

Chapter 7.2.2 Underwriting syndicates

Outline

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

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

0000

0000

Slide 4 of 23

► Investment banks rely on their network of investors to solicit bids for securities they underwrite

- ► Investment banks rely on their network of investors to solicit bids for securities they underwrite
- ► Each investment bank will have a limited network, not covering the whole market

- ► Investment banks rely on their network of investors to solicit bids for securities they underwrite
- ► Each investment bank will have a limited network, not covering the whole market
- ▶ Issuers could appoint multiple banks to reach a wider pool of potential investors

- ► Investment banks rely on their network of investors to solicit bids for securities they underwrite
- Each investment bank will have a limited network, not covering the whole market
- Issuers could appoint multiple banks to reach a wider pool of potential investors
- Such syndicates are routinely appointed

- ► Investment banks rely on their network of investors to solicit bids for securities they underwrite
- Each investment bank will have a limited network, not covering the whole market
- Issuers could appoint multiple banks to reach a wider pool of potential investors
- Such syndicates are routinely appointed

Problem and assumptions

0000

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

Problem and assumptions

When appointing a syndicate to manage the underwriting, a moral hazard problem emerges that allows investment bank to shirk their efforts to identify potential investors

- When appointing a syndicate to manage the underwriting, a moral hazard problem emerges that allows investment bank to shirk their efforts to identify potential investors
- ► Typically, a lead underwriter is appointed

- ▶ When appointing a syndicate to manage the underwriting, a moral hazard problem emerges that allows investment bank to shirk their efforts to identify potential investors
- ► Typically, a lead underwriter is appointed who has overall responsibility for the underwriting process

Lead underwriters

- When appointing a syndicate to manage the underwriting, a moral hazard problem emerges that allows investment bank to shirk their efforts to identify potential investors
- Typically, a lead underwriter is appointed who has overall responsibility for the underwriting process
- ► Such a lead underwriter can mitigate the moral hazard problem

- When appointing a syndicate to manage the underwriting, a moral hazard problem emerges that allows investment bank to shirk their efforts to identify potential investors
- ► Typically, a lead underwriter is appointed who has overall responsibility for the underwriting process
- ▶ Such a lead underwriter can mitigate the moral hazard problem

0000

Slide 6 of 23

0000

ightharpoonup The issue has a potential value of V

Problem and assumptions

000

ightharpoonup The issue has a potential value of V, which is realised if all possible investors are contacted and the highest bids considered

Problem and assumptions

0000

- ightharpoonup The issue has a potential value of V, which is realised if all possible investors are contacted and the highest bids considered
- \blacktriangleright Search is inefficient in that only a fraction γ of this value can be realised

- ightharpoonup The issue has a potential value of V, which is realised if all possible investors are contacted and the highest bids considered
- ightharpoonup Search is inefficient in that only a fraction γ of this value can be realised
- We set $\gamma = 1 \frac{\eta}{N}$

- ightharpoonup The issue has a potential value of V, which is realised if all possible investors are contacted and the highest bids considered
- ightharpoonup Search is inefficient in that only a fraction γ of this value can be realised
- We set $\gamma = 1 \frac{\eta}{N}$
- ▶ The more investors are contacted, the more of the value can be obtained

- ► The issue has a potential value of *V*, which is realised if all possible investors are contacted and the highest bids considered
- lacktriangle Search is inefficient in that only a fraction γ of this value can be realised
- $\blacktriangleright \text{ We set } \gamma = 1 \frac{\eta}{N}$
- ▶ The more investors are contacted, the more of the value can be obtained
- ▶ If search is fully efficient $\eta = 0$, then the full value can be realised

- ► The issue has a potential value of *V*, which is realised if all possible investors are contacted and the highest bids considered
- lacktriangle Search is inefficient in that only a fraction γ of this value can be realised
- $\blacktriangleright \text{ We set } \gamma = 1 \frac{\eta}{N}$
- ▶ The more investors are contacted, the more of the value can be obtained
- lacktriangle If search is fully efficient $\eta=0$, then the full value can be realised
- lacktriangle If search is not fully efficient $0<\eta<1$, then only part of the value is realised

- ► The issue has a potential value of *V*, which is realised if all possible investors are contacted and the highest bids considered
- ightharpoonup Search is inefficient in that only a fraction γ of this value can be realised
- ightharpoonup We set $\gamma=1-rac{\eta}{N}$
- The more investors are contacted, the more of the value can be obtained
- ▶ If search is fully efficient $\eta = 0$, then the full value can be realised
- lacktriangle If search is not fully efficient $0<\eta<1$, then only part of the value is realised

