

Bargaining over Remedies in Merger Regulation

Bruce Lyons

Andrei Medvedev

Ryanair/AerLingus

- Notified to DG Comp
- Remedies proposed
- Referred to Phase II
- New remedies proposed
- Final decision deadline
- 30th October 2006
- 29th November 2006
- 20th December 2006
- April 2007?
- 11th May 2007

Negotiating merger remedies

© The Artist from www.cartoonbank.com. All Rights Reserved



Merger regulation under the ECMR

(similar in other major authorities)

- Regulation to preserve *ex ante* competition
 - Dominance test → SIEC test (= consumer welfare)
 - Phase I filter for Phase II investigations
- Number of regulated mergers
 - 3196 qualified (1990 to Nov 2006)
 - Only 19 prohibited
- Why so few?
 - High standard of proof; cautious DG Comp?
 - Many mergers have no competition implications
 - Deterrent effect
 - No obviously anti-competitive proposals
 - Negotiated remedies
 - i.e. modify merger to eliminate anti-competitive effects

Remedy negotiation under ECMR

- Remedies can be offered and accepted in Phase I and/or Phase II
 - Extra time to appraise offers
 - e.g. Ryanair/Aer Lingus
- Of the 3125 Phase I merger cases
 - 4.4% remedied in Phase I (=139 cases)
 - 5.0% referred to Phase II
 - 2.4% withdrawn
- Of the 155 Phase II merger cases
 - 50.3% remedied (=78 cases)
 - 12.3% prohibited
 - 17.4% withdrawn ('quit option')

Asymmetric information in remedy negotiation

- Firms initially know more about competitive effects of a merger than agency knows
- Agency's information gathering depends on available resources
- Agency's resources are largely exogenous to individual mergers
- Phase II allows the agency to learn more information than is possible in phase I

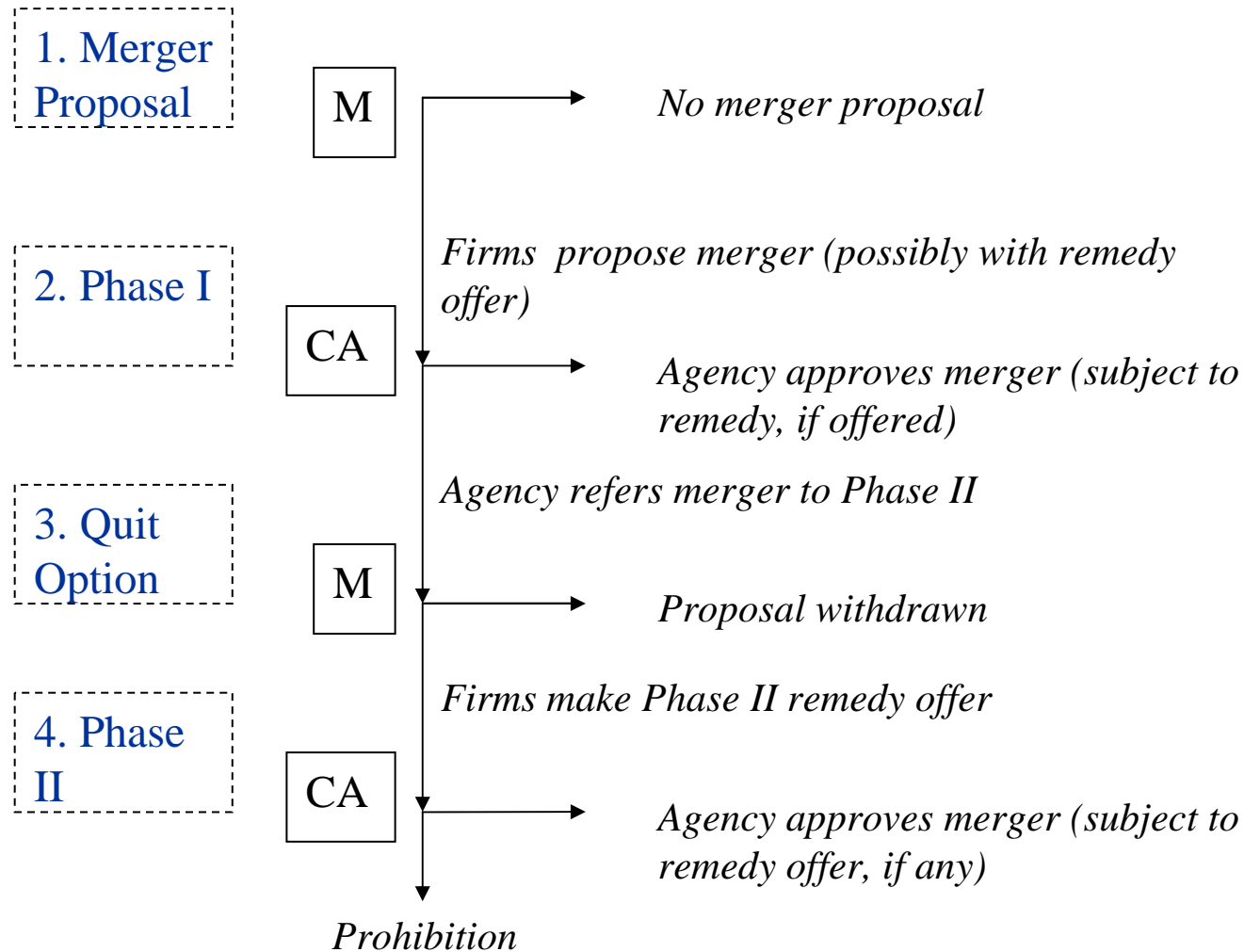
Questions we ask about the remedy negotiation process

- How does a 2-phase inquiry structure affect negotiations?
- How efficient is the process at revealing the truth?
- What types of error are more likely and when?
- How do errors change if more resource is put in the competition agency?
- Should firms prefer a more or less well resourced agency?

