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Can Internet news media firms make good deals with Internet portals by making coalitions?

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Abstract

The platform for the consumption of newspaper content, since 2000, has been shifted from the traditional printed newspapers to the Internet. This resulted in rapid declines in the reach of newspapers worldwide. When reading news stories online, people in Korea use Internet portal sites more often than newspaper companies' websites. Internet portals share some of their revenues with newspaper firms on individual contract basis, but newspaper firms keep complaining that Internet portals are not providing a fair share with them. This paper views that the unfair revenue sharing between Internet portals and newspaper companies stems fundamentally from the imbalance of negotiation power between the two sides. This paper investigates whether newspaper firms can make coalitions among themselves to increase their negotiation power against Internet portals, and examines the stability of such coalitions. This paper find that internet news media firms can make better deals with internet portal by making stable coalitions, but it is also found that without commitment device, stable coalitions cannot be sustained. In short, newspaper firms should make revenue sharing contract with Internet portal not individually but as a group, and the stability of coalitions can be achieved with a commitment device, suggested in the paper.

Keywords: News Content; Internet Portal; Revenue Sharing; Coalition, Core, Nash Strong Equilibrium.

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1. Introduction

Nowadays, people often read free online news on the internet rather than reading newspapers and magazines. According to Ofcom (2014), the decrease in newspaper readership has been prominent among the age group of under 35. In addition, about 40% of adults in the UK and about 60% of young adults in the age group between 16 and 24 use the Internet for reading news. Even when they read free online news, they get access to news by visiting Internet portals rather than newspaper companies' internet websites. This trend is especially evident in Korea, and Internet portals, since 2000, have become a main online news distribution channel. In the UK, however, about 60% of online news users use the BBC website or app and only about 18% use the Google search engine.

Newspaper companies' major revenue source is advertising, whose revenue depends on the number of newspaper readers. As the number declines, the sales of print news media markets have been shrinking globally and regionally. Even though print news media firms, to revive their market sales, are reshaping their distribution channels by adopting information technologies, their financial future looks dismal in Korea, especially because Internet portals function as a gateway keeper in online news distribution.

Print newspaper companies have been in a nutcracker situation: on one side, they are facing an uphill battle against online-only news companies and, on the other side, they are engaging in tug of war with Internet portals to increase their shares in dividing the revenues generated by Internet portals' news outlets. Still, newspaper firms have competitive edge in creating news content, so they sometimes refuse to offer some news content to and demand more financial reward from Internet portals.

The relationship between Internet portals and news media firms can be seen as a cooperative game. Internet portals see news as a key content to gain attention from people, so it is important for them to acquire good news content from news media firms. Newspaper firms in return receive fees for news content from Internet portals and also enjoy increases in web traffic inflow. Therefore, news media firms have an incentive to cooperate with Internet portals by generating and offering good content. Put differently, the interests of two sides are well aligned, and Fig. 1 summarizes this interdependence between Internet portals and newspaper companies.



Fig. 1 Interdependency between Internet portals and news media firms

However, their relationship can also be understood as a non-cooperative game because their interests are in conflict in sharing Internet portals' revenues generated by news content. In the static perspective, two sides try to maximize their shares in dividing the revenues generated by their collaboration each year and this aspect of the game can be well described by a non-cooperative game. In a non-cooperative revenue sharing game, the outcome often depends on the relative negotiation power of the two sides. In the current Internet ecology, Internet portals have superior negotiation power over newspaper firms because Internet portals are few in number and play a role of major gateway for news distribution. Previous studies argued that news content fees were unequally distributed between Internet portals and newspaper firms (Kim and Nam, 2014; Park, Hwang, and Mo, 2011)).

Newspaper firms can increase their negotiation power by forming a coalition among themselves. This paper focuses on and investigates the possibility of forming coalitions between newspaper companies to enhance their negotiation power. Furthermore, the paper examines the possible coalition structures and the effectiveness of coalition strategies by deriving revenue increases under successful coalitions. This paper shows that news

media firms can increase news content fees by about 31.0% on average after forming a coalition. This paper assumes that Internet portals cannot join coalitions mainly because the coalition including Internet portals can result in unfair competition between a group of newspaper companies in the coalition and the other group out of the coalition. In addition, technically, if Internet portals belong to a coalition, the coalition forming game becomes a noncooperative game. Therefore, this paper focuses on the coalition formation game in which newspaper firms incentives are well aligned. News media firms, as the music content industry did in the past, can form a coalition by establishing a copyright protection association for online news content. In Korea, the Korea Internet-media Journalists Association was established in 2002 and recently the Internet News Association of Korea was also launched. Those associations can function as coalitions in negotiating over revenue sharing with Internet portals and this study can provide meaningful insights for understanding the revenue sharing issue among news media firms and Internet portals.

This paper is structured as follows. Section 2 explores the recent developments in the news media industry of Korea, and section 3 briefly reviews the related literature. Section 4 explains the coalitional game and the concept of coalition formation and section 5 introduces the model of this paper, which reflects the industry environment of Korea. Section 6 reports the results of analyses, and finally section 7 concludes the paper with summarizing implications and suggesting future research directions.

2. The Recent Developments in the Korean Newspaper Industry

Since 2000, with providing of internet and digitalization of content, paradigm of news consumption has changed. Unfortunately, traditional newspaper companies didn't accommodate this change seriously. They didn't develop their own platform for internet news but just contracted with internet portal to provide the news content without any standard contract form. This first handling brought these days uncomfortable relation between news media firms and internet portal.

As time goes by, portal grew enormously and news media firm shrank. For example the revenue of Naver, the number one internet portal company in Korea, increased from 357 billion Korean won in 2005 to 2.3 trillion Korean won in 2013. And the revenue of Chosun, the number one company in the Korean newspaper industry, decreased form 389 billion Korean won in 2005 to 341 billion won in 2013. Fig. 2 shows Naver and Chosun's revenue change.



Fig. 2 Revenue of Naver and Chosun from 2005 to 2013

To breakthrough this situation, news media firms have been struggling to find new business models that will enable them to survive in this internet and digital communication environment. Broadly speaking, news media firms have been taking two paths together for survival: one is to open their own online news platforms on the internet and earn advertising revenue directly; and the other is to provide their news content to internet portals and receive content fee and inflow web traffic. Some news media firms are also use a hybrid form of business model, offering premium content only to subscribers and non-premium content to internet portals.

But, strategies above made any growth of revenue. Since they got off on the wrong foot, consumers already get used to news content consuming behavior in portal. So, first path, opening online news platforms on the internet, didn't make prominent improvement. Besides, their web traffic is highly depend on portal's out-link occurred by second path. And content fee in second path is just 10% of advertisement revenue using web traffic. And premium content is in experimental stage, hard to make noticeable revenue.

In this situation, almost news media firms become really dependent to portal and news media firms started to demand an increase of their shares in dividing portal's advertisement revenue incurred by news content. But their assertion is making tense conflict with portal company's assertion. In detail, each side's point is like follow. Internet news providers think news content is undervalued and they need revaluation of news content, which have highest level of contribution on portal's advertisement revenue. Portal think news content (especially internet news content) are supplying excessively. Portal's main advertisement profit source is search advertisement. So, news content's contribution is evaluated in right way.

As this conflict state showed any change, internet news media firms implemented next strategy, making coalition. Leading under the Korea Newspaper Association, news media firms are under discussion about this issue. This coalition has form of establishing trusting company to trust the copyright of news content like music content industry already doing. After establishing trusting company, news media firms can negotiate with portal with strengthened negotiation power. Without coalition, news media firms are hard to threat portal to do not provide news content since there are too many free news content and absence of little portion of news content don't lead to revenue decrease. But, with coalition, news media firms can threat the portal to do not provide all members' content when portal turn down on coalition's advertisement profit sharing proposal. Additionally, they can ask more value with coalition than without coalition under scientific fair division principle. So news content firms can expect larger advertisement profit share of portal with coalition. Namely, news content revaluation.