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

Slide 8 of 23

 \blacktriangleright The issuer receives a fraction γ of the value of the security V

- lacktriangle The issuer receives a fraction γ of the value of the security V
- lacktriangle They have to pay a underwriting fee f based on the proceeds of the security γV

- lacktriangle The issuer receives a fraction γ of the value of the security V
- They have to pay a underwriting fee f based on the proceeds of the security γV to each of the N syndicate members

 \blacktriangleright The issuer receives a fraction γ of the value of the security V

- \blacktriangleright They have to pay a underwriting fee f based on the proceeds of the security γV to each of the N syndicate members
- ightharpoonup Net proceeds: $\Pi_C = \gamma V N f \gamma V$

- \blacktriangleright The issuer receives a fraction γ of the value of the security V
- \blacktriangleright They have to pay a underwriting fee f based on the proceeds of the security γV to each of the N syndicate members
- ightharpoonup Net proceeds: $\Pi_C = \gamma V N f \gamma V$
- ► The optimal syndicate size if given if $\frac{\partial \Pi_C}{\partial N} = 0$,

 \blacktriangleright The issuer receives a fraction γ of the value of the security V

- \blacktriangleright They have to pay a underwriting fee f based on the proceeds of the security γV to each of the N syndicate members
- ightharpoonup Net proceeds: $\Pi_C = \gamma V N f \gamma V$
- ► The optimal syndicate size if given if $\frac{\partial \Pi_C}{\partial N} = 0$, giving $fN^2 = \eta$

lacktriangle The issuer receives a fraction γ of the value of the security V

- ▶ They have to pay a underwriting fee f based on the proceeds of the security γV to each of the N syndicate members
- ▶ Net proceeds: $\Pi_C = \gamma V Nf\gamma V$
- lacktriangle The optimal syndicate size if given if $rac{\partial \Pi_C}{\partial N}=0$, giving $fN^2=\eta$
- ▶ This gives proceeds $\Pi_C = \left(1 2\frac{\eta}{N}\right)V$

 \blacktriangleright The issuer receives a fraction γ of the value of the security V

- \blacktriangleright They have to pay a underwriting fee f based on the proceeds of the security γV to each of the N syndicate members
- ightharpoonup Net proceeds: $\Pi_C = \gamma V N f \gamma V$
- ► The optimal syndicate size if given if $\frac{\partial \Pi_C}{\partial N} = 0$, giving $fN^2 = \eta$
- ► This gives proceeds $\Pi_C = (1 2\frac{\eta}{N}) V$
- If $N \ge 2 > 2\eta$, then $\Pi_C > 0$ and using a syndicate is profitable

 \blacktriangleright The issuer receives a fraction γ of the value of the security V

- \blacktriangleright They have to pay a underwriting fee f based on the proceeds of the security γV to each of the N syndicate members
- ightharpoonup Net proceeds: $\Pi_C = \gamma V N f \gamma V$
- ► The optimal syndicate size if given if $\frac{\partial \Pi_C}{\partial N} = 0$, giving $fN^2 = \eta$
- ► This gives proceeds $\Pi_C = (1 2\frac{\eta}{N}) V$
- If $N \ge 2 > 2\eta$, then $\Pi_C > 0$ and using a syndicate is profitable

Slide 9 of 23

Issuers prefer the largest possible syndicate size

- ► Issuers prefer the largest possible syndicate size
- ▶ This is because the underwriting fee is reducing in the syndicate size

Issuers prefer the largest possible syndicate size

Optimal syndicate size

- This is because the underwriting fee is reducing in the syndicate size
- A larger syndicate increases the moral hazard of investment banks not performing their tasks

- ► Issuers prefer the largest possible syndicate size
- ▶ This is because the underwriting fee is reducing in the syndicate size
- ▶ A larger syndicate increases the moral hazard of investment banks not performing their tasks
- We propose that using a lead underwriter mitigates this moral hazard problem

► Issuers prefer the largest possible syndicate size

Optimal syndicate size

- This is because the underwriting fee is reducing in the syndicate size
- ▶ A larger syndicate increases the moral hazard of investment banks not performing their tasks
- ► We propose that using a lead underwriter mitigates this moral hazard problem and allows for larger syndicate sizes

- ► Issuers prefer the largest possible syndicate size
- This is because the underwriting fee is reducing in the syndicate size
- ▶ A larger syndicate increases the moral hazard of investment banks not performing their tasks
- ► We propose that using a lead underwriter mitigates this moral hazard problem and allows for larger syndicate sizes

