Content Moderation in Presence of Fringe Platforms

Iván Rendo (TSE)

JRC, Seville, 18 February 2025

Motivation

- **Online** extreme/**unsafe content** bad *per se*, and:
  - e.g. Jiménez-Durán (2022) links online hate to **offline violence**
  - e.g. **20%** of terrorists radicalized **exclusively** online (Hamiz and Ariza, 2022)
  - bullying, food disorders, pornography…

Motivation

- **Online** extreme/**unsafe content** bad *per se*, and:
  - e.g. Jiménez-Durán (2022) links online hate to **offline violence**
  - e.g. **20%** of terrorists radicalized **exclusively** online

    (Hamiz and Ariza, 2022)
  - bullying, food disorders, pornography…

➡ EU Response: **Digital Services Act**

Motivation

- **Online** extreme/**unsafe content** bad *per se*, and:
  - e.g. Jiménez-Durán (2022) links online hate to **offline violence**
  - e.g. **20%** of terrorists radicalized **exclusively** online

    (Hamiz and Ariza, 2022)
  - bullying, food disorders, pornography…

➡ EU Response: **Digital Services Act**

But… **users may migrate to small (fringe) platforms!**

Motivation

- **Online** extreme/**unsafe content** bad *per se*, and:
  - e.g. Jiménez-Durán (2022) links online hate to **offline violence**
  - e.g. **20%** of terrorists radicalized **exclusively** online

    (Hamiz and Ariza, 2022)
  - bullying, food disorders, pornography…

➡ EU Response: **Digital Services Act**

But… **users may migrate to small (fringe) platforms!**

4Chan, Parler, Truth…

~ 6% of the US market

(Stocking et al., 2022)

Motivation

- **Online** extreme/**unsafe content** bad *per se*, and:
  - e.g. Jiménez-Durán (2022) links online hate to **offline violence**
  - e.g. **20%** of terrorists radicalized **exclusively** online
  - bullying, food disorders, pornography…

(Hamiz and Ariza, 2022)

➡ EU Response: **Digital Services Act**

But… **users may migrate to small (fringe) platforms!**

4Chan, Parler, Truth…

~ 6% of the US market

(Stocking et al., 2022)

(Madio et al. 2025)

(Rizzi, 2023; Agarwal et al., 2022)

- ↑ **moderation** on a mainstream platform = ↑ **migration** to fringe platforms

Motivation

- **Online** extreme/**unsafe content** bad *per se*, and:
  - e.g. Jiménez-Durán (2022) links online hate to **offline violence**
  - e.g. **20%** of terrorists radicalized **exclusively** online
  - bullying, food disorders, pornography…

(Hamiz and Ariza, 2022)

➡ EU Response: **Digital Services Act**

But… **users may migrate to small (fringe) platforms!**

4Chan, Parler, Truth…

~ 6% of the US market

(Stocking et al., 2022)

(Madio et al. 2025)

(Rizzi, 2023; Agarwal et al., 2022)

- ↑ **moderation** on a mainstream platform = ↑ **migration** to fringe platforms

Broad question: consequences of **content moderation**?

Today

Today

Platforms’ competition model with

- An ads-based **mainstream** platform that **moderates** content
- A **fringe** one that **doesn’t**
- Users choice (and their content) is endogenous (“migration”)

Today

Platforms’ competition model with

- An ads-based **mainstream** platform that **moderates** content
- A **fringe** one that **doesn’t**
- Users choice (and their content) is endogenous (“migration”)

Questions:

➡ Platform: What’s the optimal moderation to **maximize profits**?

➡ Regulator: What’s the optimal moderation to **minimize unsafety**?