3. Literature Review

The studies to find out proper revenue sharing between portal and news media firms are conducted by (Kim and Nam, 2014; Park et al, 2011). Park et al. studied about proper revenue sharing between portal, news media industry, and broadcaster. Especially, they adapted cooperative game theory and Shapley value. Shapley value is the concept of assigning a unique distribution of a total surplus generated by coalition of all players to each cooperative game. The Shapley value is characterized by a collection of desirable properties, efficiency, symmetry, linearity, and zero payoffs to null players.

Kim and Nam studied similar subject, proper revenue sharing between portal and news media firms. They conducted survey and adapted AHP(Analytic Hierarchy Process) method to find contribution of news content to portal's advertisement revenue.

But Park et al. show that news content are undervalued but they regarded news media industry as one player and broadcaster also. So their results mean in condition of grand coalition. And Kim and Nam found that news content's contribution to Naver's advertisement revenue is about 75.5 billion won. But, about revenue sharing, they just suggested traditional half-and-half division.

The cooperative game theory, which we adapted in this paper, originate from the publication in 1953 of the monumental work (Morgenstern & Von Neumann, 1953). The most of the research in n-person cooperative game theory has been concerned explicitly with predicting players' payoff and only with predicting which coalition shall form.

There are many payoff-solution concepts, like various bargaining sets(Robert J Aumann & Maschler, 1961; Davis & Maschler, 1965),

Neumann-Morgenstern solution(Morgenstern & Von Neumann, 1953), core(Gillies, 1959), kernel(Davis & Maschler, 1965), nucleolus(Schmeidler, 1969), and Shapley value(Shapley, 1952). Among many payoff-solution concepts above, Shapley value has been the focus of sustained interest among scholars of cooperative game theory ever since.

In the remarkable 1952 paper by Lloyd Shapley, he proposed that it might be possible to evaluate, in a numerical way, the "value" of playing a game. The particular function he derived for this purpose is the Shapley value. Shapley value is defined as follow.

Definition 1 (Shapley value) For given coalitional game (N, v), where N is set of players and v is characteristic function, the Shapley value of i is

$$\phi_i(v) = \sum_{S \subseteq N\{i\}} \frac{|S|!(n-|S|-1)!}{n!} (v(S \cup \{i\}) - v(S))$$

This formula can be interpreted as mean value of marginal contribution of player i for all permutations.

All researches about payoff-solutions above developed for the case of individual players make grand coalition. But, by the approach taken in the literature on the various bargaining sets(R. J. Aumann & Dreze, 1974) define the extension of (N,v) game with coalition structure **B**. $B = \{B_1, B_2, ..., B_m\}$ is defined to be a finite partition either of the player set N. And they established the connection between coalition structure and above solution notions. But they didn't propose the proper reasoning of existence coalition formation which is not grand coalition in super-additive game.

Owen(1977) studied situations in which players are divided into groups by proposing concept of priori union(priori union structure concept is same with coalition structure in Aumann & Dreze agenda). In this context Owen introduced the Owen value, which is the generalization of Shapley value. After, Hart and Kurz(1984, 1983) refined and simplified Owen value and Owen value is now named coalition value.

Continually with above discussion about coalition value, it is natural to inquire which of the possible coalitions can be expected to form, stable coalition structure. And the question of stability of coalition structures is nearly equivalent to the question of why coalition structures form to begin with. The view of Owen, Hart and Kurz is that the real entity that forms at the end is the coalition of the whole, N, and the coalition structure **B** is formed only as a bargaining tool aiming to increase the payoff of individual members.

Stable coalition structure concepts for games represented by a valuation were introduced by (Shenoy, 1979) and (Hart and Kurz, 1983) in their models of endogenous coalition formation. To predict which coalitions will be formed, they propose different definitions of stability of coalition structure. The variety of stability concepts accounts for the fact that the payoffs of members who breaking coalition depend on the reaction of the external players.

This kind of inquiry of stable coalition structure emerges in many industries and many researchers adapted this cooperative game theory to industrial organization issues. Pintassilgo et al.(2014) surveyed the application of coalition game to the economic analysis of international fisheries agreements. This approach conducted in the fisheries economics literature over the last decade. Vinyals et al. (2012)searched for stable coalition formation among energy consumers in the smart grid. Yamamoto & Sycara (2001) searched for a stable and efficient coalition formation of consumers in the E-marketplaces.

But this theory has never been applied to media industry. So, we will apply coalitional game to news media industry described in Section 2. This approach can overcome the limitations of priori studies to find proper revenue sharing between portal and news media firms.

4. Theory of Stable Coalition Formation

This section includes the definitions of a coalitional game, coalition structure and the coalition value proposed by Hart and Kurz(1983). After that, we review the core, proposed by Shenoy, and static model of coalition formation (γ -model, δ -model) and strong Nash equilibrium proposed by Hart and Kurz.

1) Coalition Value

The universe of players is an infinite subset U. A game v is a realvalued function on all subsets of N satisfying $v(\emptyset) = 0$. We call v(S) the worth of S (S \subset N). A set N \subset U is a carrier of v if $v(S) = v(S \cap N)$ for all S \subset U; we will consider only games with finite carriers.

A coalition structure **B** is a finite partition $\mathbf{B} = \{B_1, B_2, \dots, B_m\}$ of U. For a subset of player N, we will denote the restriction of **B** to N as \mathbf{B}_N ; namely, $\mathbf{B}_N = \{B_k \cap N | k = 1, 2, \dots m\}$, which is a partition of N.

Definition 2 (Coalition value) For each coalitional form game v with coalition structure **B**, coalition value for each player $i \in N$, $B_j \in B$ and $i \in B_j$,

$$\phi_i(v, \mathbf{B}) = \sum_{H \subseteq M, j \notin H} \sum_{S \subseteq B_j, i \notin S} \frac{h! (m - h - 1)! s! (b_j - s - 1)!}{m! b_j!} [v(Q \cup S \cup i) - v(Q \cup S)]$$

where h, s and b_j are the cardinalities of H, S and B_j , and $Q = \bigcup_{k \in H} B_k$.

Again, the coalition value $\phi_i(v, \mathbf{B})$ is the payoff of player *i* participating the game *v*, when players are organized as **B**. And this coalition value also can be interpreted like Shapley value, the mean value of marginal contribution of player *i* for permutations which consistent with given **B**. Namely, satisfying below property.

Property 1 (Consistency with coalition structure) A permutation π is

consistent with a coalition structure **B** when, for all $(i, j) \in C^2, C \in \mathbf{B}$ and $l \in N, \pi(i) < \pi(l) < \pi(j)$ implies that $l \in C$.

But, please note the coalition value is derived from a system of axioms. See (Owen, 1977) for this approach.

2) Coalition Formation

When coalition structure and valuation method is given, we can calculate the payoff vector of game. But when there is no given coalition structure, we can expect the coalition structure occur endogenously by using valuation method among rational agents. In this study, we use coalitional value as a valuation method.

Before establish the game, we should check that why coalition structures appear. The existence of coalition implies that the interactions among the players will be conducted on two levels: first, among the coalition, and second, within each coalition (Hart and Kurz, 1983). Players make coalition to make better payoff by formulating coalition and increasing negotiation power.

Kurz(1988) distinguished three stability concepts about coalition structure. First, the core stability concept is based on following dominance relation. A coalition structure π dominates a coalition structure π' if there exists a coalition in π whose members receive strictly higher payoffs than in π' .

Definition 3 (Core) A coalition structure **B** is called *core stable* if it is undominated by any other coalition structure.

This stable concept means that when a group of players deviate from given **B**, the external players react in such a way as to maximize the payoff of deviating players. So, it's really restrictive concept.

Hart and Kurz(1983) presented strategic form game model of coalition formation which have other external players reaction. In the γ model,

coalitions which are left by some members dissolve. In the δ model,

members of coalitions which lose members remain together and form smaller coalitions.

Formally, for a coalitional game v with the set of players $N = \{1, 2, ..., n\}$, the games of coalition formation, $\Gamma(v, N)$ and $\Delta(v, N)$, are defined as follows.