Outline of the remainder of this presentation

1. *The model*: assumptions about moves, information and objectives
2. *Case 1*: errors and efficiency of remedy negotiation in single phase investigations
3. *Case 2*: errors and efficiency in 2-phase investigations
4. *Conclusions*

The model: sequence of decision making



The quit option...

© The Artist, from www.cartoonbank.com. All Rights Reserved



Characterisation of remedies

Example: Ryanair – Aer Lingus

*Routes unlikely to
impair competition*

*Routes most likely to
impair competition*

Inter-continental
routes

European
routes

Domestic
Irish routes

$\alpha = 0$

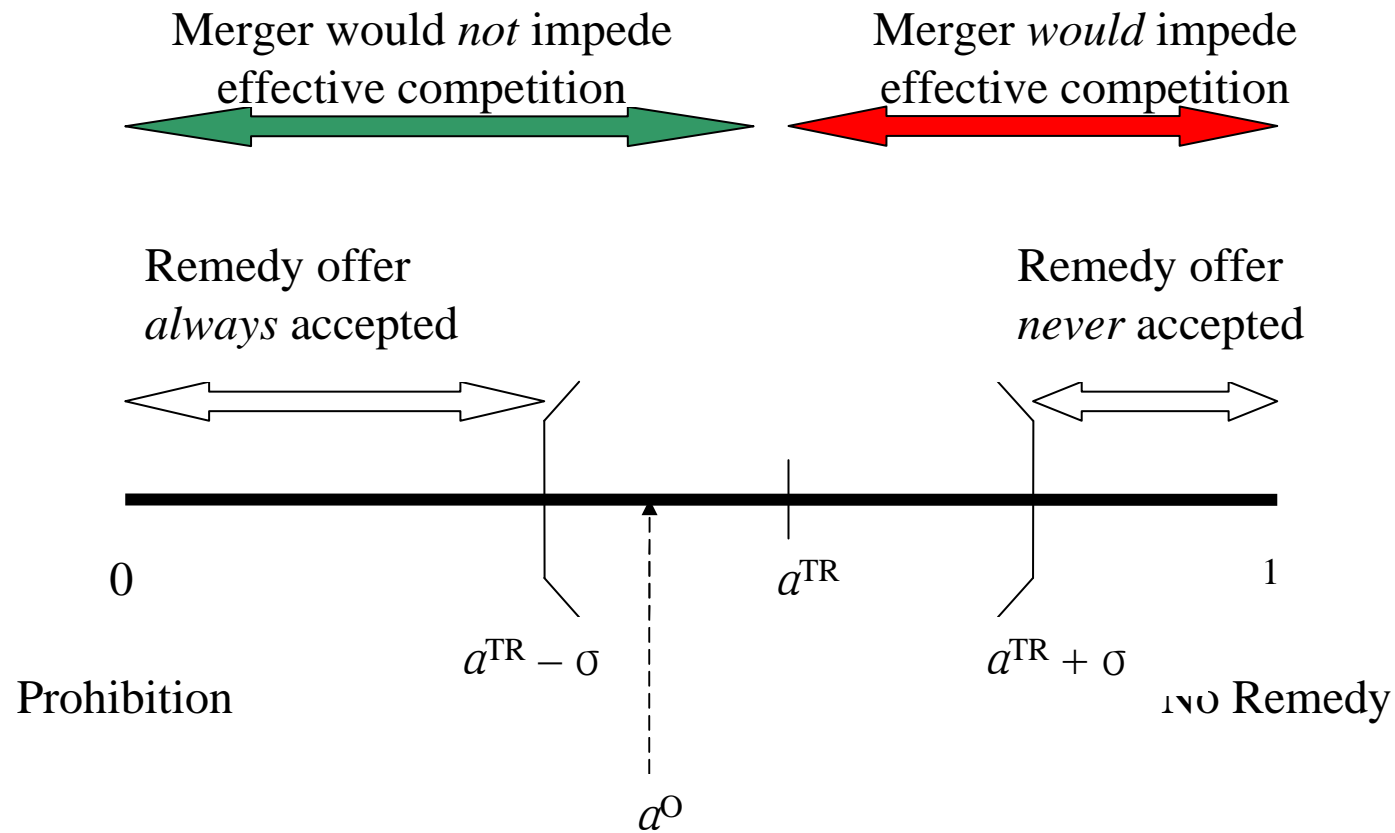
*Divest all
routes*

$\alpha = 1$

*Divest no
routes*

α is the proportion of merged assets that are retained

The model: characterisation of remedies



The model: firms' objective

Choose remedy offers to maximise expected profit:

$$\text{Max}_{\alpha^o, \alpha^{oo}} \left\{ \Pr(\text{Phase I App.}) \alpha^o \pi + [1 - \Pr(\text{Phase I App.})] \left[\Pr(\text{Phase II App.}) \alpha^{oo} \pi - K_F \right] \right\}$$