➡ **How do they compare?**

Preview of the Main Results

1. More content moderation $\not\Rightarrow$ Less unsafety

2. W Large network effects, platform over-self-moderates

Preview of the Main Results

1. More content moderation $\not\Rightarrow$ Less unsafety

   Due to migration

   Only true if very small network effects

2. W Large network effects, platform over-self-moderates

Preview of the Main Results

1. More content moderation $\not\Rightarrow$ Less unsafety

   Due to migration

   Only true if very small network effects

2. W Large network effects, platform over-self-moderates

   Mainstream doesn't internalizes what happens on the fringe

Preview of the Main Results

1. More content moderation $\not\Rightarrow$ Less unsafety

Due to migration

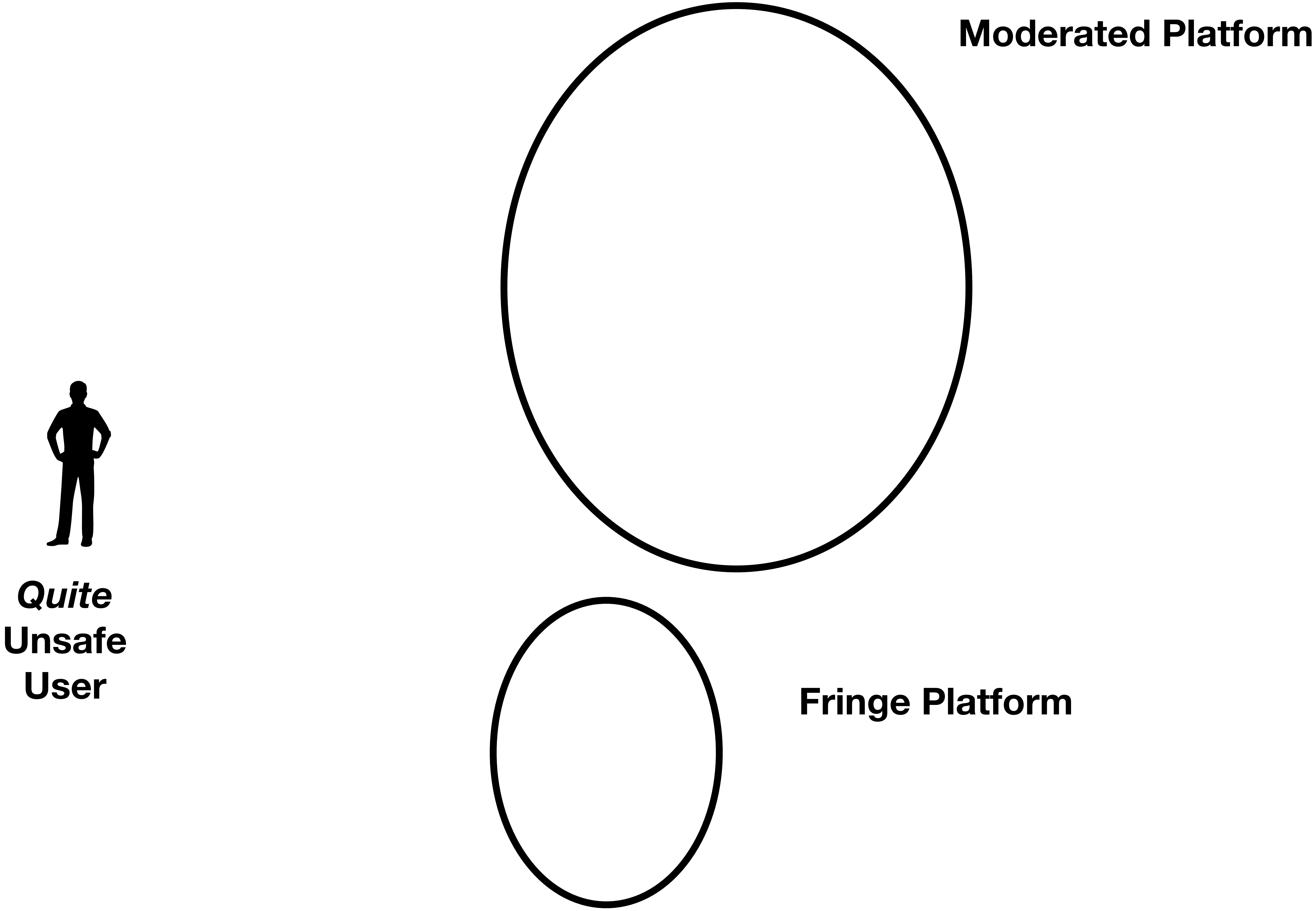
Only true if very small network effects

2. W Large network effects, platform over-self-moderates

Mainstream doesn't internalizes what happens on the fringe

Same for low competition -> policy implication

Main Mechanism

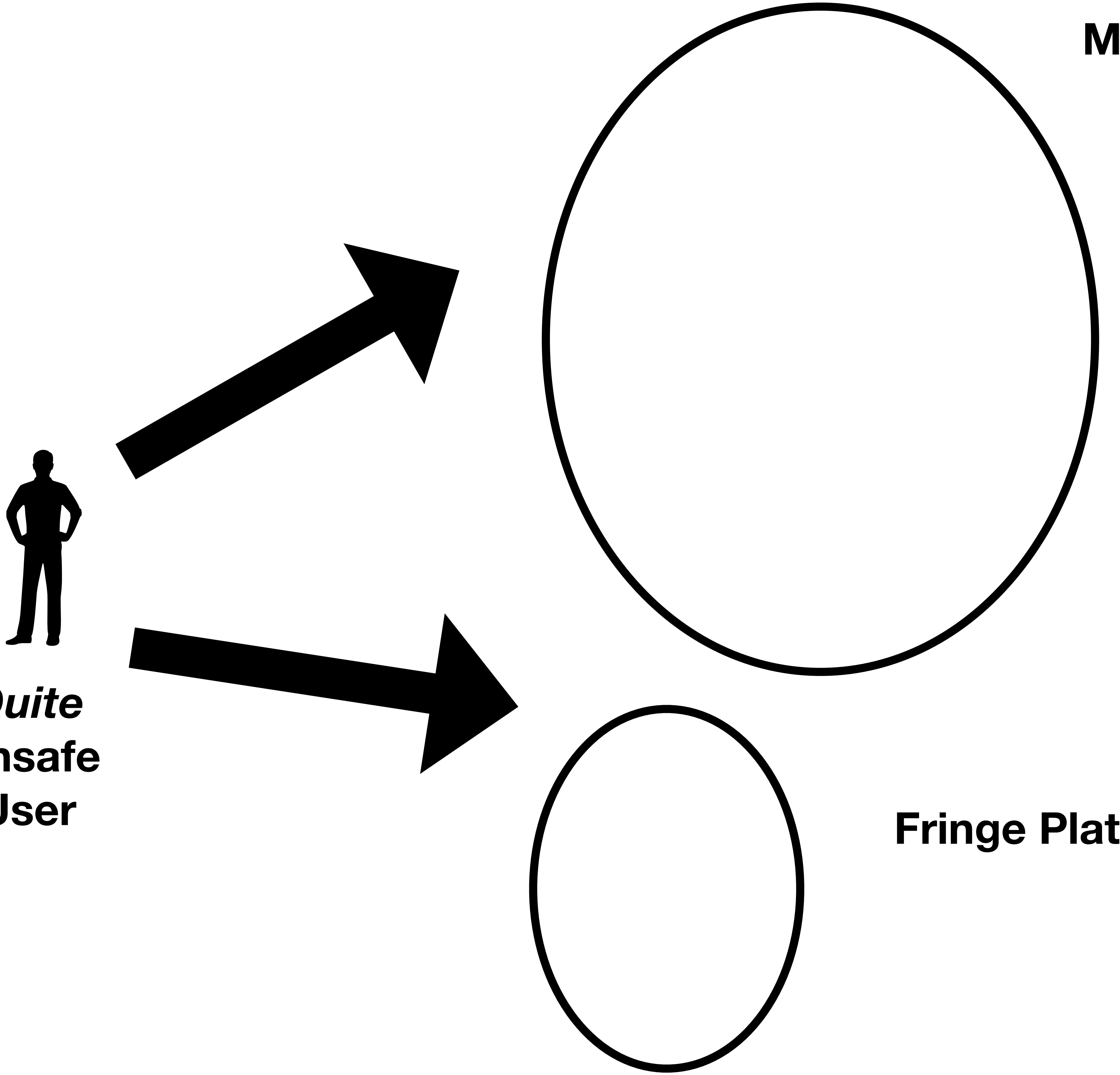


Moderated Platform

Quite Unsafe User

Fringe Platform

Main Mechanism

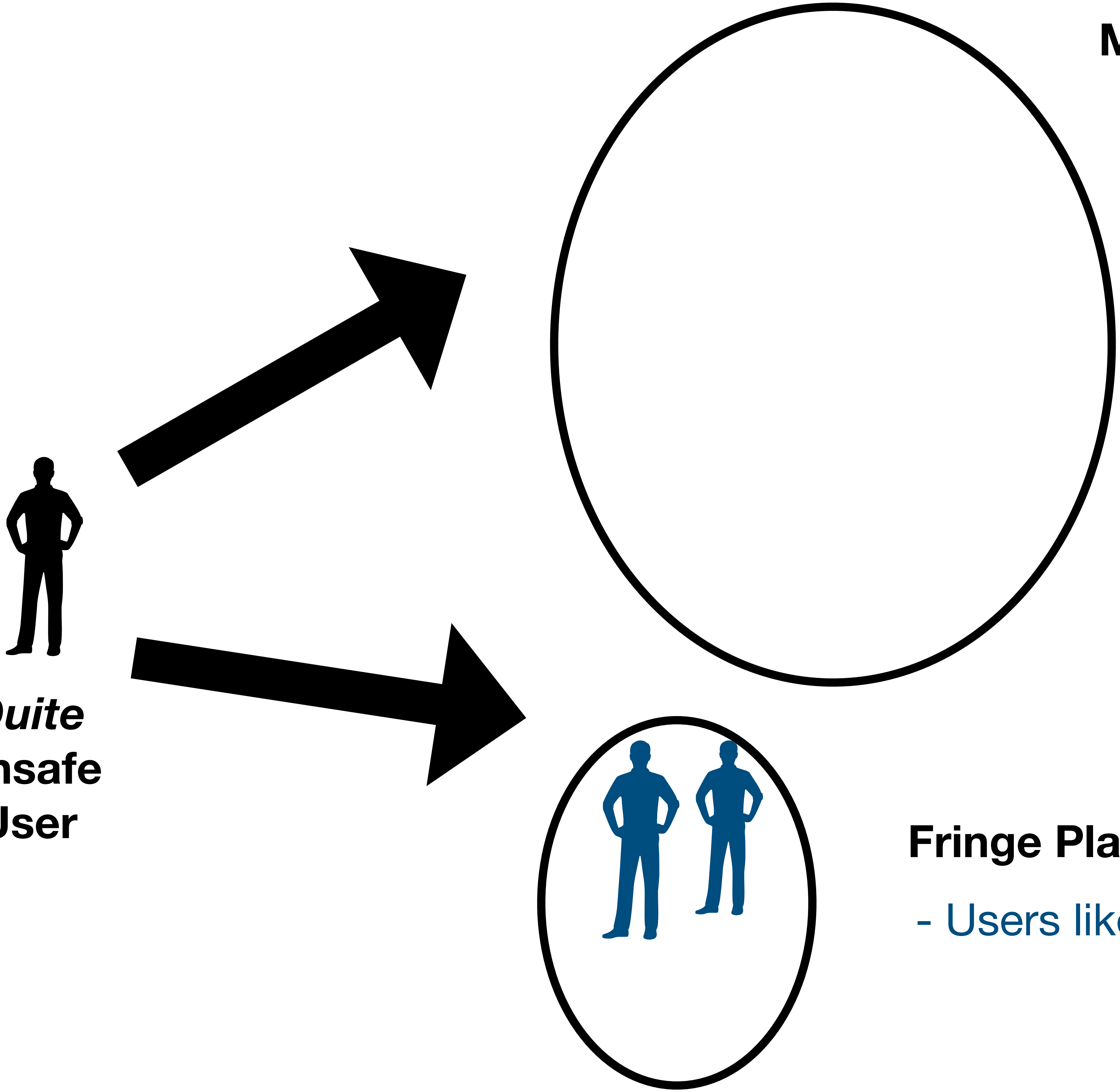


Moderated Platform

Quite
Unsafe
User

Fringe Platform

Main Mechanism



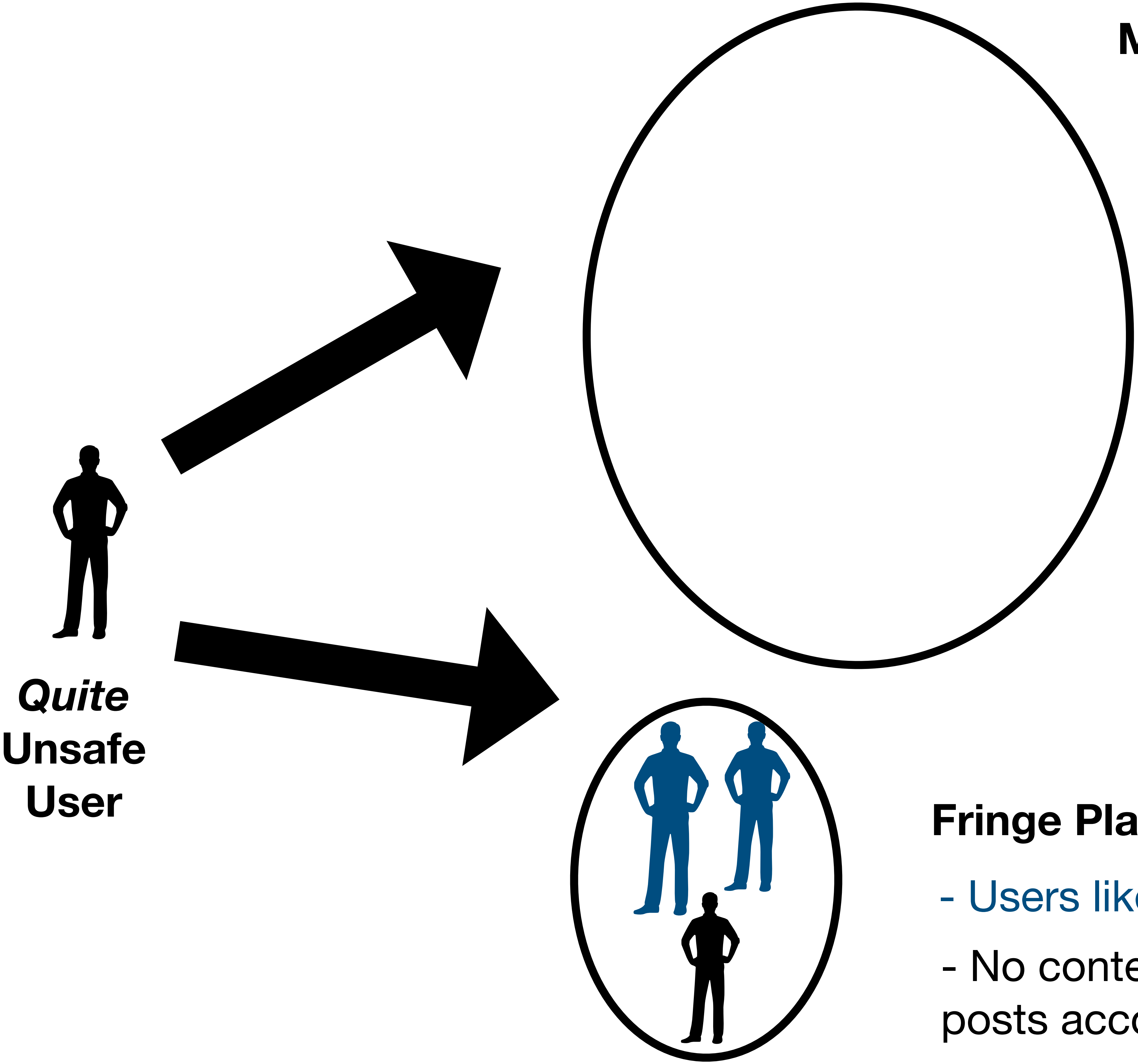
Moderated Platform

Quite
Unsafe
User

Fringe Platform

- Users like him (in unsafe terms)