Definition 4 (γ -model) The game $\Gamma(v, N)$ consists of the following:

- (1) The set of players is N
- (2) For each $i \in N$, the set of strategies of player I is $\Sigma^i = \{S \subset N | i \in S\}$.
- (3) For each *n*-tuple of strategies $\sigma^{i} = (S^{1}, S^{2}, ..., S^{n}) \in \prod_{i=1}^{n} \Sigma^{i}$ and each $i \in N$, the payoff to I is $\phi_{i}(v, \boldsymbol{B}_{\sigma}^{(\gamma)})$, where

$$T^{i}{}_{\sigma} = \begin{cases} S^{i} & \text{ if } S^{j} = S^{i} \text{ for all } j \in S^{i} \text{ ,} \\ \{i\} & \text{ otherwise} \end{cases}$$

and $\boldsymbol{B}_{\sigma}^{(\gamma)} = \{T_{\sigma}^{i} | i \in N\}.$

Definition 5 (δ -model) The game $\Delta(v, N)$ consists of (1), (2) and

(4) For each *n*-tuple of strategies $\sigma^{i} = (S^{1}, S^{2}, ..., S^{n}) \in \prod_{i=1}^{n} \Sigma^{i}$ and each $i \in \mathbb{N}$, the payoff to I is $\phi_{i}(v, \boldsymbol{B}_{\sigma}^{(\delta)})$, where $\boldsymbol{B}_{\sigma}^{(\delta)} = \{T \subset \mathbb{N} | i, j \in T \text{ if and only if } S^{i} = S^{j} \}.$

With above models, Hart and Kurz(1983) characterize the stable coalition structure by using the notion of strong Nash equilibrium. To check the stability of coalition structure, we should be able to map the coalition structure to strategy set of n players. But above models' mapping is not oneto-one. So, they determine the representative strategy set to each coalition structure, σ_B . For a coalition structure **B** and a player $i \in N$, set S^i_B be that element of **B** to which **i** belongs: $i \in S^i_B \in B$. σ_B is determined by putting $\sigma_B = (S^i_B)_{i \in N}$.

Definition 6 (Strong Nash equilibrium) The coalition structure **B** is γ stable(respectively, δ -stable) in the game v with N if σ_{B} is a strong Nash
equilibrium in $\Gamma(v, N)$ (respectively, $\Delta(v, N)$); i.e., if there exists no nonempty $T \subset N$ and no $\hat{\sigma}^{i} \in \Sigma^{i}$ for all $i \in T$, such that $\phi_{i}(v, \hat{B}) > \phi_{i}(v, B)$ for all $i \in T$, where \hat{B} is produced by $((\hat{\sigma}^{i})_{i \in T}, (\sigma^{j}_{B})_{j \in N \setminus T})$ according to
(3) (respectively (4))

In the following analysis, we will check the stability of each coalition structure by using above three stability concepts.

5. Model

In this section, we model the problem of coalition formation among news media firms and portal as a coalitional game. Let $\mathbf{N} = \{\mathcal{P}, f_1, f_2, \dots, f_{n-1}\}$ be the set of players. The symbol \mathcal{P} denote portal and f_i denotes the ith news media firm when we lined up the firms as decreasing page view order. Since the portal 'Naver' is almost monopolized Korean internet portal market, we included only one portal player.

Each player has given characteristic, additional revenue and inflow page view from portal. Let me denote additional revenue to $\mathbf{AR} = \{P_{p}, P_1, P_2, \dots, P_{n-1}\}$, inflow page view from portal to $\mathbf{PV} = \{0, V_1, V_2, \dots, V_{n-1}\}$, and share of inflow page view from portal of ith player $s_i = \frac{V_i}{\sum_{j=1}^{n-1} V_j}$. Note that **PV** of portal is 0.

The P_{p} mean portal's revenue occurred by news content and P_i means news media firm f_i 's revenue occurred by inflow page view from the portal. So, P_i can be calculated by f_i 's advertisement revenue multiply V_1 over f_i 's total page view, approximately. With above variables, characteristic function v is determined as

$$v(S) = \begin{cases} \sum_{i \in S} P_i + \left(\sum_{i \in S} s_i\right)^{\alpha} \cdot P_{p} & \text{if } |S| \ge 2 \text{ and } p \in S \\ 0 & o/w \end{cases}$$

The α in the above function is the real number satisfying $\alpha \in (0,1)$. And this characteristic function contains three assumptions reflecting environments.

(1) The game is inessential if portal is excluded in the game. Namely, just news media firms' coalition can't make surplus.

(2) We quote the Kim and Nam's result about contribution of news content to portal's advertisement revenue. Their result is widely accepted.

(3) Portal's marginal revenue when each firm provides their news content shows diminishing marginality. The level of diminishing marginality denoted as α .

Example 1

When the player set $\mathbf{N} = \{p, f_1, f_2\}$, coalition value of game (v, N, B) to each coalition structure **B** is as follow. We simply described coalition structure $\{1, \{2, 3\}\}$ as $1 \mid 2, 3$.

	<i>₽=J</i> 1	$\Psi_{-}J_{2}$
$\frac{P_1}{2} + \frac{P_2}{2} + \frac{2(s_1 + s_2)^{\alpha} + {s_1}^{\alpha} + {s_2}^{\alpha}}{6} P_p$	$\frac{P_1}{2} + \frac{2(s_1 + s_2)^{\alpha} - 2s_2^{\alpha} + s_1^{\alpha}}{6} P_p$	$\frac{P_2}{2} + \frac{2(s_1 + s_2)^{\alpha} - 2s_1^{\alpha} + s_2^{\alpha}}{6} P_p$
$\frac{P_1}{2} + \frac{P_2}{2} + \frac{(s_1 + s_2)^{\alpha}}{2} P_p$	$\frac{P_1}{2} + \frac{(s_1 + s_2)^{\alpha} - s_2^{\alpha} + s_1^{\alpha}}{4} P_p$	$\frac{P_2}{2} + \frac{(s_1 + s_2)^{\alpha} - s_1^{\alpha} + s_2^{\alpha}}{4} P_p$
$\frac{P_1}{2} + \frac{P_2}{2} + \frac{(s_1 + s_2)^{\alpha} + {s_1}^{\alpha} + {s_2}^{\alpha}}{4} P_p$	$\frac{P_1}{2} + \frac{(s_1 + s_2)^{\alpha} - s_2^{\alpha} + s_1^{\alpha}}{4} P_p$	$\frac{P_2}{2} + \frac{(s_1 + s_2)^{\alpha} - s_1^{\alpha}}{2} P_{p}$
$\frac{P_1}{2} + \frac{P_2}{2} + \frac{(s_1 + s_2)^{\alpha} + {s_1}^{\alpha} + {s_2}^{\alpha}}{4} P_p$	$\frac{P_1}{2} + \frac{(s_1 + s_2)^{\alpha} - s_2^{\alpha}}{2} P_p$	$\frac{P_2}{2} + \frac{(s_1 + s_2)^{\alpha} - s_1^{\alpha} + s_2^{\alpha}}{4} P_p$
$\frac{P_1}{2} + \frac{P_2}{2} + \frac{2(s_1 + s_2)^{\alpha} + s_1^{\alpha} + s_2^{\alpha}}{6} P_p$	$\frac{P_1}{2} + \frac{2(s_1 + s_2)^{\alpha} - 2s_2^{\alpha} + s_1^{\alpha}}{6} P_p$	$\frac{P_2}{2} + \frac{2(s_1 + s_2)^{\alpha} - 2s_1^{\alpha} + s_2^{\alpha}}{6} P_p$
1	$\frac{P_1}{2} + \frac{P_2}{2} + \frac{2(s_1 + s_2)^{\alpha} + s_1^{\alpha} + s_2^{\alpha}}{6} P_p$ $\frac{P_1}{2} + \frac{P_2}{2} + \frac{(s_1 + s_2)^{\alpha}}{2} P_p$ $\frac{P_1}{2} + \frac{P_2}{2} + \frac{(s_1 + s_2)^{\alpha} + s_1^{\alpha} + s_2^{\alpha}}{4} P_p$ $\frac{P_1}{2} + \frac{P_2}{2} + \frac{(s_1 + s_2)^{\alpha} + s_1^{\alpha} + s_2^{\alpha}}{4} P_p$ $\frac{P_1}{2} + \frac{P_2}{2} + \frac{2(s_1 + s_2)^{\alpha} + s_1^{\alpha} + s_2^{\alpha}}{6} P_p$	$\begin{aligned} & \frac{P_1}{2} + \frac{P_2}{2} + \frac{2(s_1 + s_2)^{\alpha} + s_1^{\alpha} + s_2^{\alpha}}{6} P_p & \frac{P_1}{2} + \frac{2(s_1 + s_2)^{\alpha} - 2s_2^{\alpha} + s_1^{\alpha}}{6} P_p \\ & \frac{P_1}{2} + \frac{P_2}{2} + \frac{(s_1 + s_2)^{\alpha}}{2} P_p & \frac{P_1}{2} + \frac{(s_1 + s_2)^{\alpha} - s_2^{\alpha} + s_1^{\alpha}}{4} P_p \\ & \frac{P_1}{2} + \frac{P_2}{2} + \frac{(s_1 + s_2)^{\alpha} + s_1^{\alpha} + s_2^{\alpha}}{4} P_p & \frac{P_1}{2} + \frac{(s_1 + s_2)^{\alpha} - s_2^{\alpha} + s_1^{\alpha}}{4} P_p \\ & \frac{P_1}{2} + \frac{P_2}{2} + \frac{(s_1 + s_2)^{\alpha} + s_1^{\alpha} + s_2^{\alpha}}{4} P_p & \frac{P_1}{2} + \frac{(s_1 + s_2)^{\alpha} - s_2^{\alpha} + s_1^{\alpha}}{4} P_p \\ & \frac{P_1}{2} + \frac{P_2}{2} + \frac{(s_1 + s_2)^{\alpha} + s_1^{\alpha} + s_2^{\alpha}}{6} P_p & \frac{P_1}{2} + \frac{(s_1 + s_2)^{\alpha} - 2s_2^{\alpha} + s_1^{\alpha}}{6} P_p \end{aligned}$