α^o = Firms' remedy offer in Phase I

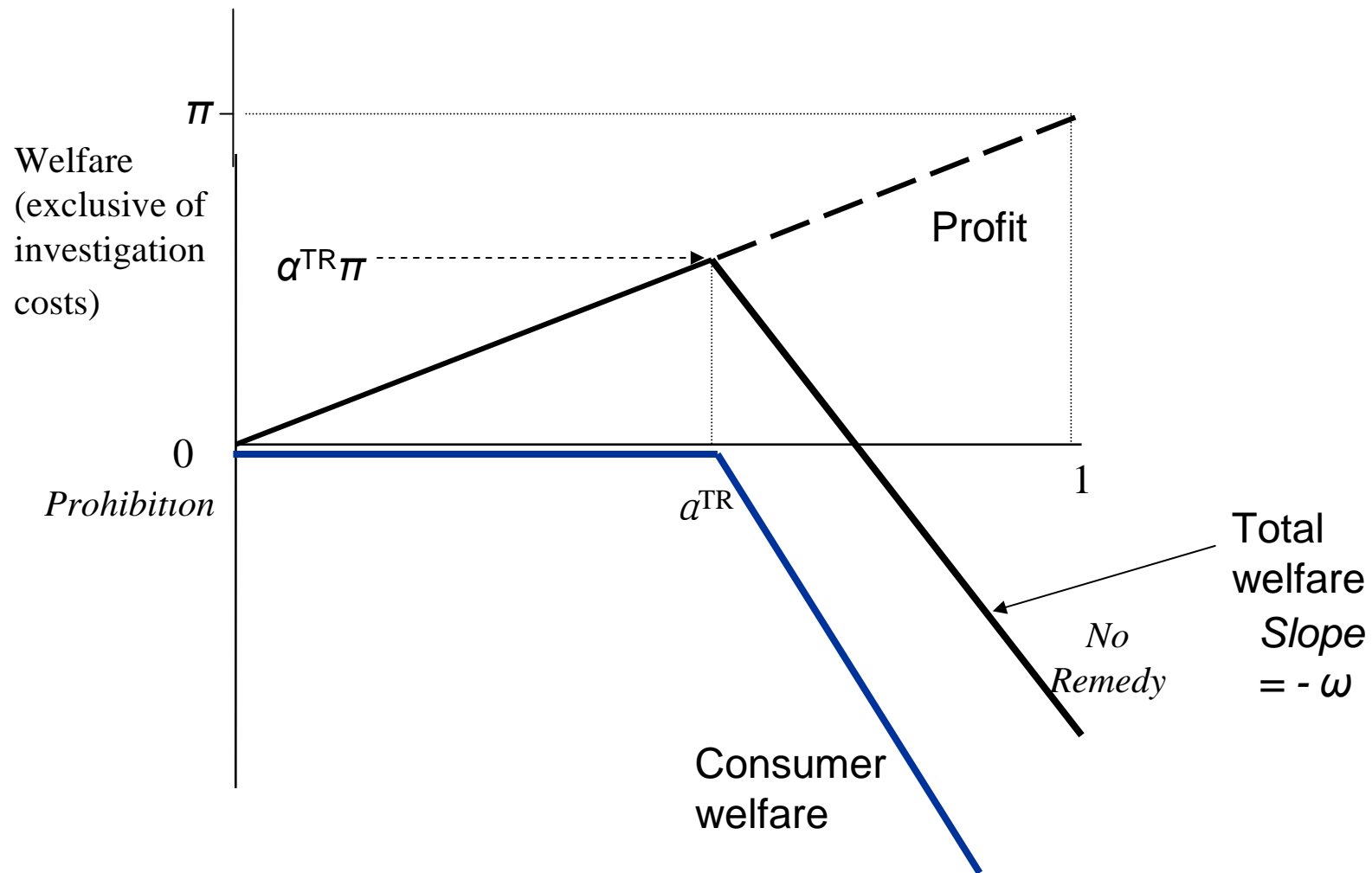
α^{oo} = Firms' remedy offer in Phase II

Note: Quit option relevant if last term in square brackets < 0

The model: agency objective and errors

- Agency objective of no SIEC
 1. No consumer harm
 2. Subject to 1, allow firms to maximise profits
- Broader social objective may be different from delegated objective given to agency
 - Total welfare (inc. profits)
 - Agency investigation costs
 - Firms' compliance costs
- Errors
 - Type 1 = overzealous remedy
 - Type 1D = prohibition or quit option
 - Despite potentially beneficial merger
 - Type 2 = insufficient remedy
 - Type 3 = Phase II investigation costs
 - Incurred due to bargaining failure in Phase I

Welfare effects of alternative remedies



Errors and welfare losses (excluding investigation costs)

<p>\ <i>Firms' offer</i></p> <p><i>Agency decision</i>\</p>	$a^O < a^{TR}$	$a^O > a^{TR}$
<p><i>Approve</i></p>	$[a^{TR} - a^O] \pi$ <i>Type I</i>	$[a^O - a^{TR}] \omega$ <i>Type II</i>
<p><i>Prohibit</i></p>	$a^{TR} \pi$ <i>Type ID</i>	$a^{TR} \pi$ <i>Type ID</i>

Asymmetric information in remedy negotiation [REPEAT OF EARLIER SLIDE]

- Firms initially know more about competitive effects of a merger than agency knows
- Agency's information gathering depends on available resources
- Agency's resources are largely exogenous to individual mergers
- Phase II allows the agency to learn more information than is possible in phase I

The model: information and agency approval

- Phase I provides agency with an unbiased signal, x , of the true remedy, α^{TR}
 - Drawn from uniform distribution with range: $[\alpha^{\text{TR}} - \sigma, \alpha^{\text{TR}} + \sigma]$
 - Support falls entirely within $[0, 1]$
 - Firms know σ but not x
 - σ decreases with resources available to agency
- Agency discovers full truth after Phase II
 - Generalises to $\sigma_1 > \sigma_2 \geq 0$
- Agency approval rule
 - Approve remedy offer *iff* $\alpha^0 \leq x$
 - x is evidence based (independent of α^0)

Some terminology

■ Errors

- Potential harm of merger = $1 - \alpha^{\text{TR}}$
- Size of remedy offer = $1 - \alpha^{\text{O}}$
- Excessive (deficient) remedy = $\alpha^{\text{TR}} - \alpha^{\text{O}} > 0 (< 0)$
- Probability of prohibition = Prob. of failure to agree

■ Investigation costs

- Inaccuracy of investigation = σ
- Relative inaccuracy of Phase I investigation = $\sigma / \alpha^{\text{TR}}$
- Relative cost of Phase II to the firms = $K_F / \alpha^{\text{TR}} \pi$
- Firms' costs relative to agency's inaccuracy = $K_F / \sigma \pi$
= $(K_F / \alpha^{\text{TR}} \pi) / (\sigma / \alpha^{\text{TR}})$