Main Mechanism



Quite Unsafe User

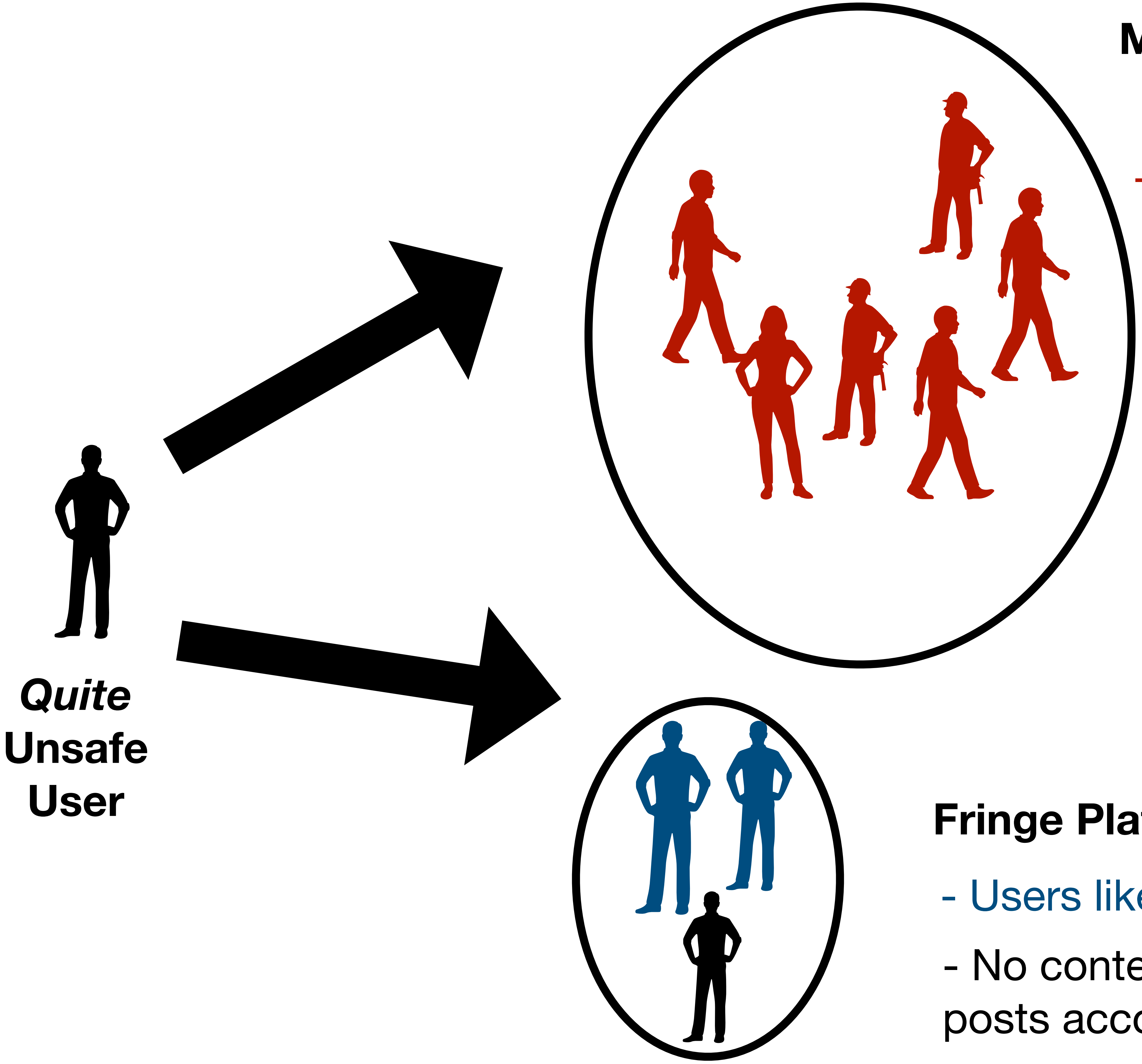
Moderated Platform

Fringe Platform

- Users like him (in unsafe terms)

- No content moderation: posts according to his unsafety

Main Mechanism



***Quite* Unsafe User**

Moderated Platform

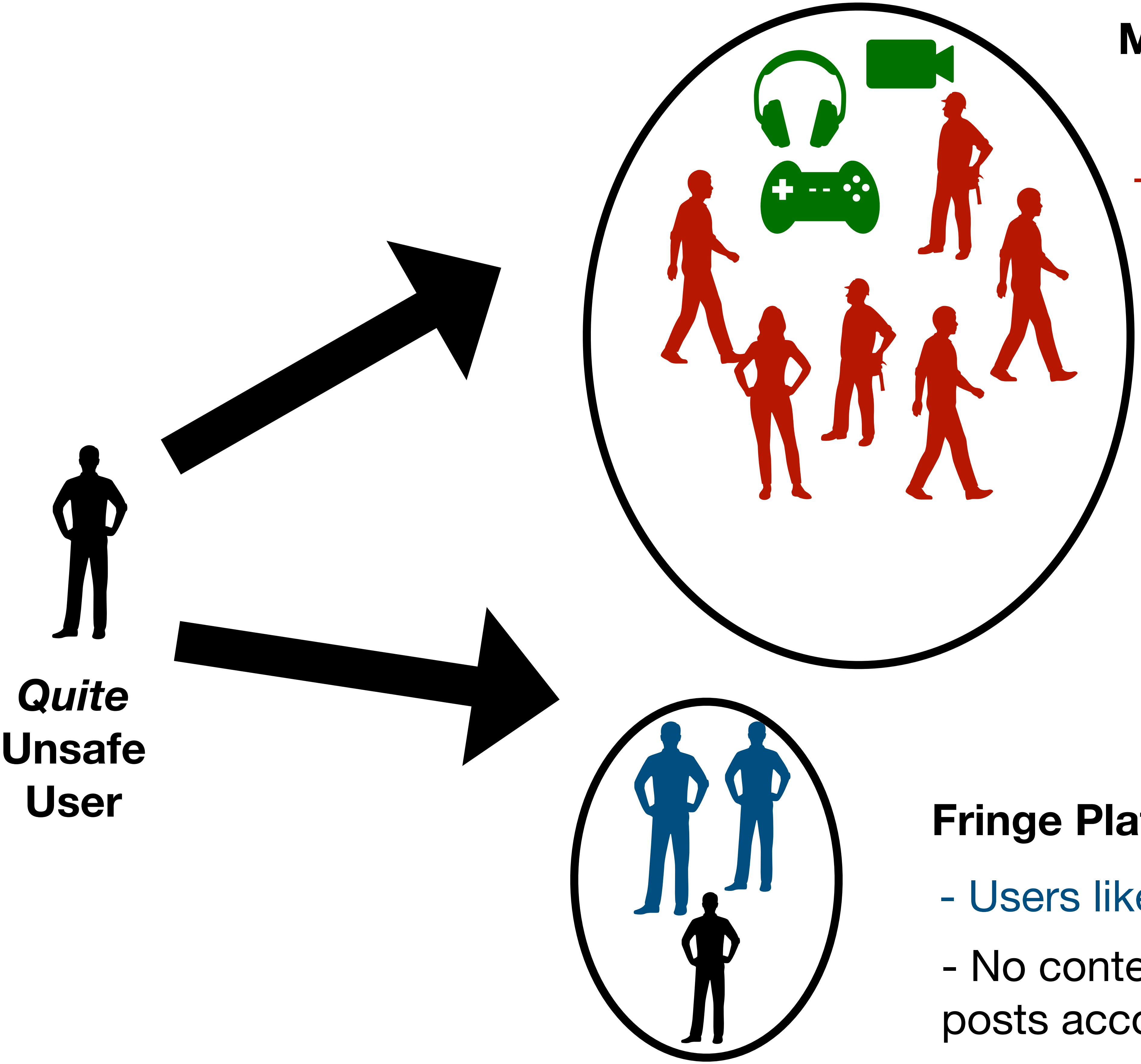
- More (and safer) users

Fringe Platform

- Users like him (in unsafe terms)