 Table. 1 Coalition value of Example 1

From now on, we'll discuss about stable coalition structure. Before start

the discussion, let me remind the one characteristic of portal and news media firm relationship. If portal make coalition priori with some firms except other firms, it breaks the fair trade rule by restricting the competition. So, the coalition structures which have any coalition contain both portal and news media firm will be excluded from consideration. We'll call the non-excluded coalition structure as *target coalition structure*. For instance, in Example 1, target coalition structure are $p | f_1 | f_2$ and $p | f_1, f_2$.

And, we'll introduce useful proposition to reduce the complex calculation when we search for stable coalition structure. It is well known that each game (v, N) can be uniquely represented as a linear combination of unanimity games:

$$v=\sum_{S\subset N}\alpha_S u_S,$$

Where $u_s(T) = 1$ if $T \supset S$ and $u_s(T) = 0$ o/w, and

$$\alpha_S = \sum_{T \subset S} (-1)^{|S| - |T|} v(T),$$

Proposition 1 : Let (v, N) and (v', N) be two games, $v = \sum_{S \subset N} \alpha_S u_S$ and $v' = \sum_{S \subset N} \alpha'_S u_S$. If $\alpha_S = \alpha'_S$ for all *S* with $|S| \ge 3$, then **B** stable in *v* if and only if **B** is stable in *v'*.

See (Hart and Kurz, 1983) for proof.

According to proposition 5.1, below v' have same stable coalition structure with v.

$$v'(S) = \begin{cases} \left(\sum_{i \in S} s_i\right)^{\alpha} \cdot P_{\varphi} & \text{if } |S| \ge 2 \text{ and } \varphi \in S \\ 0 & o/w \end{cases}$$

This v' means $P_1 = P_2 = \dots = P_{n-1} = 0$. As we can check in Example 1, the coalition value for news media firm *i* contain $\frac{P_i}{2}$ term and coalition value for portal contain $\frac{\sum_{i \in N/\{p\}} P_i}{2}$ no matter which coalition structure

proposed.

Example 2

When the player set $\mathbf{N} = \{p, f_1, f_2, f_3\}$, $\mathbf{AR} = \{100, 0, 0, 0\}$, $\mathbf{PV} = \{0, 1, 1, 1\}$, and $\alpha = 0.5$, coalition value of game (v, N, B) to each target coalition structure \mathbf{B}' is as follow.

Β'	$\phi_{\mathcal{P}}$	$\phi_{-}f_{1}$	$\phi_{-}f_{2}$	$\phi_{-}f_{3}$
$\mathcal{P} \mid f_1, f_2, f_3$	50	16.7	16.7	16.7
$\mathcal{P} \mid f_1, f_2 \mid f_3$	56.6	13.8	13.8	15.7
$\mathcal{P} \mid f_1, f_3 \mid f_2$	56.6	13.8	15.7	13.8
$\mathcal{P} \mid f_1 \mid f_2, f_3$	56.6	15.7	13.8	13.8
$\mathcal{P} \mid f_1 \mid f_2 \mid f_3$	59.8	13.3	13.3	13.3

Table. 2 Coalition value of Example 2

From Example 2, we can check that grand coalition between f_i s take largest payoff from portal in sum. Generally, as number of coalition in coalition structure increase, portal's payoff get larger. And coalition structure $p \mid f_1, f_2, f_3$ is core, gamma stable, and delta stable.

Then, can we find the stable coalition structure in general case? Unfortunately that's impossible. Stable coalition structure result depend on **PV** and α . But, at least, we can make smart guess to find the stable coalition structure.

Example 3

For the most general case, N = { $p, f_1, f_2, \dots, f_{n-1}$ }, AR = { P_p, \sim }, PV = {0, V_1, V_2, \dots, V_{n-1} }, coalition value of two extreme target coalition structure is

В	ϕ_f_i
$\mathcal{P} \mid f_1, f_2, \cdots, f_{n-1}$	$\sum_{\substack{p,f_i \in S}} ((\sum_{i \in S} S_i)^{\alpha} - (\sum_{i \in S/\{1\}} S_i)^{\alpha}) \cdot \frac{(n- S)!(S -2)!}{2(n-1)!}$

$$\mathcal{P} \mid f_1 \mid f_2 \mid \dots \mid f_{n-1} \qquad \sum_{\substack{S \subseteq N \\ \mathcal{P}, f_i \in S}} ((\sum_{i \in S} s_i)^{\alpha} - (\sum_{i \in S/\{1\}} s_i)^{\alpha}) \cdot \frac{(n-|S|)!(|S|-1)!}{n!}$$

Table. 3 Coalition value of Example 3

Let me denote $\mathcal{P} \mid f_1 \mid f_2 \mid \dots \mid f_3$ to < N > and $\mathcal{P} \mid f_1, f_2, \dots, f_3$ to

GC(Grand coalition).

Note that

$$\frac{\phi_{f_i, }}{\phi_{f_i, GC}} = \frac{2(|S|-1)}{n}$$

It means if $|S| < \frac{n}{2} + 1$, $\phi_{f_i, <N>} < \phi_{f_i,GC}$. And remind there is diminishing marginality, $\alpha \in (0,1)$. In conclusion, always $\phi_{f_i, <N>} < \phi_{f_i,GC}$ is satisfied for all *i*. So, the smart guess is stable coalition structure might be GC or some other coalition structure near GC.

For
$$\mathcal{P} \mid f_j \mid f_1, \dots, f_{j-1}, f_{j+1}, \dots, f_{n-1}$$
, coalition value for j is

$$\phi_- f_j = \frac{2(\sum_{i \in N} s_i)^{\alpha} - 2(\sum_{i \in N}/\{j\} s_i)^{\alpha} + s_j^{\alpha}}{6}$$

This value can bigger than $\phi_{f_i,GC}$ or not. Depends on s_j , α , and n. And like comparison between GC and $\langle N \rangle$, we can show above ϕ_f_j is bigger than the ϕ_f_j of $p | f_j, f_i | f_1, \dots, f_{j-1}, f_{j+1}, \dots, f_{i-1}, f_{i+1}, \dots, f_{n-1}$.

