation of the fee income is unlikely to be optimal.
- ▶ The consequence is that the fee income is not equally distributed and therefore a lead underwriter emerges, who takes a larger share of the fee income than the co-underwriters.
- Having established that syndicates are optimal and that they appoint a lead underwriter, we can now determine some properties of the optimal syndicate size.

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Syndicate size

- The syndicate size is given as N^* from the incentives to induce co-underwriters to exert effort. We can use this expression to obtain the key properties.
 - ▶ If search is less likely to result in finding suitable investors, the same value can only be realised by having more investment banks conducting the search, hence the optimal syndicate size would increase.
 - ▶ If the costs to reputation when not exerting effort are high, then underwriters are more likely to exert effort as the costs of not doing so are considerable. This implies that the incentives to exert effort are higher and the fee income can be smaller, which in turn allows a larger syndicate.
 - ▶ The larger the costs of exerting effort become, the more fee income an investment bank needs to obtain in order to recover these costs, reducing the optimal size of the syndicate.
 - ▶ Overall as the search efficiency was assumed to be low, the optimal syndicate size will be small. This is consistent with the size of actual syndicates that usually only consist of a small number of investment banks.
- We have this established that syndicates are small and will increase in size with the search efficiency, the costs of not exerting efforts and reduce with the costs of exerting effort,

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- ▶ If **cost difference** to exerting effort is **bigger**, syndicates are **smaller**: $\frac{\partial N^*}{\partial (c_H - c_L)} < 0$

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■ Problem and model assumptions

■ Optimal syndicate size for issuers

■ Co-underwriters

■ Lead underwriter

■ Summary

- We have seen that syndicates are viable in many cases, but typically remain small.
- We will here summarize the results of this model.

Increasing offer price

Increasing offer price

- The main benefits of syndicates for issuers is that it can reach more investors due to their extended network connections and thus increase the offer price.
- ▶
 - The benefits of syndicates is that with multiple investment banks involved they complement each other can reach a larger number of potential investors.
 - With more investors reached, this should increase the number of potentially interested investors and therefore increase the price, making syndicates beneficial.
- ▶
 - The more investment banks are involved the higher the costs to issuers as they have to pay more investment banks for their efforts, this will limit the size of the syndicate.
 - In addition a larger syndicate size increases the moral hazard problem of investment banks not exerting effort as free-riding becomes more profitable, given the lower influence each investment bank has on the final outcome. This will also limit the size of the syndicate to ensure investment banks exert effort in finding investors for the issue.
- ▶ The appointment of a lead underwriter allows the syndicate size to increase as they can set the distribution of the underwriting spread such that they exert effort in a larger syndicate than in a syndicate without a lead underwriter.
- ▶ Nevertheless the optimal syndicate size will be small as each investment bank has to bear the costs of searching for investors, increasing the fee required substantially, while the benefits of finding additional investors will diminish due to overlapping networks between banks.
- A syndicate is beneficial in that it can attract more investors to an issue, but it is also beset with increasing costs and moral hazard, which will limit the size of syndicates.

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- ▶ Syndicates extend the search for potential investors

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- ▶ This is balanced against **higher costs**

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- ▶ Syndicates extend the search for potential investors and increase the offer price
- ▶ This is balanced against higher costs and the possible **free-riding** of syndicate members

Increasing offer price

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 - ▶
 - The benefits of syndicates is that with multiple investment banks involved they complement each other can reach a larger number of potential investors.
 - With more investors reached, this should increase the number of potentially interested investors and therefore increase the price, making syndicates beneficial.
 - ▶
 - The more investment banks are involved the higher the costs to issuers as they have to pay more investment banks for their efforts, this will limit the size of the syndicate.
 - In addition a larger syndicate size increases the moral hazard problem of investment banks not exerting effort as free-riding becomes more profitable, given the lower influence each investment bank has on the final outcome. This will also limit the size of the syndicate to ensure investment banks exert effort in finding investors for the issue.
 - ▶ The appointment of a lead underwriter allows the syndicate size to increase as they can set the distribution of the underwriting spread such that they exert effort in a larger syndicate than in a syndicate without a lead underwriter.
 - ▶ Nevertheless the optimal syndicate size will be small as each investment bank has to bear the costs of searching for investors, increasing the fee required substantially, while the benefits of finding additional investors will diminish due to overlapping networks between banks.
- A syndicate is beneficial in that it can attract more investors to an issue, but it is also beset with increasing costs and moral hazard, which will limit the size of syndicates.

Increasing offer price

- ▶ Syndicates extend the search for potential investors and increase the offer price
- ▶ This is balanced against higher costs and the possible free-riding of syndicate members
- ▶ Lead underwriters can provide **incentives** for co-underwriters to exert effort

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- The conditions under which a syndicate can exist are quite restrictive, given the requirement that all syndicate members need to exert effort.
- ▶ The lead underwriter assembles the syndicate and will therefore dictate the conditions of any co-underwriters. Naturally, the lead underwriter would want to maintain any surplus for himself and give only a minimum fee income to his co-underwriters.
- ▶ For syndicates to be viable, the distribution of the fee income as well as the size is quite restrictive. These restrictions ensure that all syndicate members exert effort in searching for potential investors.
- ▶ Given that in most underwriting a syndicate has been assembled, suggests that while constraints exist, they are met easily in reality. The benefits to the issuer are significant and the incentive problems of syndicate members can be overcome. In addition, not exerting efforts might have substantial costs to investment banks in the form of reputational damage and not being chosen again as a member of a future syndicate, losing out on substantial future revenue. This might provide additional incentives to exert effort and make syndicates viable.
- Syndicates are widespread and provide substantial benefits to issuers of securities. We have shown that the commonly observed structure with a lead underwriter makes syndicates more easily viable. It is thus that the theoretical model captures the features of the actual underwriting process.

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