- No content moderation:
posts according to his unsafety

Main Mechanism



Quite **Unsafe User**

Moderated Platform

- More (and safer) users

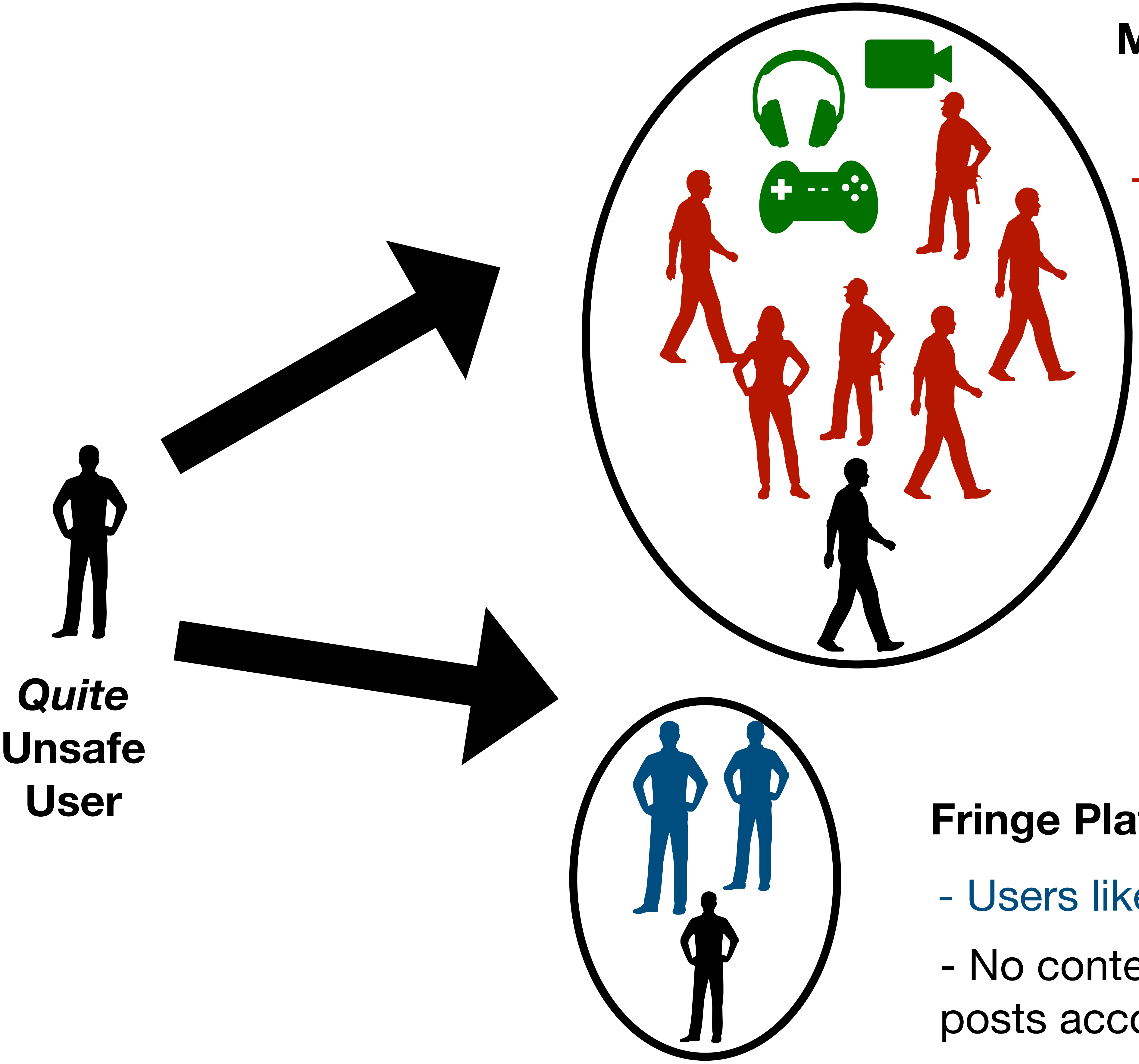
- More Features

Fringe Platform

- Users like him (in unsafe terms)

- No content moderation:
posts according to his unsafety

Main Mechanism



Quite Unsafe User

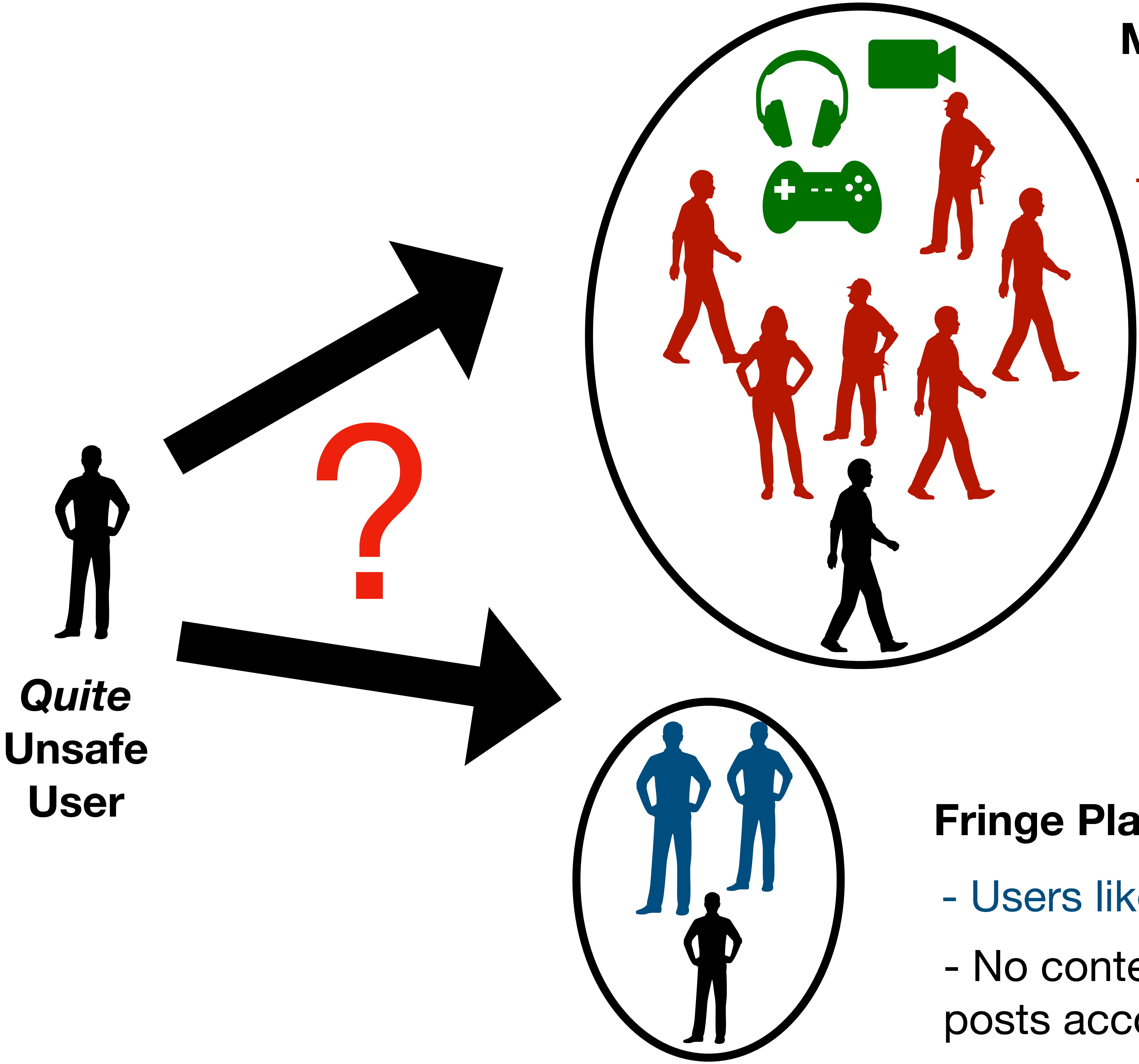
Moderated Platform

- More (and safer) users
- More Features
- Needs to respect the moderation policy: **self-censors**

Fringe Platform

- Users like him (in unsafe terms)
- No content moderation: posts according to his unsafety

Main Mechanism



Moderated Platform

- More (and safer) users

- More Features

- Needs to respect the moderation policy: **self-censors**

Fringe Platform

- Users like him (in unsafe terms)

- No content moderation: posts according to his unsafety

Model

Model

- A unit mass of **users**, heterogeneous in their preferences for unsafe content: $\theta_i \sim U(0,1)$.

High θ = Unsafe content

Model

- A unit mass of **users**, heterogeneous in their preferences for unsafe content: $\theta_i \sim U(0,1)$. High θ = Unsafe content
- 2 **platforms** $j = 1,2$
  - with K_j = **max unsafety level allowed**
  - Assumed $K_2 = 1$, No Content Moderation on the Fringe

Model

- A unit mass of **users**, heterogeneous in their preferences for unsafe content: $\theta_i \sim U(0,1)$. High θ = Unsafe content

- 2 **platforms** $j = 1,2$
  - with K_j = **max unsafety level allowed**
  - Assumed $K_2 = 1$, No Content Moderation on the Fringe

- User i in platform j **creates** 1 piece of content of type θ_i^C

$$\theta_i^C = \min\{\theta_i, K_j\}$$

Model

- A unit mass of **users**, heterogeneous in their preferences for unsafe content: $\theta_i \sim U(0,1)$. High θ = Unsafe content

- 2 **platforms** $j = 1,2$
  - with K_j = **max unsafety level allowed**
  - Assumed $K_2 = 1$, No Content Moderation on the Fringe

- User i in platform j **creates** 1 piece of content of type θ_i^C

$$\theta_i^C = \min\{\theta_i, K_j\}$$

- User i in platform j **reads** a random sample of the content, of avg type $\bar{\theta}_j$

$$\bar{\theta}_j = \int_{i \in j} \theta_i^C \mathrm{d}i$$

= average type of content in platform j

- Platform 1, **moderated**, is intrinsically better than 2, **unmoderated**
- Utilities of user i joining $j = 1{,}2$ are defined as:

- Platform 1, **moderated**, is intrinsically better than 2, **unmoderated**
- Utilities of user i joining $j = 1{,}2$ are defined as:

$$U_1(\theta_i) = \alpha N_1 - |\theta_i - \bar{\theta}_1| + \Delta$$

$$U_2(\theta_i) = \alpha N_2 - |\theta_i - \bar{\theta}_2|$$

- Platform 1, **moderated**, is intrinsically better than 2, **unmoderated**
- Utilities of user i joining $j = 1,2$ are defined as:

# Users in the Platform

$$U_1(\theta_i) = \alpha N_1 - |\theta_i - \bar{\theta}_1| + \Delta$$

$$U_2(\theta_i) = \alpha N_2 - |\theta_i - \bar{\theta}_2|$$

- Platform 1, **moderated**, is intrinsically better than 2, **unmoderated**
- Utilities of user i joining $j = 1,2$ are defined as:

# Users in the Platform

Average "Unsafety" of the Content

$$U_1(\theta_i) = \alpha N_1 - |\theta_i - \bar{\theta}_1| + \Delta$$

$$U_2(\theta_i) = \alpha N_2 - |\theta_i - \bar{\theta}_2|$$

- Platform 1, **moderated**, is intrinsically better than 2, **unmoderated**
- Utilities of user i joining $j = 1,2$ are defined as:

# Users in the Platform

Average "Unsafety" of the Content

$$U_1(\theta_i) = \alpha N_1 - |\theta_i - \bar{\theta}_1| + \Delta$$

$$U_2(\theta_i) = \alpha N_2 - |\theta_i - \bar{\theta}_2|$$

Quality Premium of the Moderated

- Platform 1, **moderated**, is intrinsically better than 2, **unmoderated**
- Utilities of user i joining $j = 1,2$ are defined as:

# Users in the Platform

Average "Unsafety" of the Content

$$U_1(\theta_i) = \alpha N_1 - |\theta_i - \bar{\theta}_1| + \Delta$$

$$U_2(\theta_i) = \alpha N_2 - |\theta_i - \bar{\theta}_2|$$

Quality Premium of the Moderated

(Proxy for competition)

- Platform 1, **moderated**, is intrinsically better than 2, **unmoderated**
- Utilities of user i joining $j = 1,2$ are defined as:

# Users in the Platform

Average “Unsafety” of the Content

$$U_1(\theta_i) = \alpha N_1 - |\theta_i - \bar{\theta}_1| + \Delta$$

$$U_2(\theta_i) = \alpha N_2 - |\theta_i - \bar{\theta}_2|$$

Quality Premium of the Moderated

(Proxy for competition)

Strength of network effects

- Platform 1, **moderated**, is intrinsically better than 2, **unmoderated**
- Utilities of user i joining $j = 1,2$ are defined as:

# Users in the Platform

Average “Unsafety” of the Content

$$U_1(\theta_i) = \alpha N_1 - |\theta_i - \bar{\theta}_1| + \Delta$$

$$U_2(\theta_i) = \alpha N_2 - |\theta_i - \bar{\theta}_2|$$

Quality Premium of the Moderated

(Proxy for competition)

Strength of network effects

Users single-home

- Platform 1, **moderated**, is intrinsically better than 2, **unmoderated**
- Utilities of user i joining $j = 1,2$ are defined as:

# Users in the Platform

Average “Unsafety” of the Content

$$U_1(\theta_i) = \alpha N_1 - |\theta_i - \bar{\theta}_1| + \Delta$$

$$U_2(\theta_i) = \alpha N_2 - |\theta_i - \bar{\theta}_2|$$

Quality Premium of the Moderated

(Proxy for competition)

Strength of network effects

Users single-home

Rk: No outside option!