Case 1: single phase investigation

- Firms' objective:

$$\text{Max}_{\alpha^o} \{ \text{Pr}(\textit{Phase I Approval}) \alpha^o \pi \}$$

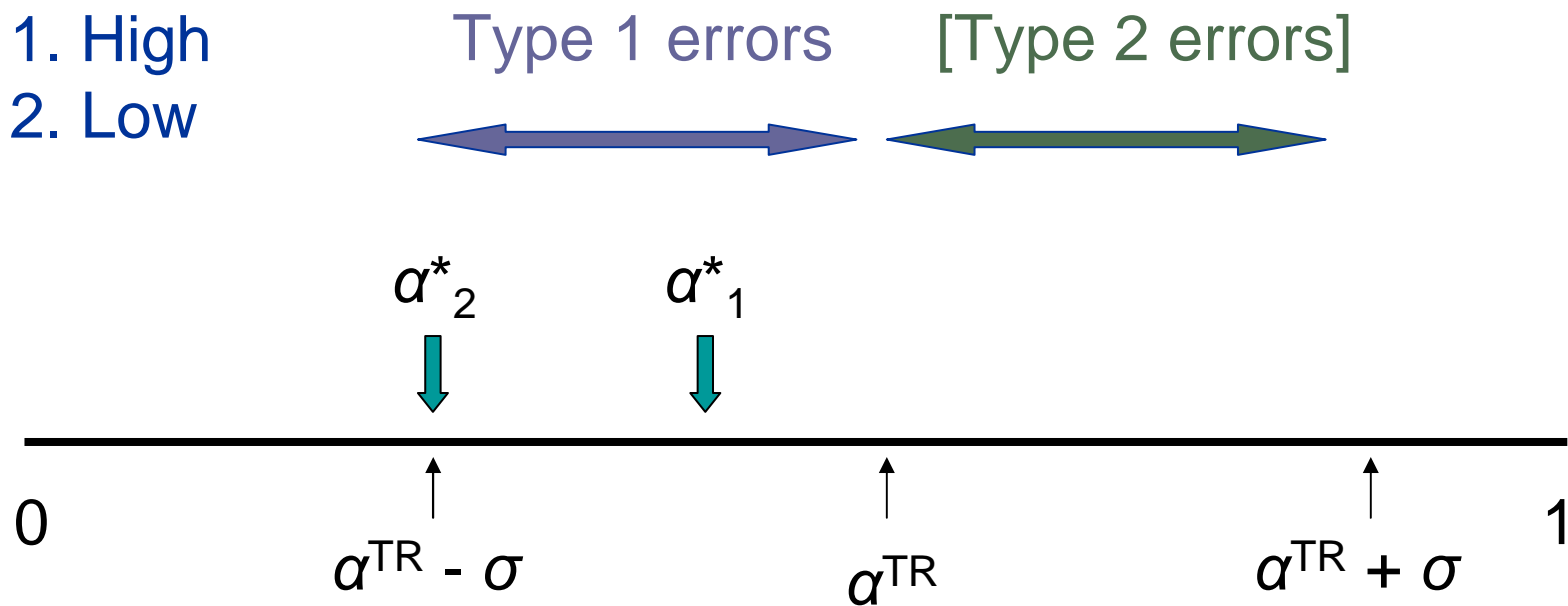
- Optimal offer:

- $\alpha^* = \alpha^{\text{TR}} - \sigma$ if agency is relatively accurate
- $\alpha^* = [\alpha^{\text{TR}} + \sigma]/2$ if agency is relatively inaccurate

Phase I offer depends on $\sigma / \alpha^{\text{TR}}$

$\sigma / \alpha^{\text{TR}}$:

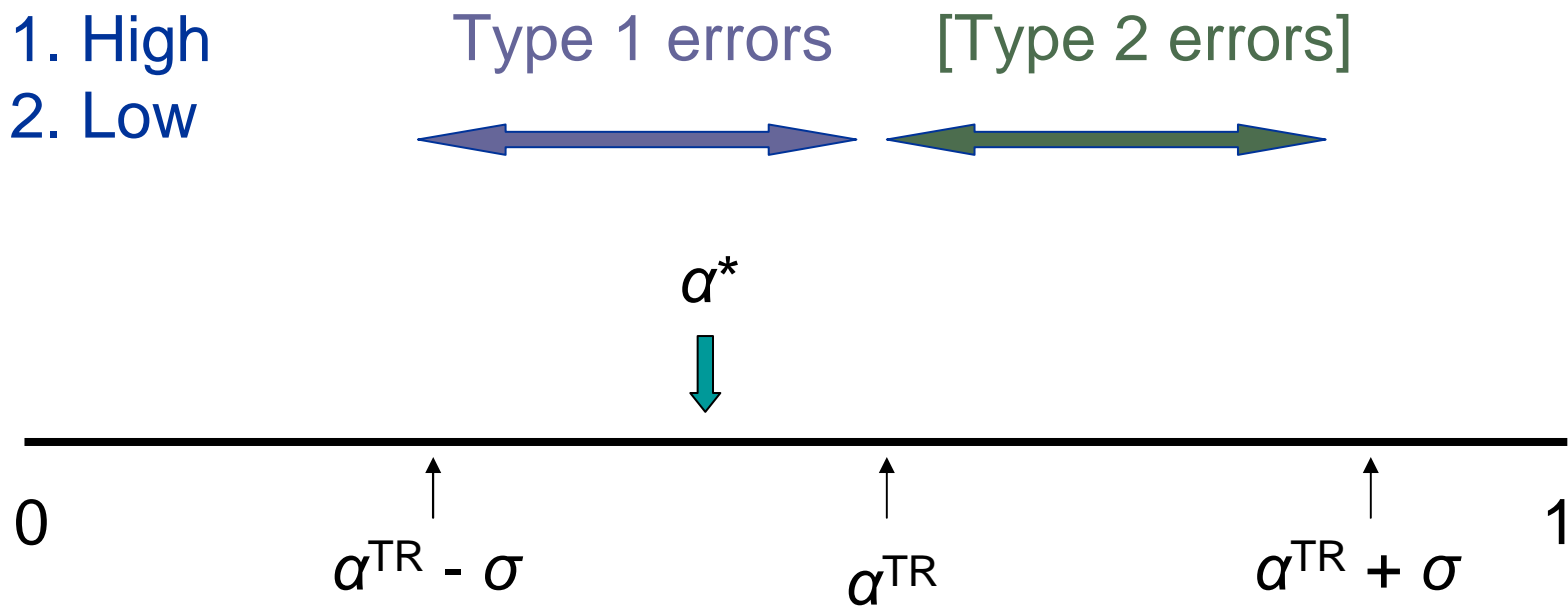
1. High
2. Low



Phase I offer depends on $\sigma / \alpha^{\text{TR}}$

$\sigma / \alpha^{\text{TR}}$:

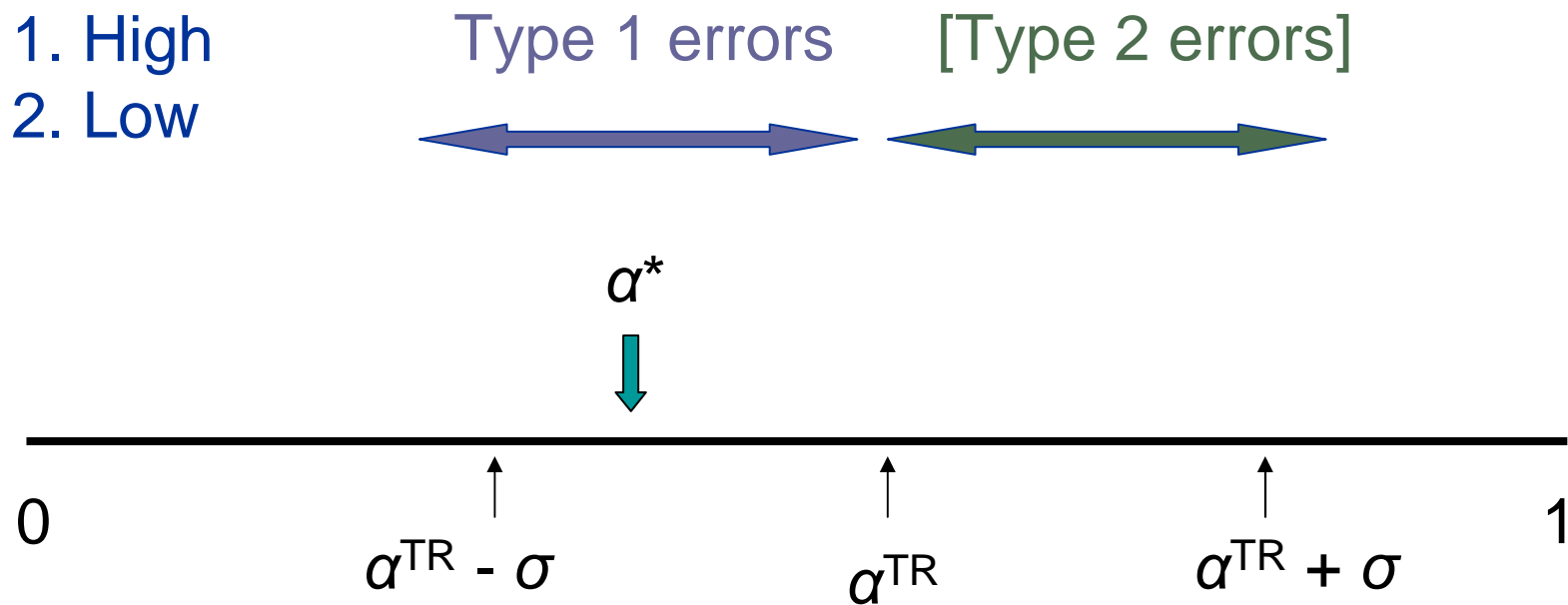
1. High
2. Low



Phase I offer depends on $\sigma / \alpha^{\text{TR}}$

$\sigma / \alpha^{\text{TR}}$:

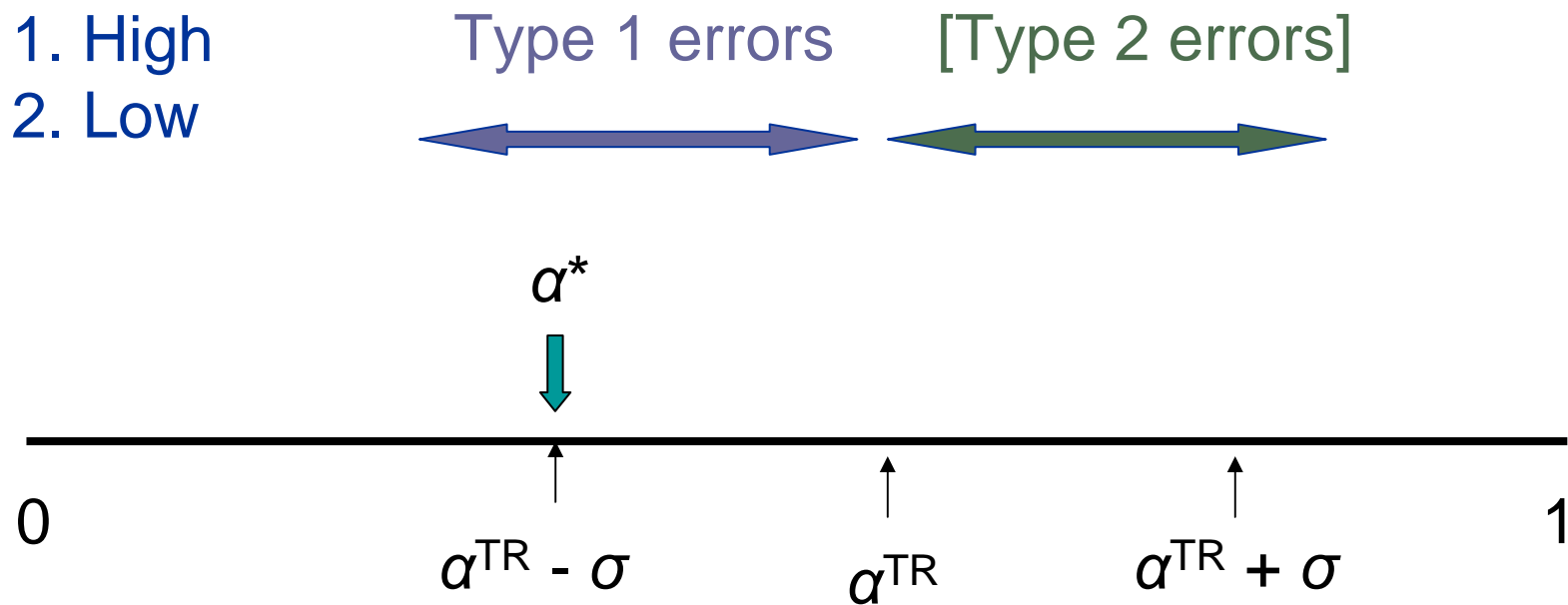
1. High
2. Low



Phase I offer depends on $\sigma / \alpha^{\text{TR}}$

$\sigma / \alpha^{\text{TR}}$:

1. High
2. Low



Phase I offer depends on $\sigma / \alpha^{\text{TR}}$

$\sigma / \alpha^{\text{TR}}$:

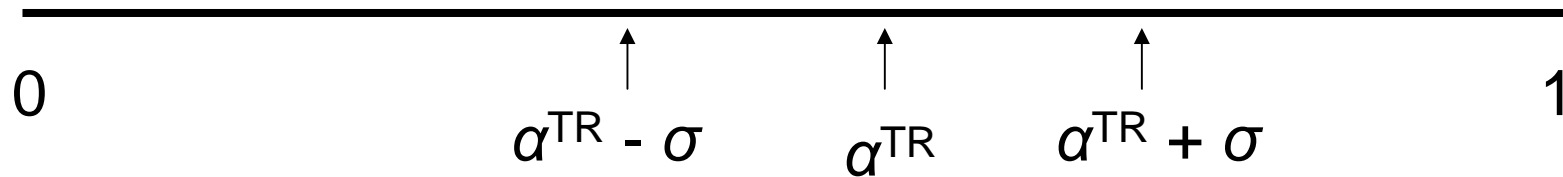
1. High
2. Low

Type 1 errors

[Type 2 errors]



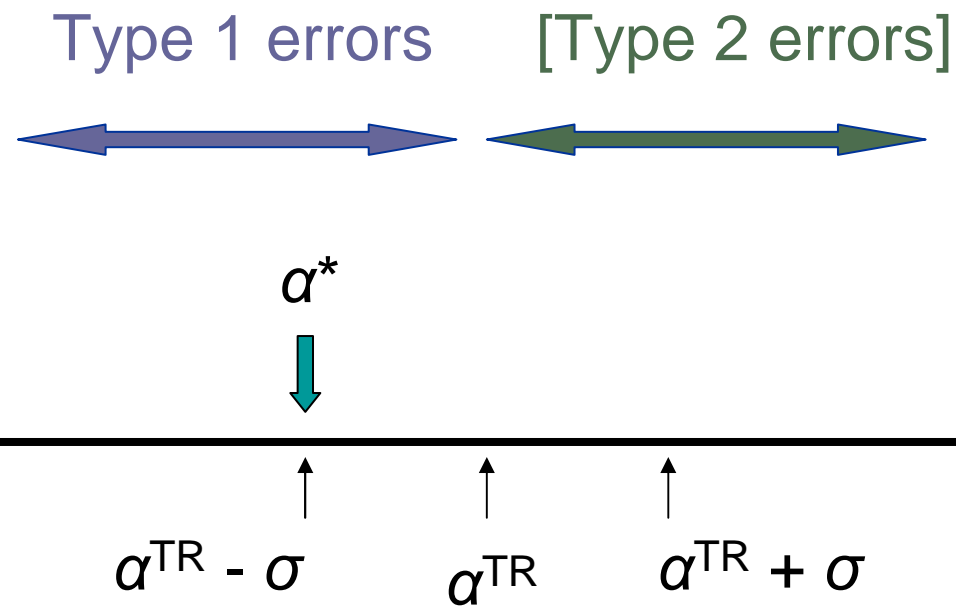
α^*



Phase I offer depends on $\sigma / \alpha^{\text{TR}}$

$\sigma / \alpha^{\text{TR}}$:

1. High
2. Low



Proposition 1: single phase investigation

Define relatively accurate investigation as: $\sigma / \alpha^{TR} < 1/3$

- a) Optimal offer is always excessive (Type I error)
 - If relatively (in)accurate investigation, excess of offer is (in)decreasing in accuracy
- b) Probability of prohibition (Type 1D error) is
 - Zero, if agency is relatively accurate
 - Non-zero & decreasing in accuracy, if relatively inaccurate
- c) Increased resourcing of the agency (= lower σ)
 - Reduces expected cost of errors
 - Even though incremental error may be raised
 - Raises expected profit

Observations on Proposition 1

- Excessive offers by firms do *not* result from risk aversion
 - The bias is created by drastic error if failure to agree
- Case 1 applies also to 2-phase investigations if second phase would be prohibitively expensive

Case 2: two-phase investigation

- Firms' objective:

$$\text{Max}_{\alpha^o} \left\{ \Pr(\text{Phase I App.}) \alpha^o \pi + [1 - \Pr(\text{Phase I App.})] [\alpha^{TR} \pi - K_F] \right\}$$