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

lacktriangle Co-underwriters receive a fraction λ of the total fee income $Nf\gamma V$

- lacktriangle Co-underwriters receive a fraction λ of the total fee income $Nf\gamma V$
- lacktriangle Investment banks exerting efforts to identify potential investors face costs c_H

- 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
- ightharpoonup Profits: $\Pi_R^H = \lambda N f \gamma V c_H V$

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

lacktriangle An investment bank exerting no effort faces lower costs $c_L < c_H$

- \blacktriangleright 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: $\hat{\gamma} = 1 \frac{\eta}{N-1}$

- \blacktriangleright 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: $\hat{\gamma}=1-\frac{\eta}{N-1}$
- ▶ Profits: $\Pi_B^L = \lambda N f \hat{\gamma} V c_L V$

- \blacktriangleright 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: $\hat{\gamma}=1-\frac{\eta}{N-1}$
- ▶ Profits: $\Pi_B^L = \lambda N f \hat{\gamma} V c_L V$

Slide 13 of 23

▶ If $\Pi_B^H \geq \Pi_B^L$, the investment bank will make effort to identify investors

- ▶ If $\Pi_B^H \geq \Pi_B^L$, the investment bank will make effort to identify investors
- ► This implies $\lambda f \geq \frac{c_H c_L}{\eta} (N 1)$

- ▶ If $\Pi_B^H \geq \Pi_B^L$, the investment bank will make effort to identify investors
- \blacktriangleright This implies $\lambda f \geq \frac{c_H c_L}{\eta} \left(N 1 \right)$
- ▶ Underwriting needs to be profitable: $\Pi_B^H \ge 0$

- ▶ If $\Pi_B^H \geq \Pi_B^L$, the investment bank will make effort to identify investors
- \blacktriangleright This implies $\lambda f \geq \frac{c_H c_L}{\eta} \left(N 1 \right)$
- ▶ Underwriting needs to be profitable: $\Pi_B^H \geq 0$ giving $\lambda f \geq \frac{c_H}{N-\eta}$

- ▶ If $\Pi_B^H \geq \Pi_B^L$, the investment bank will make effort to identify investors
- ▶ This implies $\lambda f \geq \frac{c_H c_L}{\eta} (N 1)$
- lacksquare Underwriting needs to be profitable: $\Pi_B^H \geq 0$ giving $\lambda f \geq rac{c_H}{N-\eta}$
- ► To ensure underwriting is always profitable, we need the first constraint to be more binding

- ▶ If $\Pi_{P}^{H} \geq \Pi_{P}^{L}$, the investment bank will make effort to identify investors
- ▶ This implies $\lambda f \geq \frac{c_H c_L}{n} (N 1)$
- Underwriting needs to be profitable: $\Pi_B^H \geq 0$ giving $\lambda f \geq \frac{c_H}{N-n}$
- To ensure underwriting is always profitable, we need the first constraint to be more binding: $\frac{c_H - c_L}{n} (N - 1) \ge \frac{c_H}{N - n}$

- ▶ If $\Pi_B^H \geq \Pi_B^L$, the investment bank will make effort to identify investors
- \blacktriangleright This implies $\lambda f \geq \frac{c_H c_L}{\eta} \, (N-1)$
- lacksquare Underwriting needs to be profitable: $\Pi_B^H \geq 0$ giving $\lambda f \geq rac{c_H}{N-\eta}$
- ▶ To ensure underwriting is always profitable, we need the first constraint to be more binding: $\frac{c_H c_L}{\eta} \, (N-1) \geq \frac{c_H}{N-\eta}$
- ► This solves for $N \geq N^* = \frac{1}{2} \left(1 + \eta\right) + \sqrt{\frac{1}{4} \left(1 + \eta\right)^2 + \frac{\eta c_L}{c_H c_L}}$

- ▶ If $\Pi_B^H \geq \Pi_B^L$, the investment bank will make effort to identify investors
- \blacktriangleright This implies $\lambda f \geq \frac{c_H c_L}{\eta} \left(N 1 \right)$
- lacksquare Underwriting needs to be profitable: $\Pi_B^H \geq 0$ giving $\lambda f \geq rac{c_H}{N-\eta}$
- ▶ To ensure underwriting is always profitable, we need the first constraint to be more binding: $\frac{c_H c_L}{\eta} (N 1) \ge \frac{c_H}{N \eta}$
- ► This solves for $N \ge N^* = \frac{1}{2} (1 + \eta) + \sqrt{\frac{1}{4} (1 + \eta)^2 + \frac{\eta c_L}{c_H c_L}}$