Advertisers

Advertisers

Buy a fixed amount of ads in the **moderated** platform (1)

Advertisers

Buy a fixed amount of ads in the **moderated** platform (1)

Are **averse** to unsafe content

Advertisers

Buy a fixed amount of ads in the **moderated** platform (1)

Are **averse** to unsafe content

Price of ads: $1 - b\bar{\theta}_1$

Advertisers

Buy a fixed amount of ads in the **moderated** platform (1)

Are **averse** to unsafe content

Price of ads: $1 - b\bar{\theta}_1$

Moderated Platform

Advertisers

Buy a fixed amount of ads in the **moderated** platform (1)

Are **averse** to unsafe content

Price of ads: $1 - b\bar{\theta}_1$

Moderated Platform

- Platform (1) chooses a **content moderation policy**

$K \in [0,1]$: perfectly and costlessly **bans any content** $\theta_i > K$

Advertisers

Buy a fixed amount of ads in the **moderated** platform (1)

Are **averse** to unsafe content

Price of ads: $1 - b\bar{\theta}_1$

Moderated Platform

- Platform (1) chooses a **content moderation policy**

$K \in [0,1]$: perfectly and costlessly **bans any content** $\theta_i > K$

$$\Pi(K) = N_1(K) \times (1 - b\bar{\theta}_1(K))$$

Advertisers

Buy a fixed amount of ads in the **moderated** platform (1)

Are **averse** to unsafe content

Price of ads: $1 - b\bar{\theta}_1$

Moderated Platform

- Platform (1) chooses a **content moderation policy**

$K \in [0,1]$: perfectly and costlessly **bans any content** $\theta_i > K$

$$\Pi(K) = \underbrace{N_1(K)}_{\text{\# users in platform}} \times (1 - b\bar{\theta}_1(K))$$

Advertisers

Buy a fixed amount of ads in the **moderated** platform (1)

Are **averse** to unsafe content

Price of ads: $1 - b\bar{\theta}_1$

Moderated Platform

- Platform (1) chooses a **content moderation policy**

$K \in [0,1]$: perfectly and costlessly **bans any content** $\theta_i > K$

$$\Pi(K) = N_1(K) \times \boxed{(1 - b\bar{\theta}_1(K))}$$

# users in platform

Price of ads

Advertisers

Buy a fixed amount of ads in the **moderated** platform (1)

Are **averse** to unsafe content

Price of ads: $1 - b\bar{\theta}_1$

Moderated Platform

- Platform (1) chooses a **content moderation policy**

$K \in [0,1]$: perfectly and costlessly **bans any content** $\theta_i > K$

$$\Pi(K) = \underbrace{N_1(K)}_{\text{\# users in platform}} \times \underbrace{\boxed{(1 - \overset{\text{Advertisers aversion to unsafe content}}{b}\bar{\theta}_1(K))}}_{\text{Price of ads}}$$

Advertisers

Buy a fixed amount of ads in the **moderated** platform (1)

Are **averse** to unsafe content

Price of ads: $1 - b\bar{\theta}_1$

Moderated Platform

- Platform (1) chooses a **content moderation policy**

$K \in [0,1]$: perfectly and costlessly **bans any content $\theta_i > K$**

Advertisers aversion to unsafe content

$$\Pi(K) = N_1(K) \times (1 - b\bar{\theta}_1(K))$$

Average content unsafety

Price of ads

# users in platform

Advertisers

Buy a fixed amount of ads in the **moderated** platform (1)

Are **averse** to unsafe content

Price of ads: $1 - b\bar{\theta}_1$

Moderated Platform

- Platform (1) chooses a **content moderation policy**

$K \in [0,1]$: perfectly and costlessly **bans any content** $\theta_i > K$

$$\Pi(K) = \underbrace{N_1(K)}_{\text{\# users in platform}} \times \underbrace{\left(1 - \overbrace{b}^{\text{Advertisers aversion to unsafe content}} \underbrace{\bar{\theta}_1(K)}_{\text{Average content unsafety}}\right)}_{\text{Price of ads}}$$

…platform (2) just exists with $K_2 = 1$

Timing

Timing

1. Platform (1) chooses K

Timing

1. Platform (1) chooses K

2. Users choose which platform to join. I focus on threshold equilibria

Timing

1. Platform (1) chooses K

2. Users choose which platform to join. I focus on threshold equilibria

3. Profits and payoffs are realized

Threshold Equilibrium (subgame for given K)

(Assumed) User i joins platform (1) iff $\theta_i < t^*$, otherwise, they join (2)

Threshold Equilibrium (subgame for given K)

(Assumed) User i joins platform (1) iff $\theta_i < t^*$, otherwise, they join (2)

Under some assumptions on α, Δ; and given K,

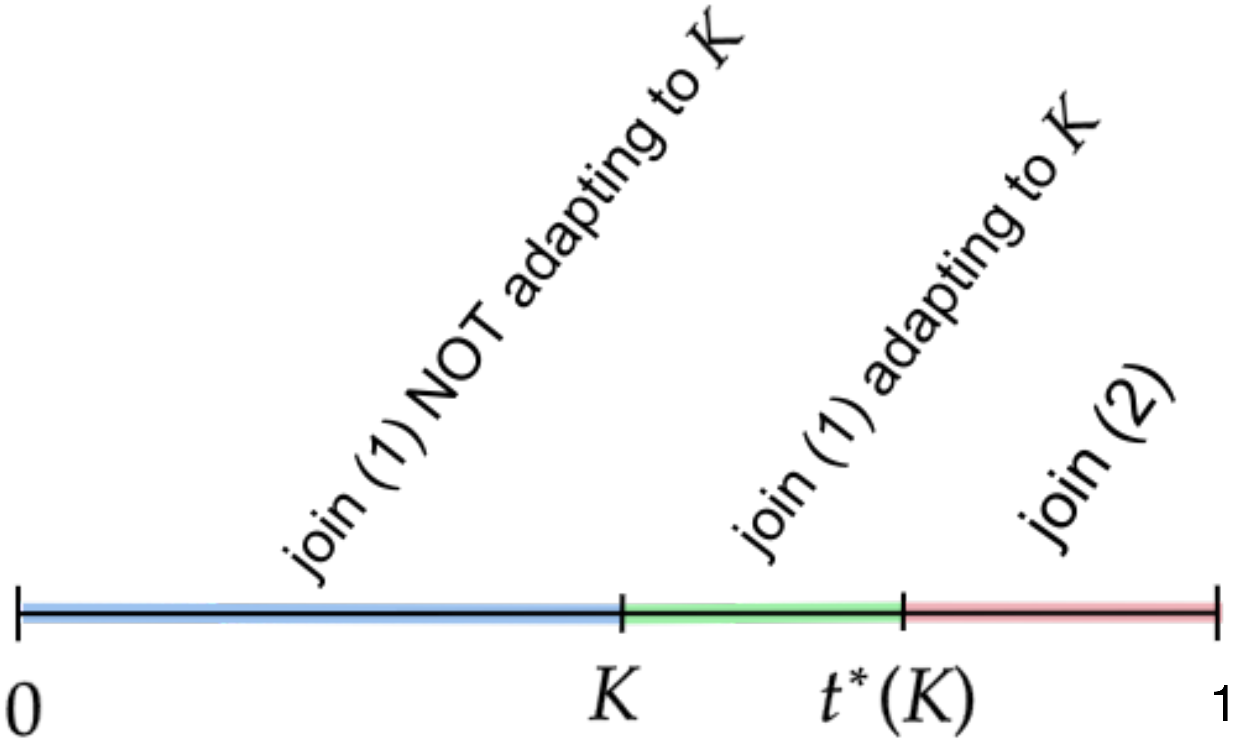
there exist a **unique** threshold **equilibrium**

Threshold Equilibrium (subgame for given K)

(Assumed) User i joins platform (1) iff $\theta_i < t*$, otherwise, they join (2)