- Optimal Phase I offer:

- $\alpha^* = \alpha^{TR} - \sigma$

if firms' costs are high
relative to agency inaccuracy

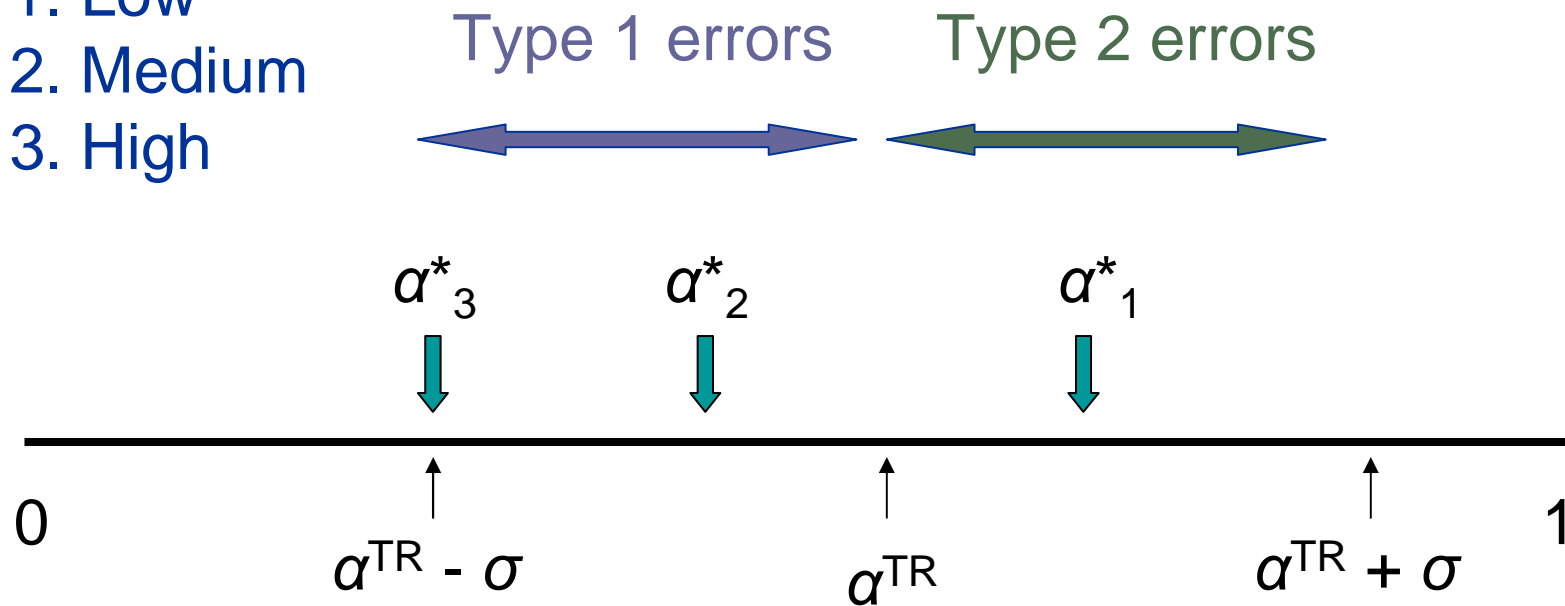
- $\alpha^* = \alpha^{TR} + [\sigma - K_F/\pi] / 2$

if firms' costs are low
relative to agency inaccuracy

Phase I offer depends on $K_F/\pi\sigma$

$K_F/\pi\sigma$:

1. Low
2. Medium
3. High



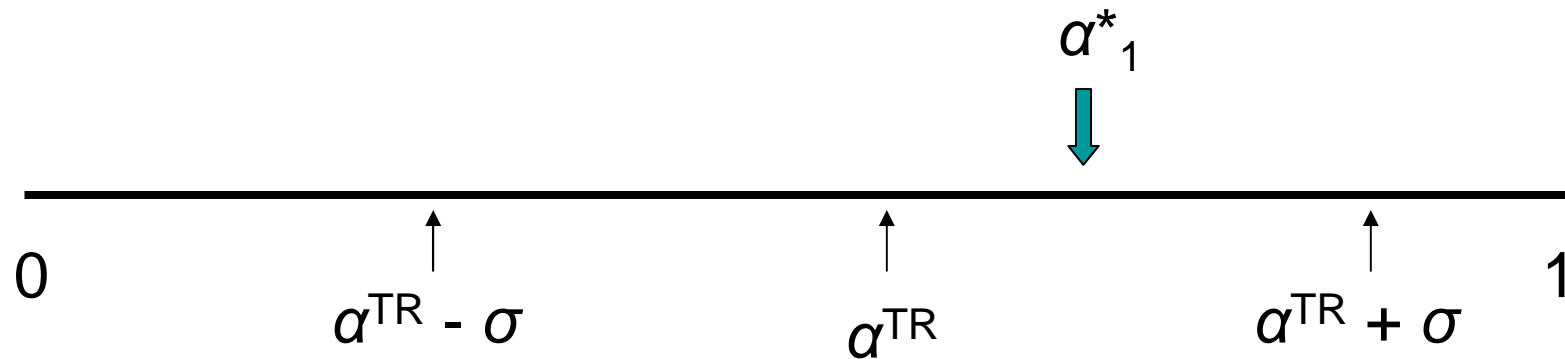
Effect of raising K_F/π

$K_F/\pi\sigma$:

1. Low
2. Medium
3. High

Type 1 errors

Type 2 errors



Effect of raising K_F/π

$K_F/\pi\sigma$:

1. Low
2. Medium
3. High

Type 1 errors

Type 2 errors



α^*_2



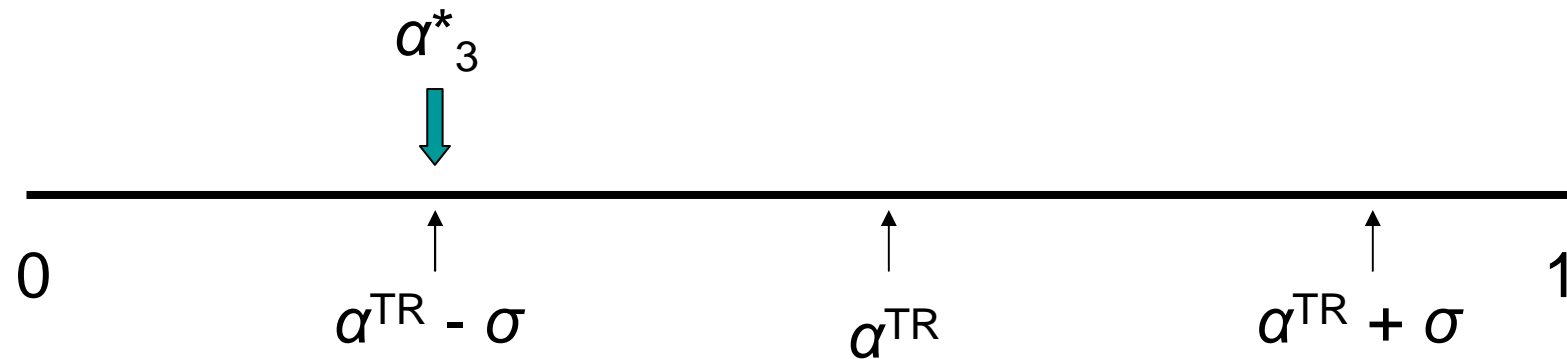
Effect of raising K_F/π

$K_F/\pi\sigma$:

1. Low
2. Medium
3. High

Type 1 errors

Type 2 errors



Proposition 2: two-phase investigation

Define firms' costs relative to agency inaccuracy: $K_F/\pi\sigma$

- a) Optimal offer may be either excessive (= Type I) or deficient (= Type II error)
 - Deficient if 'low' relative costs: $K_F/\pi\sigma < 1$
- b) Probability of Phase II is strictly positive
 - Unless 'high' relative costs: $3 < K_F/\pi\sigma$
 - Decreasing in $K_F/\pi\sigma$
 - Independent of potential harm of merger (α^{TR})
- c) Increased Phase I resourcing
 - Increases incremental error (only) if 'medium': $1 < K_F/\pi\sigma < 3$
 - Always decreases total cost of errors
 - Increases expected profit *except* for 'low': $K_F/\pi\sigma < 1$

Compliance costs, agency accuracy, Type 2 errors and the risk of Phase II

- Going to Phase II has little to do with how harmful a merger might be
 - Depends on incentive for firms to risk a high $\alpha^O - \alpha^{TR}$
- Big mergers (low K_F/π) have relatively low Phase II compliance costs
 - More likely to risk high α^O to try to bluff agency
- Inaccurate/low resourced agencies (high σ) create the incentive for firms to bluff
 - Similar for complex mergers

Effect of increasing agency resources (i.e. reducing σ) on errors and profits

<i>Initial resourcing</i>	<i>Incremental error</i>	<i>Prob. of Phase II</i>	<i>Expected profit</i>
(1) <i>Low:</i> $K_F/\pi < \sigma$	↓ Type 2	↓ Type 1D	↓
(2) <i>Medium:</i> $\sigma < K_F/\pi < 3\sigma$	↑ Type 1	↓ Type 1D	↑
(3) <i>High:</i> $3\sigma < K_F/\pi$	↓ Type 1	-	↑

Questions we have asked about the remedy negotiation process

- How does a 2-phase inquiry structure affect negotiations?
- How efficient is the process at revealing the truth?
- What types of error are more likely?
- How do errors change if more resource is put in the competition agency?
- Should firms prefer a more or less well resourced agency?

...But which circumstances apply, say, to DG Comp?

Remedy negotiation under ECMR

[REPEAT OF SLIDE 4]

- Remedies can be offered and accepted in Phase I and/or Phase II
 - Extra time to appraise offers
 - e.g. Ryanair/Aer Lingus
- Of the 3125 Phase I merger cases
 - 4.4% remedied in Phase I (=139 cases)
 - 5.0% referred to Phase II
 - 2.4% withdrawn
- Of the 155 Phase II merger cases
 - 50.3% remedied (=78 cases)
 - 12.3% prohibited
 - 17.4% withdrawn ('quit option')

Crude calibration

- **WARNING:** simple models should not be taken too literally
 - 2-sided imperfect information, imperfect information in Phase II, functional form, etc, etc
- *Nevertheless:*
 - Of Phase I cases causing concern, roughly half remedied in Phase I and half go to Phase II →
 - *Empirical:* $\Pr(\text{Phase II}) \approx \frac{1}{2}$
 - *Theory:* $\Pr(\text{Phase II}) = \frac{1}{4} [3 - K_F/\sigma\pi]$
 - → $K_F/\sigma\pi \approx 1$ **on average**
 - Or excluding cases unremedied in Phase II →
 - *Empirical:* $\Pr(\text{Phase II}) \approx \frac{1}{3} \rightarrow K_F/\sigma\pi \approx 1\frac{2}{3}$ *on average*
- **Conclude:** all identified cases may to be relevant for some particular mergers

Effect of increasing agency resources (i.e. reducing σ) on errors and profits

<i>Initial resourcing</i>	<i>Incremental error</i>	<i>Prob. of Phase II</i>	<i>Expected profit</i>
(1) <i>Low:</i> $K_F/\pi\sigma < 1$	↓ Type 2	↓ Type 1D	↓
(2) <i>Medium:</i> $1 < K_F/\pi\sigma < 3$	↑ Type 1	↓ Type 1D	↑
(3) <i>High:</i> $3 < K_F/\pi\sigma$	↓ Type 1	-	↑