So, our strategy to find the stable coalition structure with large n is start from GC and check $\mathcal{P} \mid f_j \mid f_1, \dots, f_{j-1}, f_{j+1}, \dots, f_{n-1}$. If $\phi_- f_j$ is larger when only j deviated, check

$$\mathcal{P} \mid f_j, f_i \mid f_1, \dots, f_{j-1}, f_{j+1}, \dots, f_{i-1}, f_{i+1}, \dots, f_{n-1}$$
, and so on.

6. Result

In this section we apply the real data to model in section 5. The original data is each player's advertisement revenue in 2013 and page view (w/ inflow page view) in 2013 Sep. Below table shows the **AR** and **PV** of portal and top 19 page view firms.

Domain	AR(KRW)	PV	
Portal(Naver.com)	75,500,000,000	0	
Chosun.com	330,721,790	17,168,619	
Donga.com	352,845,919	8,159,551	
Asiae.co.kr	585,464,914	18,297,820	
Joins.com	191,298,028	4,423,761	
Mk.co.kr	3,562,613,131	13,032,901	
hankooki.com	1,243,911,845	16,148,341	
mt.co.kr	434,538,698	10,048,694	
hankyung.com	549,874,247	12,715,825	
seoul.co.kr	3,550,157,066	10,518,479	
newsen.com	245,812,306	5,684,402	
hani.co.kr	2,525,400,465	4,268,680	
khan.co.kr	117,964,222	2,727,919	
ohmynews.com	186,239,556	4,306,784	
mydaily.co.kr	1,173,726,586	1,983,948	
tvreport.co.kr	2,480,852,114	4,193,380	
yonhapnews.co.kr	1,922,802,671	3,250,110	
newsis.com	989,805,790	1,673,067	
segye.com	1,392,383,855	2,353,544	

Table. 4 Given characteristics of portal and 19 news media firms

When $\mathbf{N} = \{\mathcal{P}, f_1, f_2, f_3, f_4\}$ and $\alpha = 0.5$ the result is on below table

B ′	ϕ_{f_1}	ϕ_f_2	ϕ_f_3	ϕ_{f_4}	Stability
$\mathcal{P} \mid f_1, f_2, f_3, f_4$	7,452,896,323	4,324,698,822	7,948,540,344	2,754,716,842	γ
$\mathcal{P} \mid f_1, f_2, f_3 \mid f_4$	6,728,490,056	3,698,373,725	7,216,741,333	2,979,159,986	γ
$\mathcal{P} \mid f_1, f_2, f_4 \mid f_3$	6,275,749,922	3,396,126,380	7,857,079,543	2,022,917,831	
$\mathcal{P} \mid f_1, f_2 \mid f_3, f_4$	6,528,564,722	3,606,198,773	7,112,320,203	2,234,400,646	
$\mathcal{P} \mid f_1, f_2 \mid f_3 \mid f_4$	6,096,130,889	3,244,176,728	7,062,623,667	2,184,704,110	
$\mathcal{P} \mid f_1, f_3, f_4 \mid f_2$	6,536,419,630	4,452,575,744	7,019,967,902	2,128,391,744	γ
$\mathcal{P} \mid f_1, f_3 \mid f_2, f_4$	6,642,428,531	3,749,148,388	7,124,566,381	2,275,732,630	
$\mathcal{P} \mid f_1, f_2 \mid f_3 \mid f_4$	6,283,397,648	3,731,522,816	6,762,544,337	2,258,107,059	
$p \mid f_1, f_4 \mid f_2, f_3$	6,628,771,930	3,612,312,200	7,016,815,999	2,232,990,224	

$\mathcal{P} \mid f_2, f_3, f_4 \mid f_1$	7,374,941,693	3,408,222,129	6,771,393,944	2,030,310,575
$\mathcal{P} \mid f_2, f_3 \mid f_1 \mid f_4$	6,583,476,977	3,253,281,317	6,584,382,167	2,187,695,271
$\mathcal{P} \mid f_1, f_4 \mid f_2 \mid f_3$	6,050,199,281	3,511,981,050	6,916,484,849	1,870,968,179
$\mathcal{P} \mid f_2, f_4 \mid f_1 \mid f_3$	6,363,935,211	3,170,575,738	6,846,073,061	1,843,298,798
$\mathcal{P} \mid f_3, f_4 \mid f_1 \mid f_2$	6,437,338,160	3,514,972,211	6,533,747,553	1,875,369,763
$\mathcal{P} \mid f_1 \mid f_2 \mid f_3 \mid f_4$	6,072,316,369	3,220,362,208	6,551,463,058	1,893,085,267

Table. 5 Coalition value when $\mathbf{N} = \{p, f_1, f_2, f_3, f_4\}$ and $\alpha = 0.5$

There is no core, no delta stable coalition structure, but three gamma stable coalition structure. Note that $s_i = \frac{V_i}{\sum_{j=1}^{19} V_j}$ for all f_i . We can interpret this result as follow.

- 1) The δ -stable structure is empty. Grand coalition break by deviation of f_2 or f_4 . If one player deviated, at least one player among other three players has incentive to deviate also. If two player deviated, that coalition structure dominated by grand coalition.
- 2) Core is the subset of both δ -stable and γ -stable coalition structure. So, core is empty also.
- 3) There are three γ -stable structure, grand coalition, only f_2 deviated, and only f_4 deviated. These structures are stable since the presence of threat, if one deviate, then coalition breaks into individuals, i.e. dissolves.

Note that f_2 and f_4 are firms with small **PV**. The ϕ_f_j of $p \mid f_j \mid f_1, \dots, f_{j-1}, f_{j+1}, \dots, f_{n-1}$ more likely to exceed ϕ_f_j of grand

coalition as α , n increase and s_j decrease.

In the case of $\mathbf{N} = \{\mathcal{P}, f_1, f_2, f_3, f_4, f_5\}$ or $\mathbf{N} = \{\mathcal{P}, f_1, f_2, f_3, f_4, f_5, f_6\}$, there are only γ -stable structures similarly. And the coalition structure is Grand Coalition and $\mathcal{P} \mid f_j \mid f_1, \dots, f_{j-1}, f_{j+1}, \dots, f_{n-1}, \forall i$. Table is in the appendix.

By using above results, we can draw the useful strategy to make better

deals with portals. Making grand coalition is best for all news industry because smaller number of coalition in coalition structure make portal's payoff smaller. Note that it's distribution concept, so it's zero-sum game. But each firm has incentive to deviate from grand coalition to get more payoff. To prevent this phenomenon, all players need to act like γ -model, break into individual if anyone deviate. Like kind of threat. But this threat hard to be a credible threat since other players payoffs are still higher than $\langle N \rangle$ case. So, players need commitment device like contract.

If above strategy success, each player can ask $(\sum_{\substack{S \subset N \\ \mathcal{P}, f_i \in S}} (\sum_{i \in S} s_i)^{\alpha} -$

 $\left(\sum_{i \in \frac{S}{\{1\}}} s_i\right)^{\alpha}$ $\left(\sum_{i \in \frac{S}{\{1\}}} s_i\right)^{\alpha$

7. Conclusion

In these days, news media firms get smaller than < N > case's payoff even though that's the fair value of their news content. And we showed the internet news media firm's fair value with grand coalition is much larger than < N > case. So, the coalition formation has two kinds of effects. First, give power to news media firms to ask their fair division of portal's advertisement revenue. Coalition makes news media firms threat, don't providing their news content, can reduce the portal's advertisement profit noticeably. Second, coalition formation makes news media firms can ask more than before, by using theoretical reasoning.

The grand coalition is best for whole news media industry. But if each player wants to maximize one's payoff, one might deviate the coalition, and it can make coalition collapse. So, we suggested the threat, act as γ -model's

external players. With some contract to force external players to act like that as commitment device.

But, we just checked few cases with small n. Since the calculation amount increase geometrically as n increase, precise calculation for large n leaved for future work. To overcome that limitation, we tried to show the results in general case also and found the rough rule.

The portal and news media firm relationship is common around, the platform and content provider relationship. So, I expect that the model we proposed will suitable to many this kind of relationship and can help the content providers with weak negotiation power from platform's domination.

We expect to develop our research to two possible ways. First way is making more accurate result with large n and more data, with analytic solution (if possible). Second way is extension of model by implementing dynamicity. And contrast the result with static model we solved.