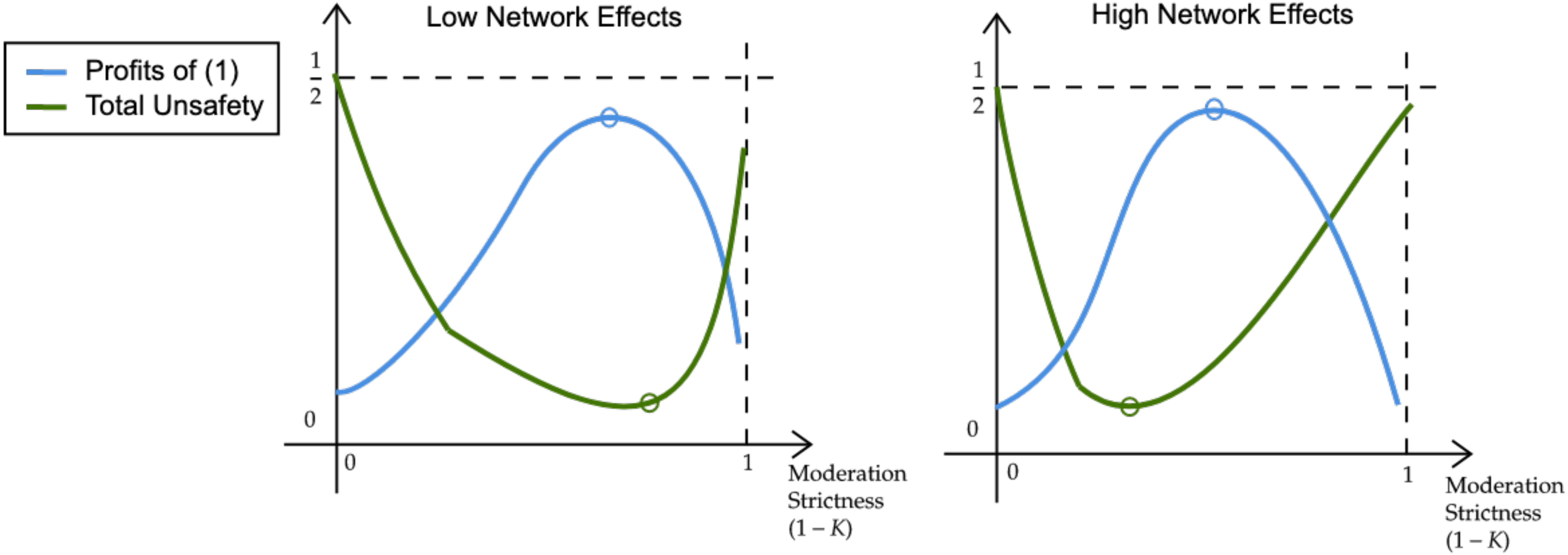
Under some assumptions on α, Δ; and given K,

there exist a **unique** threshold **equilibrium**

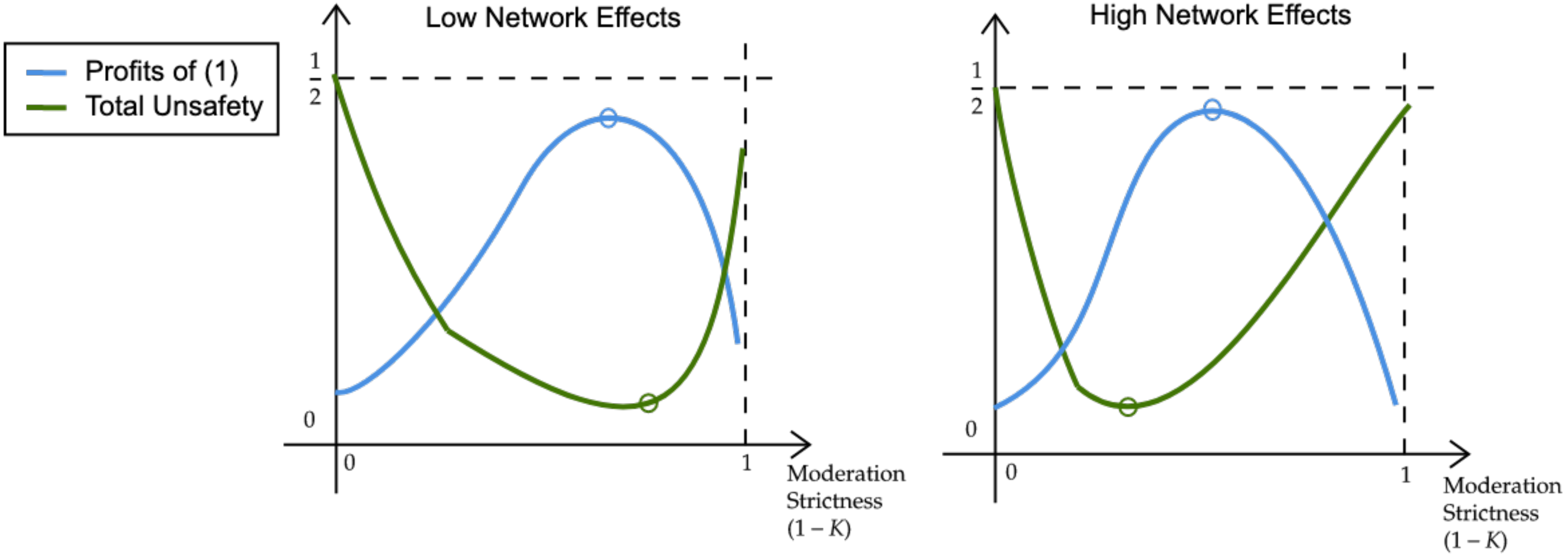


Users Unsafety θ_i

Characterization of the Equilibrium



Characterization of the Equilibrium

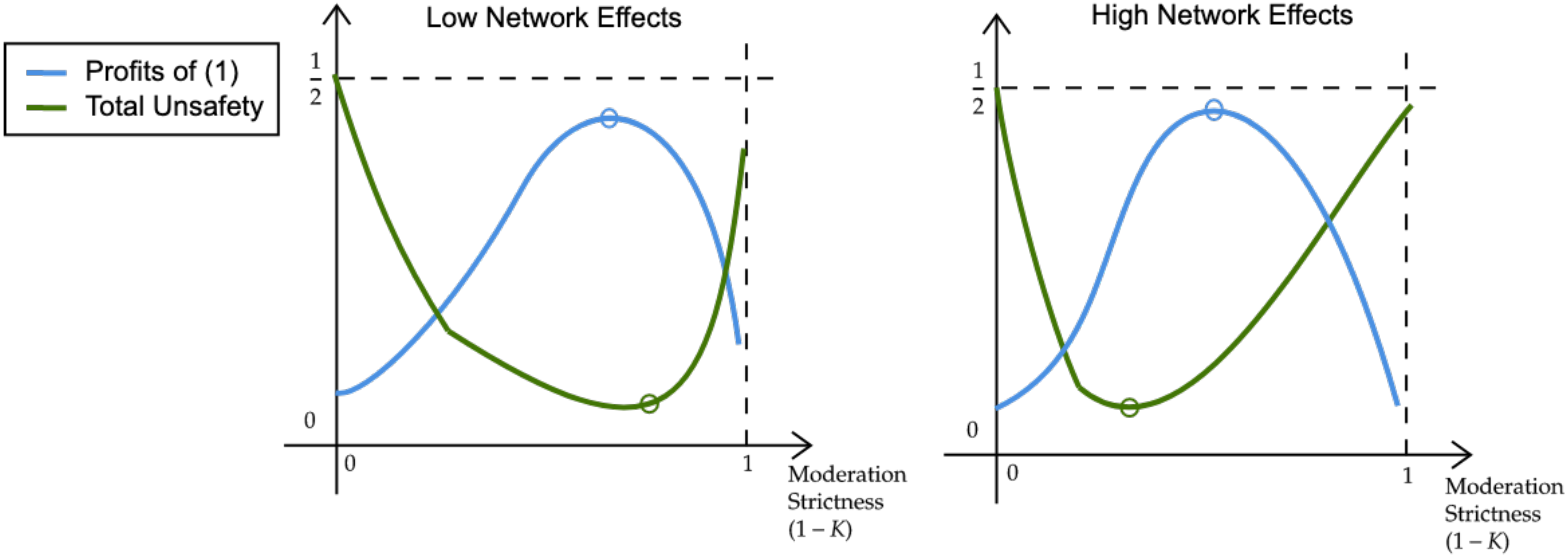


Low Network Effects

High Network Effects

Comparative statics: (excluding corner solutions)

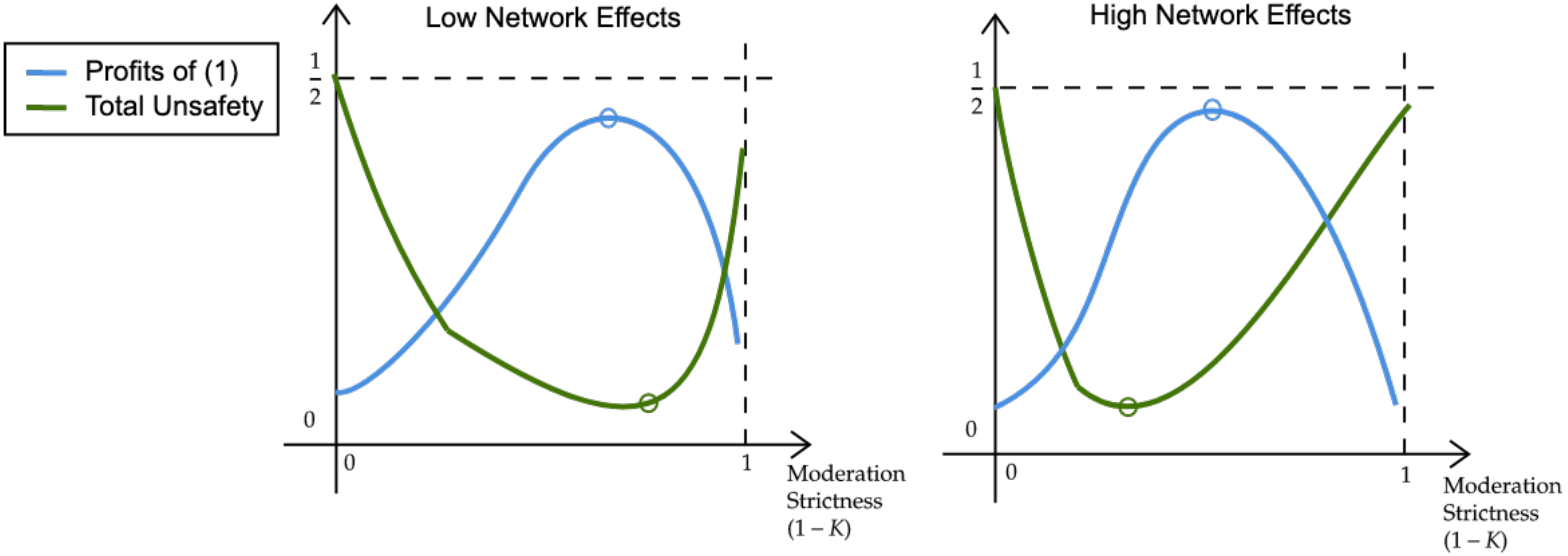
Characterization of the Equilibrium



Comparative statics: (excluding corner solutions)