Slide 14 of 23

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

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

- 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

- 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

- 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
- ► The exertion of effort requires a minimum share of the underwriting fee

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

- 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
- ▶ The exertion of effort requires a minimum share of the underwriting fee
- ► Lead underwriters must also be induced to participate in the syndicate, hence the fee available to them cannot be too small

- 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
- ▶ The exertion of effort requires a minimum share of the underwriting fee
- ► Lead underwriters must also be induced to participate in the syndicate, hence the fee available to them cannot be too small

Theoretical Foundations of Investment Banking

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

► Lead underwriters allocate tasks and distribute the revenue among syndicate members

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

- ► Lead underwriters allocate tasks and distribute the revenue among syndicate members
- ▶ They obtain the fraction of the fee not distributed, $1-(N-1)\lambda$
- ▶ Their profits are similar to that of co-underwriters, replacing λ with $1 (N 1)\lambda$

- ► Lead underwriters allocate tasks and distribute the revenue among syndicate members
- ▶ They obtain the fraction of the fee not distributed, $1-(N-1)\lambda$
- lacktriangle Their profits are similar to that of co-underwriters, replacing λ with $1-(N-1)\,\lambda$
- ► Exerting effort: $\hat{\Pi}_B^H = \left(\left(1 \frac{\eta}{N} \right) N f \left(1 \left(N 1 \right) \lambda \right) c_H \right) V$

- ► Lead underwriters allocate tasks and distribute the revenue among syndicate members
- lacktriangle They obtain the fraction of the fee not distributed, $1-(N-1)\,\lambda$
- lacktriangle Their profits are similar to that of co-underwriters, replacing λ with $1-(N-1)\,\lambda$
- lacksquare Exerting effort: $\hat{\Pi}_B^H = \left(\left(1-\frac{\eta}{N}\right)Nf\left(1-\left(N-1\right)\lambda\right)-c_H\right)V$
- ▶ Not exerting effort: $\hat{\Pi}_B^L = \left(\left(1 \frac{\eta}{N-1}\right) N f\left(1 (N-1)\lambda\right) c_L\right) V$

- Lead underwriters allocate tasks and distribute the revenue among syndicate members
- lacktriangle They obtain the fraction of the fee not distributed, $1-(N-1)\,\lambda$
- lacktriangle Their profits are similar to that of co-underwriters, replacing λ with $1-(N-1)\,\lambda$
- lacksquare Exerting effort: $\hat{\Pi}_B^H = \left(\left(1-\frac{\eta}{N}\right)Nf\left(1-\left(N-1\right)\lambda\right)-c_H\right)V$
- $\blacktriangleright \ \, \text{Not exerting effort:} \ \, \hat{\Pi}^L_B = \left(\left(1 \frac{\eta}{N-1} \right) N f \left(1 \left(N 1 \right) \lambda \right) c_L \right) V$

Slide 17 of 23

lacktriangle To induce effort into lead underwriters we need $\hat{\Pi}^H_B \geq \hat{\Pi}^L_B$

▶ To induce effort into lead underwriters we need $\hat{\Pi}_B^H \geq \hat{\Pi}_B^L$ and underwriting must be profitable $\hat{\Pi}_B^H \geq 0$

- ▶ To induce effort into lead underwriters we need $\hat{\Pi}_B^H \geq \hat{\Pi}_B^L$ and underwriting must be profitable $\hat{\Pi}_B^H \geq 0$
- ► This gives the same condition on the minimum size of the syndicate as for co-underwriters

- ▶ To induce effort into lead underwriters we need $\hat{\Pi}_B^H \geq \hat{\Pi}_B^L$ and underwriting must be profitable $\hat{\Pi}_B^H \geq 0$
- ► This gives the same condition on the minimum size of the syndicate as for co-underwriters
- Using the constraint to exert effort for co-underwriters and lead underwriters we combine them to get $\frac{c_H-c_L}{\eta^2}N^2$ $(N-1) \leq \lambda \leq \frac{1}{N-1} \frac{c_H-c_L}{\eta^2}N^2$