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Appendix

In the case of $\mathbf{N} = \{p, f_1, f_2, f_3, f_4, f_5\}$. Let me skip $\{p\}$ and denote f_i to just *i*. The unit is million won.

Β'	$\phi_{-}f_{1}$	ϕ_f_2	ϕ_{f_3}	$\phi_{-}f_{4}$	ϕ_{f_5}	Stability
1,2,3,4,5	6659	3828	7122	2412	7015	γ
1,2,3,4 5	5716	3082	6161	1818	7406	γ
1,2,3,5 4	6034	3293	6490	2899	6421	γ
1,2,3 4,5	5777	3152	6222	2136	6643	
1,2,3 4 5	5505	2917	5947	2116	6623	
1,2,4,5 3	5609	3018	7433	1780	6054	γ
1,2,4 3,5	5765	3139	6447	1879	6420	
1,2,4 3 5	5300	2786	6341	1604	6314	
1,2,5 3,4	5712	3112	6651	2116	6154	
1,2 3,4,5	6069	3378	6188	1877	6181	
1,2 3,4 5	5440	2898	5942	1716	6297	
1,2,5 3 4	5421	2866	6620	2085	5879	
1,2 3,5 4	5613	3003	6017	2068	6020	
1,2 3 4,5	5420	2887	6294	1706	5934	
1,2 3 4 5	5241	2739	5984	1758	5987	
1,3,4,5 2	5861	4295	6312	1876	6269	γ
1,3,4 2,5	5773	3400	6218	1888	6510	
1,3,4 2 5	5426	3360	5865	1653	6471	
1,3,5 2,4	5862	3580	6309	2183	6281	
1,3 2,4,5	6001	3146	6448	1883	6210	
1,3 2,4 5	5489	2988	5928	1744	6375	
1,3,5 2 4	5617	3568	6063	2172	6045	
1,3 2,5 4	5592	3016	6034	2076	6071	
1,3 2 4,5	5517	3320	5957	1753	6052	
1,3 2 4 5	5332	3044	5769	1800	6099	

	6175	1874	6513	3376	5737	1,4,5 2,3
	6164	2119	6168	3120	6206	1,4 2,3,5
	6299	1716	5882	2901	5502	1,4 2,3 5
	6420	1880	6210	3140	6000	1,5 2,3,4
γ	6071	1787	6072	3030	6986	1 2,3,4,5
	6322	1608	5746	2793	5902	1 2,3,4 5
	6017	2067	6055	3003	5571	1,5 2,3 4
	5892	2090	5876	2875	6178	1 2,3,5 4
	5940	1708	5865	2892	5854	1 2,3 4,5
	5992	1760	5683	2744	5547	1 2,3 4 5
	5822	1627	6453	3315	5356	1,4,5 2 3
	5879	1705	6281	2879	5468	1,4 2,5 3
	5945	1744	5927	3300	5585	1,4 2 3,5
	5923	1557	5905	2924	5225	1,4 2 3 5
	5900	1725	6348	2954	5435	1,5 2,4 3
	5745	1591	6296	2765	5849	1 2,4,5 3
	5909	1728	5882	2959	5910	1 2,4 3,5
	5892	1545	5865	2711	5426	1 2,4 3 5
	5939	1744	6025	3297	5481	1,5 2 3,4
	5882	1707	5913	2881	5839	1 2,5 3,4
	5834	1632	5807	3322	6013	1 2 3,4,5
	5926	1559	5665	2926	5468	1 2 3,4 5
	5752	1782	6063	3011	5279	1,5 2 3 4
	5699	1750	5956	2724	5514	1 2,5 3 4
	5761	1785	5725	3016	5626	1 2 3,5 4
	5691	1550	5890	2916	5450	1 2 3 4,5
	5745	1604	5709	2770	5272	1 2 3 4 5
				-	-	

Grand coalition and only one deviated for all players are γ -stable

P ′	d f	d f	d f	d f	d f	d f	Stability
B	Ψ_J_1	Ψ_{J2}	Ψ_{J3}	Ψ_{J4}	Ψ_{J5}	$\Psi_{-}J_{6}$	y y
1,2,3,4,5,6	6012	3436	6445	2148	6478	6190	Y
1,2,3,4,5 6	5116	2747	5531	1609	5661	6860	Y
1,2,3,4,6 5	5179	2785	5597	1632	7180	5372	γ
1,2,3,4 5,6	5118	2772	5531	1643	6129	5808	
1,2,3,4 5 6	4795	2518	5202	1441	6072	5752	
1,2,3,5,6 4	5467	2972	5894	2830	5963	5651	γ
1,2,3,5 4,6	5145	2786	5559	2035	5694	6065	
1,2,3,5 4 6	4933	2603	5344	2018	5493	6047	
1,2,3,6 4,5	5188	2811	5604	2054	6404	5383	
1,2,3 4,5,6	5251	2884	5665	1760	5854	5515	
1,2,3 4,5 6	4831	2557	5237	1614	5669	5685	
1,2,3,6 4 5	4985	2634	5398	2040	6391	5181	
1,2,3 4,6 5	4840	2562	5246	1618	6028	5329	
1,2,3 4 5,6	4951	2633	5361	1974	5712	5369	
1,2,3 4 5 6	4711	2456	5115	1674	5729	5385	
1,2,4,5,6 3	5079	2725	7092	1596	5630	5275	γ
1,2,4,5 3,6	5106	2763	5993	1637	5661	5761	
1,2,4,5 3 6	4742	2487	5908	1422	5332	5676	
1,2,4,6 3,5	5109	2766	6026	1639	6114	5306	
1,2,4 3,5,6	5383	2952	5653	1777	5788	5435	
1,2,4 3,5 6	4837	2556	5366	1477	5530	5616	
1,2,4,6 3 5	4773	2505	5960	1433	6048	4977	
1,2,4 3,6 5	4864	2571	5385	1486	5989	5177	
1,2,4 3 5,6	4824	2549	5824	1473	5521	5148	
1,2,4 3 5 6	4610	2393	5397	1354	5561	5189	
1,2,5,6 3,4	5119	2771	6288	2026	5673	5316	
1,2,5 3,4,6	5257	2885	5713	1755	5801	5490	

In the case of $\mathbf{N} = \{p, f_1, f_2, f_3, f_4, f_5, f_6\}$. The unit is million won.

1,2,5 3,4 6	4799	2537	5491	1601	5386	5639
1,2,6 3,4,5	5249	2882	5730	1758	5847	5444
1,2 3,4,5,6	5714	3205	5538	1645	5678	5322
1,2 3,4,5 6	5003	2682	5225	1474	5403	5626
1,2,6 3,4 5	4826	2554	5533	1614	6014	5029
1,2 3,4,6 5	5038	2701	5250	1483	6001	5046
1,2 3,4 5,6	4965	2662	5436	1585	5510	5135
1,2 3,4 5 6	4701	2463	5147	1425	5551	5177
1,2,5,6 3 4	4902	2585	6267	2006	5467	5101
1,2,5 3,6 4	4945	2627	5557	1969	5510	5337
1,2,5 3 4,6	4794	2534	5859	1598	5382	5268
1,2,5 3 4 6	4667	2430	5547	1657	5264	5327
1,2,6 3,5 4	4944	2628	5579	1971	5702	5144
1,2 3,5,6 4	5245	2824	5361	1981	5516	5151
1,2 3,5 4,6	4973	2666	5345	1587	5514	5232
1,2 3,5 4 6	4795	2519	5172	1647	5354	5292
1,2,6 3 4,5	4812	2546	5891	1607	5650	5016
1,2 3,6 4,5	4992	2676	5355	1594	5613	5149
1,2 3 4,5,6	4986	2673	5832	1468	5391	5010
1,2 3 4,5 6	4690	2457	5369	1420	5325	5164
1,2,6 3 4 5	4692	2445	5587	1668	5710	4898
1,2 3,6 4 5	4821	2533	5190	1655	5675	4988
1,2 3 4,6 5	4697	2461	5378	1422	5547	4944
1,2 3 4 5,6	4783	2512	5493	1643	5345	4961
1,2 3 4 5 6	4593	2380	5206	1483	5387	5004
1,3,4,5,6 2	5312	4162	5734	1683	5827	5501
1,3,4,5 2,6	5134	3212	5547	1648	5686	5909
1,3,4,5 2 6	4862	3179	5271	1465	5432	5876
1,3,4,6 2,5	5164	3240	5578	1658	6257	5359