I) As N.E. ↑, moderation strictness ↓ for **platform** and **regulator**

Characterization of the Equilibrium

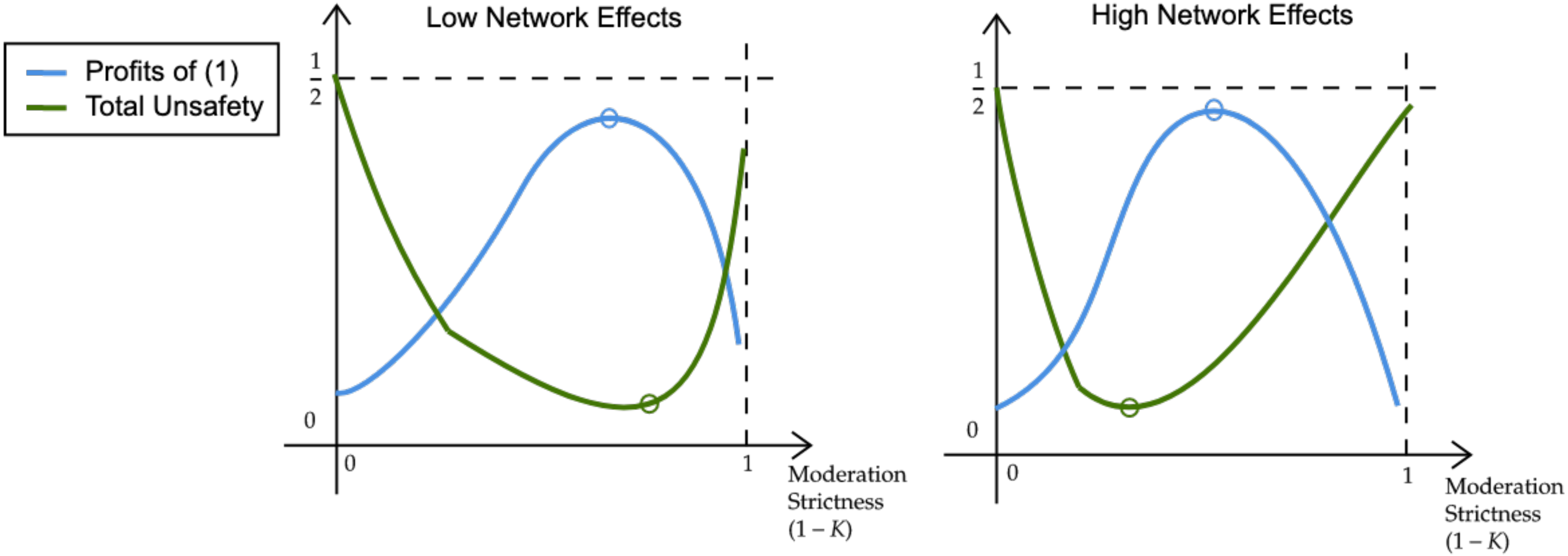


Comparative statics: (excluding corner solutions)

I) As N.E. ↑, moderation strictness ↓ for **platform** and **regulator**

II) It decreases **more** for the **regulator**

Characterization of the Equilibrium



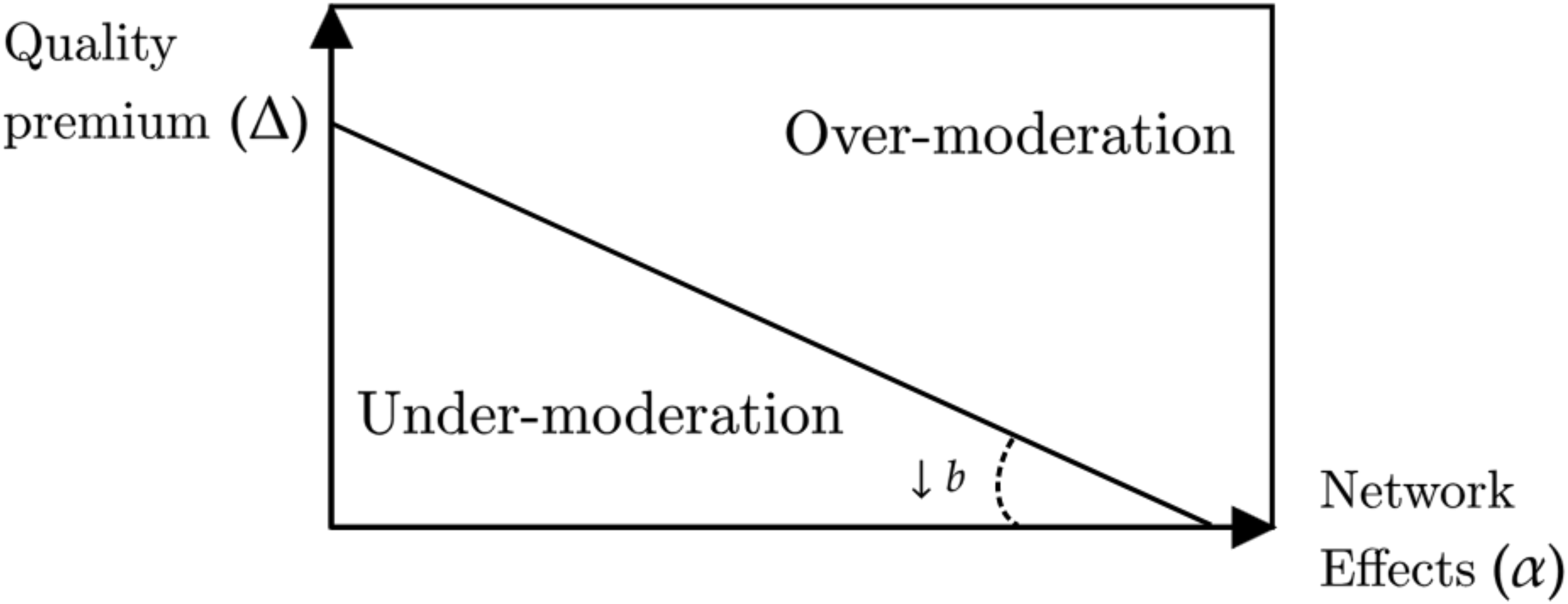
Comparative statics: (excluding corner solutions)

I) As N.E. ↑, moderation strictness ↓ for **platform** and **regulator**

II) It decreases **more** for the **regulator**

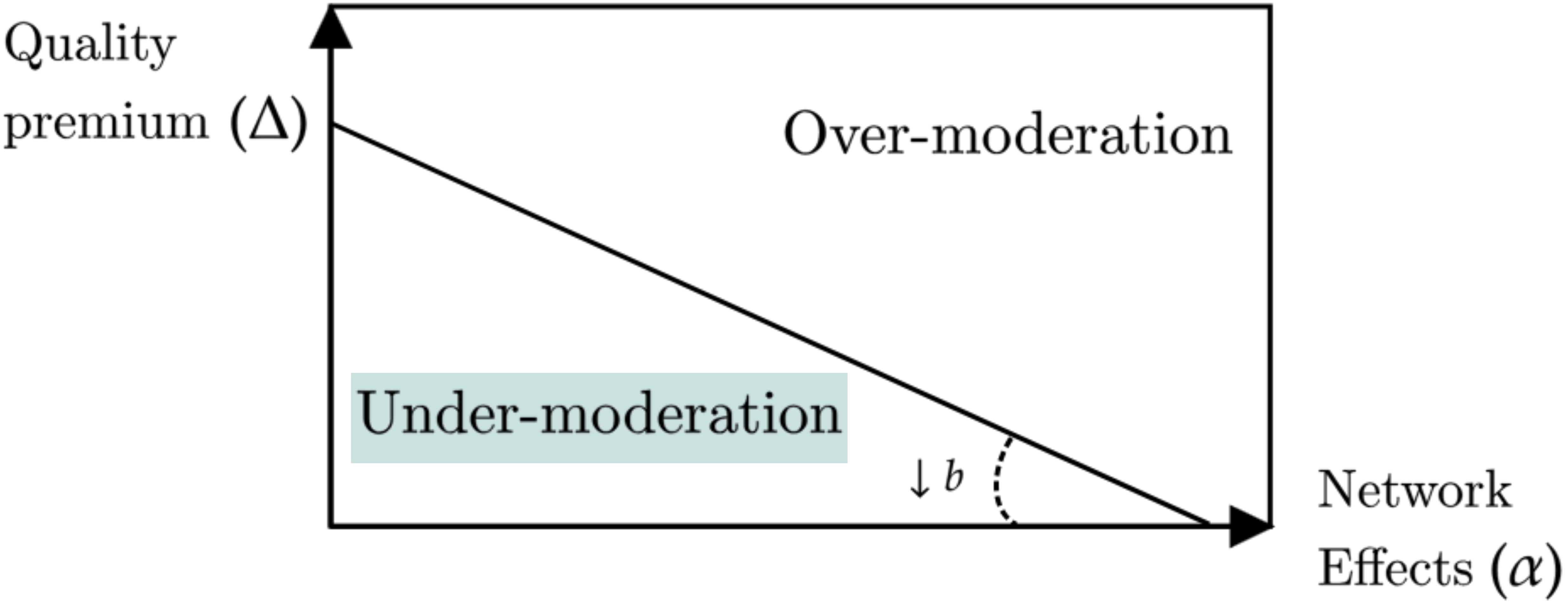
III) As quality prem ↑, strictness ↑ for **platform** but ↓ for **regulator**