- ▶ To induce effort into lead underwriters we need $\hat{\Pi}_B^H \geq \hat{\Pi}_B^L$ and underwriting must be profitable $\hat{\Pi}_B^H \geq 0$
- ► This gives the same condition on the minimum size of the syndicate as for co-underwriters
- Using the constraint to exert effort for co-underwriters and lead underwriters we combine them to get $\frac{c_H-c_L}{\eta^2}N^2\left(N-1\right)\leq\lambda\leq\frac{1}{N-1}-\frac{c_H-c_L}{\eta^2}N^2$
- ▶ A viable solution for λ requires $N^3 (N-1) \leq \frac{\eta^2}{c_H c_L}$

- ▶ To induce effort into lead underwriters we need $\hat{\Pi}_B^H \geq \hat{\Pi}_B^L$ and underwriting must be profitable $\hat{\Pi}_B^H \geq 0$
- ► This gives the same condition on the minimum size of the syndicate as for co-underwriters
- Using the constraint to exert effort for co-underwriters and lead underwriters we combine them to get $\frac{c_H-c_L}{\eta^2}N^2\left(N-1\right)\leq\lambda\leq\frac{1}{N-1}-\frac{c_H-c_L}{\eta^2}N^2$
- ▶ A viable solution for λ requires $N^3 \, (N-1) \leq \frac{\eta^2}{c_H c_L}$, the maximum syndicate size is limited

- ▶ To induce effort into lead underwriters we need $\hat{\Pi}_B^H \geq \hat{\Pi}_B^L$ and underwriting must be profitable $\hat{\Pi}_B^H \geq 0$
- ► This gives the same condition on the minimum size of the syndicate as for co-underwriters
- Using the constraint to exert effort for co-underwriters and lead underwriters we combine them to get $\frac{c_H-c_L}{\eta^2}N^2$ $(N-1) \leq \lambda \leq \frac{1}{N-1} \frac{c_H-c_L}{\eta^2}N^2$
- A viable solution for λ requires $N^3\left(N-1\right) \leq \frac{\eta^2}{c_H-c_L},$ the maximum syndicate size is limited

Slide 18 of 23

If we want the syndicate to be optimal for issuers then we need $f = \frac{\eta}{N^2}$

- lacktriangleq If we want the syndicate to be optimal for issuers then we need $f=rac{\eta}{N^2}$
- ► The lead underwriter will extract all surplus from the co-underwriters

- \blacktriangleright 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 $\Pi_B^H=0$

- lacktriangleq If we want the syndicate to be optimal for issuers then we need $f=rac{\eta}{N^2}$
- The lead underwriter will extract all surplus from the co-underwriters, hence $\Pi_B^H=0$
- ► This gives $\lambda = \frac{N^2 c_H}{\eta (N \eta)}$

- lackbox If we want the syndicate to be optimal for issuers then we need $f=rac{\eta}{N^2}$
- 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 $\Pi_B^H = \Pi_B^L$

- lackbox If we want the syndicate to be optimal for issuers then we need $f=rac{\eta}{N^2}$
- \blacktriangleright 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 $N = N^*$

- lacktriangleq If we want the syndicate to be optimal for issuers then we need $f=rac{\eta}{N^2}$
- \blacktriangleright 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 $N = N^*$
- ► This is only feasible if it meets the condition $N^2 (N-1) \left(\eta c_H + (N-\eta) \left(c_H c_L \right) \right) \leq \eta^2 \left(N-\eta \right)$ for $N=N^*$ from the constraint on λ

- lacktriangleq If we want the syndicate to be optimal for issuers then we need $f=rac{\eta}{N^2}$
- \blacktriangleright 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 $N = N^*$
- ▶ This is only feasible if it meets the condition $N^2 \left(N-1\right) \left(\eta c_H + \left(N-\eta\right) \left(c_H-c_L\right)\right) \leq \eta^2 \left(N-\eta\right)$ for $N=N^*$ from the constraint on λ
- The syndicate must not be too large

- lackbox If we want the syndicate to be optimal for issuers then we need $f=rac{\eta}{N^2}$
- \blacktriangleright 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 $N = N^*$
- ▶ This is only feasible if it meets the condition $N^2 \left(N-1\right) \left(\eta c_H + \left(N-\eta\right) \left(c_H-c_L\right)\right) \leq \eta^2 \left(N-\eta\right)$ for $N=N^*$ from the constraint on λ
- The syndicate must not be too large

▶ If all underwriters are equal, then $\lambda = \frac{1}{N}$

- ▶ If all underwriters are equal, then $\lambda = \frac{1}{N}$
- ► For optimality and inducing effort

- ▶ If all underwriters are equal, then $\lambda = \frac{1}{N}$
- For optimality and inducing effort, we would need $N^3c_H = \eta (N \eta)$ for $N = N^*$