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1,3,4 2,5,6	5295	2886	5711	1755	5803	5454
1,3,4 2,5 6	4833	2697	5239	1479	5590	5649
1,3,4,6 2 5	4907	3214	5317	1481	6231	5106
1,3,4 2,6 5	4847	2704	5254	1484	6005	5242
1,3,4 2 5,6	4899	3112	5308	1503	5621	5265
1,3,4 2 5 6	4673	2756	5076	1378	5650	5294
1,3,5,6 2,4	5274	3440	5693	2107	5802	5465
1,3,5 2,4,6	5244	2956	5658	1779	5792	5581
1,3,5 2,4 6	4871	2804	5278	1643	5446	5760
1,3,6 2,4,5	5260	2975	5675	1789	5939	5456
1,3 2,4,5,6	5566	2762	5986	1636	5660	5302
1,3 2,4,5 6	4955	2562	5363	1479	5426	5625
1,3,6 2,4 5	4909	2833	5318	1659	6126	5109
1,3 2,4,6 5	4977	2572	5386	1486	5990	5068
1,3 2,4 5,6	4981	2752	5390	1614	5561	5195
1,3 2,4 5 6	4719	2527	5122	1445	5597	5231
1,3,5,6 2 4	5090	3432	5507	2099	5624	5282
1,3,5 2,6 4	4958	2829	5368	1984	5522	5445
1,3,5 2 4,6	4899	3145	5307	1652	5470	5429
1,3,5 2 4 6	4765	2865	5171	1704	5346	5481
1,3,6 2,5 4	4981	2851	5393	1993	5810	5180
1,3 2,5,6 4	5138	2627	5553	1969	5510	5145
1,3 2,5 4,6	4943	2677	5350	1592	5561	5248
1,3 2,5 4 6	4773	2528	5178	1651	5392	5307
1,3,6 2 4,5	4928	3167	5338	1665	5797	5128
1,3 2,6 4,5	4949	2678	5357	1595	5616	5196
1,3 2 4,5,6	5042	3107	5454	1502	5470	5102
1,3 2 4,5 6	4734	2733	5138	1446	5392	5251
1.3.6 2 4 5	4802	2893	5210	1719	5852	5004

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1,3 2,6 4 5	4786	2535	5192	1656	5678	5027
1,3 2 4,6 5	4741	2739	5146	1449	5622	5024
1,3 2 4 5,6	4833	2814	5241	1677	5417	5046
1,3 2 4 5 6	4637	2590	5039	1508	5454	5083
1,4,5,6 2,3	5116	3199	6128	1642	5671	5313
1,4,5 2,3,6	5317	2883	5664	1759	5850	5445
1,4,5 2,3 6	4816	2680	5409	1472	5400	5622
1,4,6 2,3,5	5299	2885	5671	1755	5800	5492
1,4 2,3,5,6	5871	2779	5546	2030	5684	5329
1,4 2,3,5 6	5085	2541	5210	1603	5391	5647
1,4,6 2,3 5	4839	2699	5445	1481	5996	5042
1,4 2,3,6 5	5126	2558	5239	1616	6021	5036
1,4 2,3 5,6	5027	2663	5376	1586	5511	5137
1,4 2,3 5 6	4744	2465	5105	1425	5553	5178
1,5,6 2,3,4	5234	2948	5796	1775	5784	5430
1,5 2,3,4,6	5612	2769	5526	1641	6121	5311
1,5 2,3,4 6	4958	2556	5243	1477	5531	5616
1,6 2,3,4,5	5579	2765	5520	1638	5663	5767
1 2,3,4,5,6	6671	2736	5512	1603	5646	5294
1 2,3,4,5 6	5500	2493	5157	1426	5340	5689
1,6 2,3,4 5	4976	2570	5271	1485	5988	5177
1 2,3,4,6 5	5551	2512	5190	1437	6060	4988
1 2,3,4 5,6	5415	2552	5237	1475	5526	5155
1 2,3,4 5 6	4994	2396	5017	1356	5566	5195
1,5,6 2,3 4	4944	2820	5656	1979	5510	5144
1,5 2,3,6 4	5169	2630	5358	1972	5707	5147
1,5 2,3 4,6	4937	2665	5380	1587	5513	5230
1,5 2,3 4 6	4765	2518	5200	1646	5352	5290
1,6 2,3,5 4	5146	2628	5357	1970	5511	5340