Policy Takeaway



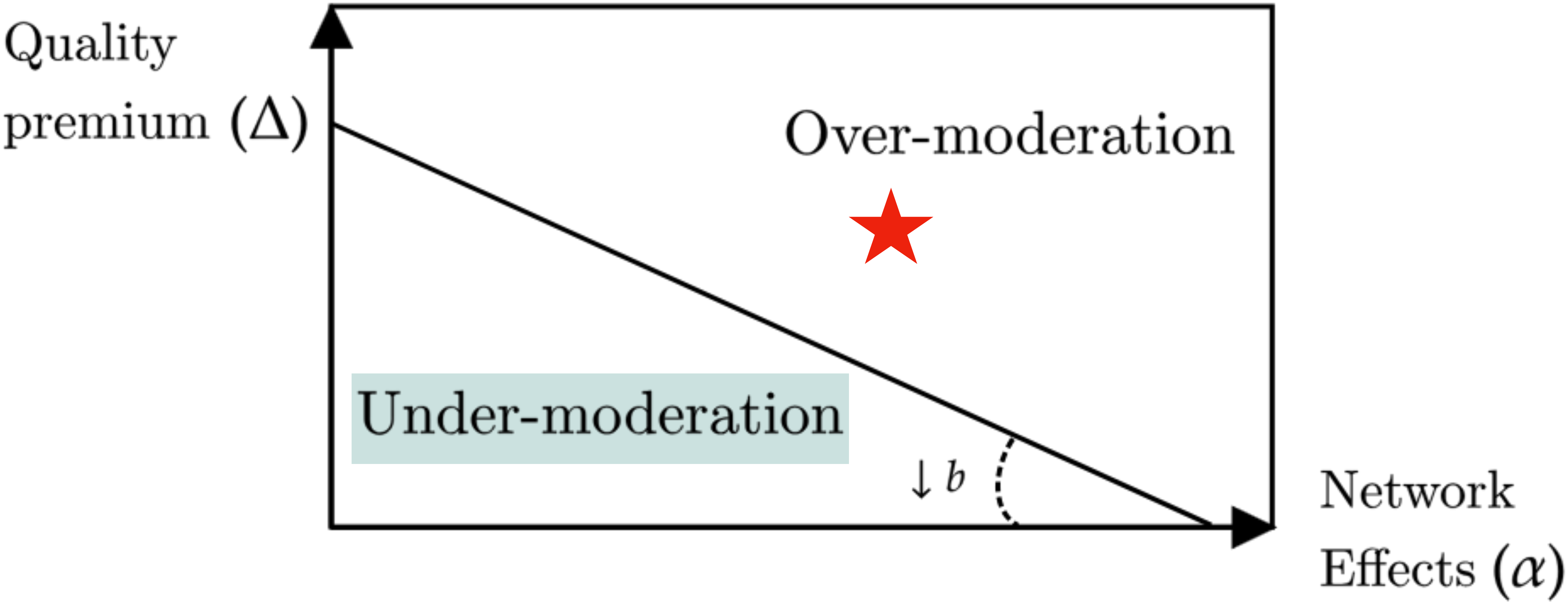
Policy Takeaway

1. Imposing a minimal content moderation (DSA) only useful if **under-moderation**



Policy Takeaway

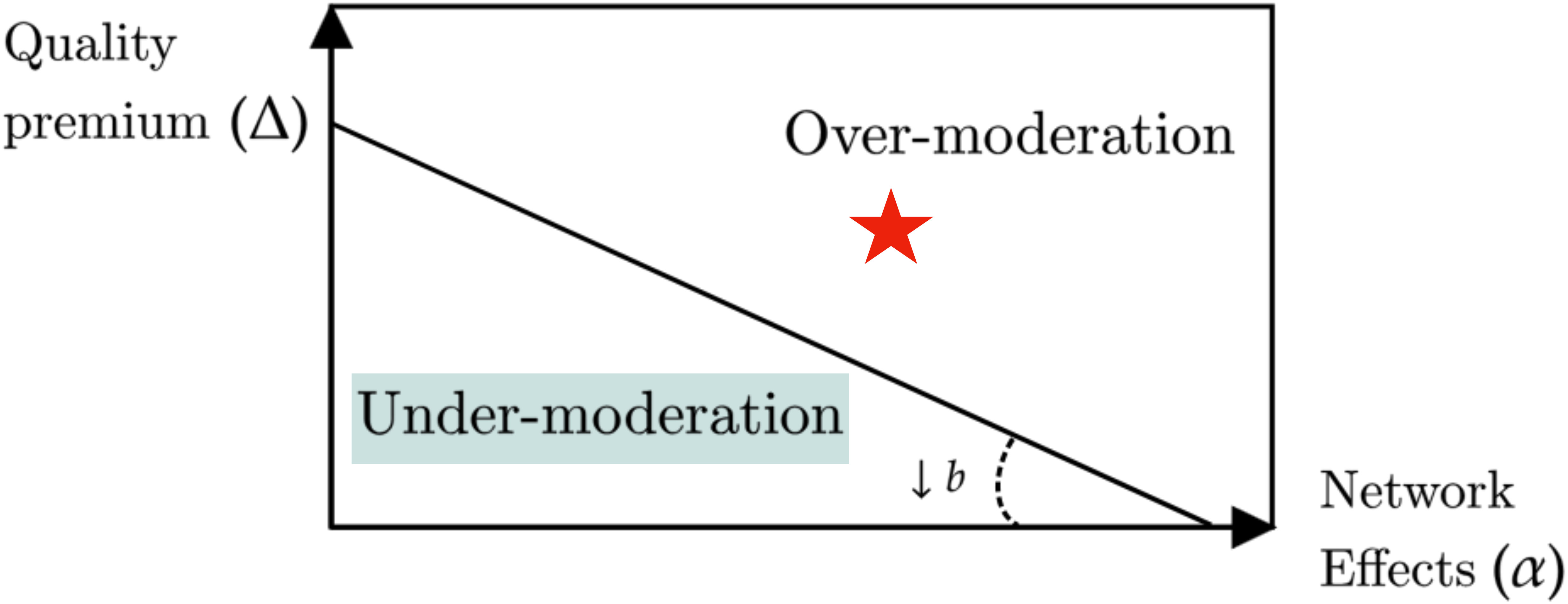
1. Imposing a minimal content moderation (DSA) only useful if **under-moderation**



Policy Takeaway

1. Imposing a minimal content moderation (DSA) only useful if **under-moderation**

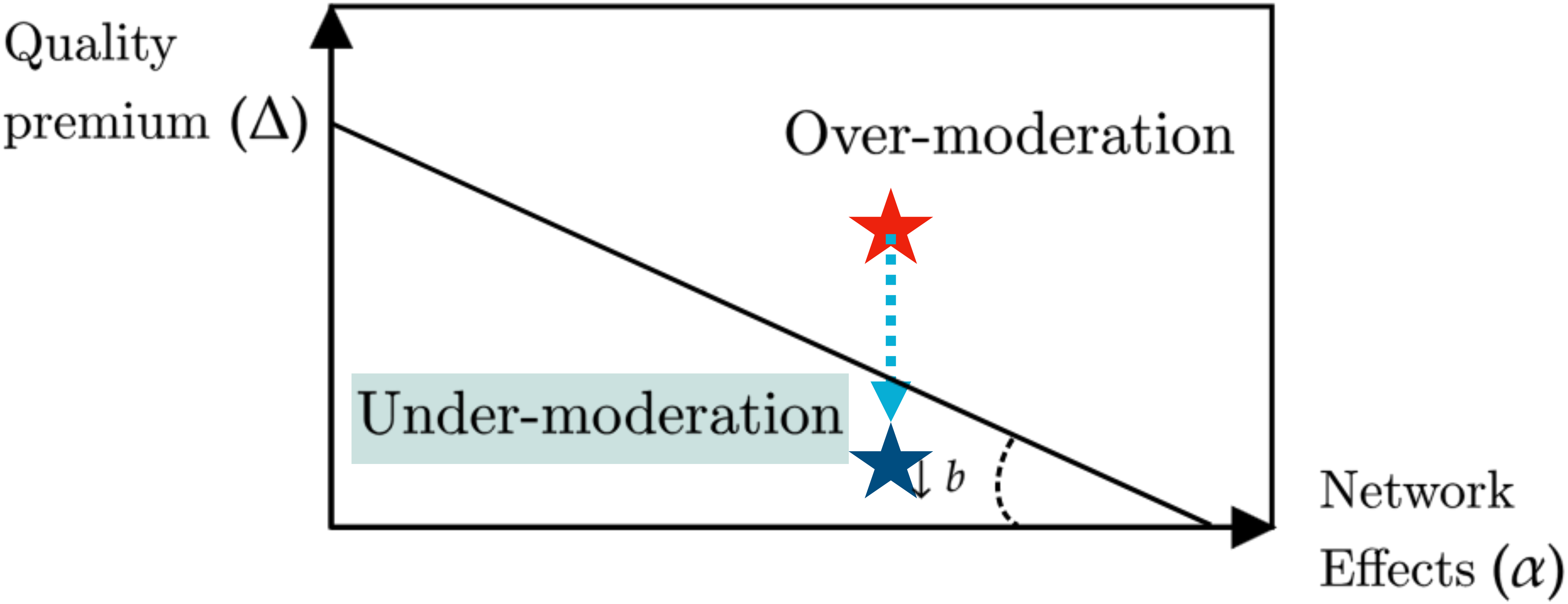
2. DSA **complements** the DMA



Policy Takeaway

1. Imposing a minimal content moderation (DSA) only useful if **under-moderation**

2. DSA **complements** the DMA



Extensions

Extensions

Multihoming

Increase in multihoming value ~ softening network effects

Extensions

Multihoming

Increase in multihoming value ~ softening network effects

Extreme unsafety weighted more

Lenient policies are preferred more

Extensions

Multihoming

Increase in multihoming value ~ softening network effects

Extreme unsafety weighted more

Lenient policies are preferred more

User Surplus

Tends to be maximized with lenient policies

However! Safe users worse-off (e.g. kids & grannies)

Extensions

Multihoming

Increase in multihoming value ~ softening network effects

Extreme unsafety weighted more

Lenient policies are preferred more

User Surplus

Tends to be maximized with lenient policies

However! Safe users worse-off (e.g. kids & grannies)

Monopolist vs outside options

Characterization robust to outside options

Trivially, full moderation = no unsafety