- ▶ If all underwriters are equal, then $\lambda = \frac{1}{N}$
- For optimality and inducing effort, we would need $N^3c_H=\eta\,(N-\eta)$ for $N=N^*$
- ► This is unlikely to be fulfilled

- ▶ If all underwriters are equal, then $\lambda = \frac{1}{N}$
- lacktriangle For optimality and inducing effort, we would need $N^3c_H=\eta\,(N-\eta)$ for $N=N^*$
- This is unlikely to be fulfilled
- Optimal syndicates require lead underwriters

- ▶ If all underwriters are equal, then $\lambda = \frac{1}{N}$
- lacktriangle For optimality and inducing effort, we would need $N^3c_H=\eta\,(N-\eta)$ for $N=N^*$
- This is unlikely to be fulfilled
- Optimal syndicates require lead underwriters

Syndicate size

Syndicate size

▶ If search is less effective, syndicates are bigger: $\frac{\partial N^*}{\partial n} > 0$

Syndicate size

- ▶ If search is less effective, syndicates are bigger: $\frac{\partial N^*}{\partial \eta} > 0$
- ▶ If the costs for not exerting effort are higher, syndicates are bigger: $\frac{\partial N^*}{\partial c_L} > 0$

Syndicate size

- ▶ If search is less effective, syndicates are bigger: $\frac{\partial N^*}{\partial \eta} > 0$
- ▶ If the costs for not exerting effort are higher, syndicates are bigger: $\frac{\partial N^*}{\partial c_L} > 0$
- ▶ If cost difference to exerting effort is bigger, syndicates are smaller: $\frac{\partial N^*}{\partial (c_H c_L)} < 0$

Syndicate size

- ▶ If search is less effective, syndicates are bigger: $\frac{\partial N^*}{\partial n} > 0$
- lacktriangle If the costs for not exerting effort are higher, syndicates are bigger: $rac{\partial N^*}{\partial c_L}{>}0$
- ▶ If cost difference to exerting effort is bigger, syndicates are smaller: $\frac{\partial N^*}{\partial (c_H c_L)} < 0$
- As $0 \le \eta \le 1$, the syndicate size generally will be small

Copyright ② 2024 by Andreas Krause

Syndicate size

- ▶ If search is less effective, syndicates are bigger: $\frac{\partial N^*}{\partial n} > 0$
- ▶ If the costs for not exerting effort are higher, syndicates are bigger: $\frac{\partial N^*}{\partial c_L} > 0$
- ▶ If cost difference to exerting effort is bigger, syndicates are smaller: $\frac{\partial N^*}{\partial (c_H c_L)} < 0$
- As $0 \le \eta \le 1$, the syndicate size generally will be small

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

► Syndicates extend the search for potential investors

▶ Syndicates extend the search for potential investors and increase the offer price

- > Syndicates extend the search for potential investors and increase the offer price
- ► This is balanced against higher costs

- > 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

- > 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

- 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
- ► The resulting syndicate size will be small

- > 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
- ► The resulting syndicate size will be small

► The lead underwriter can extract all surplus from co-underwriters

- ▶ The lead underwriter can extract all surplus from co-underwriters
- Strict conditions to be met for syndicates to be viable

- ▶ The lead underwriter can extract all surplus from co-underwriters
- Strict conditions to be met for syndicates to be viable
- ▶ Dominance of syndicates in practice suggests these constraints are fulfilled

- ▶ The lead underwriter can extract all surplus from co-underwriters
- Strict conditions to be met for syndicates to be viable
- ▶ Dominance of syndicates in practice suggests these constraints are fulfilled



This presentation is based on

Andreas Krause: Theoretical Foundations of Investment Banking, Springer Verlag 2024 Copyright @ 2024 by Andreas Krause

Picture credits:

Cover: The wub, CC BY-SA 4.0 https://creativecommons.org/licenses/by-sa/4.0, via Wikimedia Commons, https://commons.wikimedia.org/wiki/File:Canary.Wharf.from.Greenwich.uriverside.2022-03-18.jpg
Back: Seb Tyler, CC BY 3.0 https://creativecommons.org/licenses/by/3.0, via Wikimedia Commons, https://commons.wikimedia.org/wiki/File:Canary.Wharf.Panorama_Night.jpg

Andreas Krause Department of Economics University of Bath Claverton Down Bath BA2 7AY United Kingdom

E-mail: mnsak@bath.ac.uk