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1 2,3,5,6 45853259453282012548051171 2,3,5 4,65452254052081602538952791 2,3,5 4,65142243550791660527153361,6 2,3 4,54945267453881593561151471 2,3,6 4,55483255152281611565950261 2,3 4,5 65400267654011470538455181,6 2,3 4 54966246050961421532851681,6 2,3 4 54976253252261654567249861,2,3 4,5 64974246451031424555149471,2,3 4,5 64974246451031424534849651,2,3 4,5 64804238249981484539050081,2,3 4,5 64804238249981484539050081,4,5,6 2 34808267558361470533351001,4,5,2 3 64803267558361470533852421,4,5 2,3 64637273054591365523852421,4,5 2,3 64637273054591365523852421,4,6 2,5 35044267453621418526651511,4,6 2,5 35031265553621418551351771,4,6 2,5 5533126545344158755135173<							
112.3.514.65452225405208160253895279112.3.514.65142243550791660527153361.612.314.5494526745398159356115147112.3,614.5548325515228161156595026112.314.56542026765401147053945014112.314.5164966246050961421532851681,612.314.5478225325226165456724986112.3,6145518124515106167157194907112.3,461549742464510314245551494712.3,4156480423824998148453905008112.3,4156480423824998148453905008112.3,41564808267558361470533351901,4,5,61234808267558361470533352461,4,512,6134808267558361470533352461,4,512,6134808267558361470533352461,4,512,6134808267558361470533749941,4,512,6134807273054591365524852421,4,512,6135064268658541473557450021,4,612,5135031266553441587551351731,4,	1 2,3,5,6 4	5853	2594	5328	2012	5480	5117
1 2.3.5 4 65142243550791660527153361,6 2,3 4,54945267453981593561151471 2,3,6 4,55483255152281611565950261 2,3 4,5)65420267654011470539450141 2,3 4,5)64966246050961421532851681,6 2,3 4)54782253252261654567249861 2,3,6 4)55181245151061671571949071 2,3 4,5)64974246451031424555149471 2,3 4,5)64986251551941644534849651 2,3 4 564804238249981484539050081,4,5,6 2 34808267558361470539351901,4,5 2,6 34808267558361470533852461,4,5 2,6 34808267558361470533852461,4,5 2,6 34803267358511592546952421,4,5 2,6 34863267458541473557450201,4,5 2,6 35064267453621418526651411,4,2,5,6 35064267453621418551351711,4,2,5,6 35031266553441597551351731,4,6 2,5,5503126655344158755135173 <t< td=""><td>1 2,3,5 4,6</td><td>5452</td><td>2540</td><td>5208</td><td>1602</td><td>5389</td><td>5279</td></t<>	1 2,3,5 4,6	5452	2540	5208	1602	5389	5279
1.6[2,3]4,54945267453981593561151471[2,3,6]4,55483255152281611569950261[2,3]4,5,65420267654011470539450141[2,3]4,5)64966246050961421532851681,6]2,3]4,54782253252261654567249861[2,3]4,5)64782253251061671571949071[2,3]4,6]54974246451031424555149471[2,3]4,5)64974246451031424553050861[2,3]4,5)64804238249981484539050081,4,5,6]234835316060891456541050371,4,5]2,6]34808267558361470533351901,4,5]2,6]34808267558361470533351901,4,5]2,6]34807273054591365523852461,4,6]2,5]34816268658541473557449941,4]2,5,6]35064267453621418528651511,4,6]2,5]34816268658541473557449941,4]2,5,6]35041266553441597551351731,4,6]2,5,65044267453621418528651511,4,6]2,5,6503126655344158755135173 <t< td=""><td>1 2,3,5 4 6</td><td>5142</td><td>2435</td><td>5079</td><td>1660</td><td>5271</td><td>5336</td></t<>	1 2,3,5 4 6	5142	2435	5079	1660	5271	5336
1 2,3,6 4,55483255152281611565950261 2,3 4,5,65420267654011470539450141 2,3 4,5)64966246050961421532851681,6 2,3 4 54782253252261654567249861 2,3,6 4 55181245151061671571949071 2,3 4,6)54974246451031424555149471 2,3 4 5,65086251551941644534849651 2,3 4 5,64804238249981484539050081,4,5,6 2 34808267558361470539351901,4,5 2,6 34808267558361470539351901,4,5 2,6 34637273054561502546952421,4,5 2,3 64637273054591365523852661,4,6 2,5 35064268658541473557450201,4,2,5 3,65044267453621418528651571,4,6 2,5,55031266553441587551351731,4,2,6 3,54658274654921373563448651,4,2,6 3,54658274654921373563448651,4,2,6 3,54817273651421448561849021,4,2 3,6,6481727365142144856184943<	1,6 2,3 4,5	4945	2674	5398	1593	5611	5147
1 2,3 4,5,65420267654011470539450141 2,3 4,5 64966246050961421532851681,6 2,3 4 54782253252261654567249861 2,3,6 4 55181245151061671571949071 2,3 4,6 54974246451031424555149471 2,3 4,5 65086251551941644534849651 2,3 4 5,65086251551941484539050081,4,5,6 2 34804238249981484539050081,4,5 2,6 34808267558361470533351901,4,5 2,6 34808267558361470533852421,4,5 2,6 34807273054561502546952421,4,5 2,3 64637273054591365523852461,4,6 2,5 34816268658541473557450021,4,2,5,6 35044267453621418528651571,4,6 2,5 34895310854721501561450911,4,2,5,6 55031266553441587551351731,4,6 2,55031266553441587551351731,4,6 2,55031266553441587551351731,4,2,6,3,54658274654921373563448651	1 2,3,6 4,5	5483	2551	5228	1611	5659	5026
1 2,3 4,5 64966246050961421532851681,6 2,3 4 54782253252261654567249861 2,3,6 4 55181245151061671571949071 2,3 4,6 54974246451031424555149471 2,3 4 5,65086251551941644534849651 2,3 4 5,64804238249981484539050081,4,5,6 2 34835316060891456541050371,4,5 2,6 34808267558361470539351901,4,5 2,6 34808267558361470539352421,4,5 2,6 34807273054591365523852461,4,5 2,6 34816268658541473557450201,4,5 2,6 35044267453461591555651411,4 2,5 3,65044267453621418528651571,4,6 2,3,55031266553441587551351731,4,6 2,3,55031266553441587551350131,4,2 3,5,65228313952981649546350911,4,2 3,5,64791272151241440531552291,4,6 2,3 54487274653761422554649021,4,2 3,6 5473724605376142255464902<	1 2,3 4,5,6	5420	2676	5401	1470	5394	5014
1,6 2,3 4 54782253252261654567249861 2,3,6 4 55181245151061671571949071 2,3 4,6 54974246451031424555149471 2,3 4,5 65086251551941644534849651 2,3 4 5 64804238249981484539050081,4,5,6 2 34835316060891456541050371,4,5 2,6 34808267558361470539351901,4,5 2 3,64900310754561502546952421,4,5 2 3,64637273054591365523852461,4,6 2,5 34816268658541473557450201,4 2,5 3,65044267453461591555651411,4 2,5 3,65044267453621418528651571,4,6 2,3,54895310854721501561450961,4 2,5 3,64724245553621418528651571,4,6 2,3,55031266553441587551351731,4 2,6 3,55031266553441587551351731,4 2,6 3,54791272151241440531552291,4,6 2,3 54658274654921373563448651,4 2,6 3,5481727365142144856184902<	1 2,3 4,5 6	4966	2460	5096	1421	5328	5168
1 2,3,6 4 55181245151061671571949071 2,3 4,6 54974246451031424555149471 2,3 4 5,65086251551941644534849651 2,3 4 5,64804238249981484539050081,4,5,6 2 34835316060891456541050371,4,5 2,6 34808267558361470539351901,4,5 2,3,64900310754561502546952421,4,5 2,3 64637273054591365523852461,4,6 2,5 34816268658541473557450201,4 2,5 3,65064253158511597537749941,4 2,5 3,65044267453621418528651571,4,6 2,3,55031266553441587551351731,4 2,6 3,55031266553441587551351731,4 2 3,5 64791272151241440531552291,4 2,6 3,54658274654921373563448651,4 2,6 3,54817273651421448561849021,4 2,6 3,54817273651421448561849431,4 2 3,6 5481727355427143653064913	1,6 2,3 4 5	4782	2532	5226	1654	5672	4986
1 2,3 4,6 54974246451031424555149471 2,3 4 5,65086251551941644534849651 2,3 4 5 64804238249981484539050081,4,5,6 2 34835316060891456541050371,4,5 2,6 34808267558361470539351901,4,5 2,6 34807273054561502546952421,4,5 2,3,64637273054591365523852461,4,6 2,5 34816268658541473557450201,4 2,5,6 35064253158511597537749941,4 2,5,6 35044267453461591555651411,4 2,5 3,65044267453621418528651571,4,6 2,3,55031266553441587551351731,4,6 2,3,55031266553441587551351731,4 2,3,5,65228313952981649546350911,4 2,3,5,64791272151241440531552291,4,6 2,3 54658274654921373563448651,4 2,6,3 54737246053761422554649021,4 2,6,3 54817273651421448561849431,4 2,3,6 5481727365142143653064913<	1 2,3,6 4 5	5181	2451	5106	1671	5719	4907
1 2,3 4 5,65086251551941644534849651 2,3 4 5 64804238249981484539050081,4,5,6 2 34835316060891456541050371,4,5 2,6 34808267558361470539351901,4,5 2 3,64900310754561502546952421,4,5 2 3 64637273054591365523852461,4,6 2,5 34816268658541473557450201,4 2,5,6 35064253158511597537749941,4 2,5 3 64724245553621418528651571,4,6 2 3,54895310854721501561450961,4 2,6 3,55031266553441587551351731,4 2 3,5 64791272151241440531552291,4 2,6 3 54658274654921373563448651,4 2,6 3 54737246053761422554649021,4 2 3,6 54817273651421448561849431,4 2 3,6 5481727365142143653064913	1 2,3 4,6 5	4974	2464	5103	1424	5551	4947
1 2,3 4 5 64804238249981484539050081,4,5,6 2 34835316060891456541050371,4,5 2,6 34808267558361470539351901,4,5 2 3,64900310754561502546952421,4,5 2 3,64637273054591365523852461,4,6 2,5 34816268658541473557450201,4 2,5,6 35064253158511597537749941,4 2,5 3,65044267453461591555651411,4 2,5 3,65044267453621418528651571,4,6 2 3,54895310854721501561450961,4 2,6 3,55031266553441587551351731,4 2 3,5,64791272151241440531552291,4,6 2 3 54658274654921373563448651,4 2,6 3 54737246053761422554649021,4 2,6 3 54737273651421448561849431,4 2 3,6 5481727365427143653064913	1 2,3 4 5,6	5086	2515	5194	1644	5348	4965
1,4,5,6 2 34835316060891456541050371,4,5 2,6 34808267558361470539351901,4,5 2 3,64900310754561502546952421,4,5 2 3 64637273054591365523852461,4,6 2,5 34816268658541473557450201,4 2,5,6 35064253158511597537749941,4 2,5 3,65044267453461591555651411,4 2,5 3,65044267453621418528651571,4,6 2 3,54895310854721501561450961,4 2,6 3,55031266553441587551351731,4 2 3,5,65228313952981649546350911,4 2 3,5 64791272151241440531552291,4 2,6 3 54658274654921373563448651,4 2,6 3 54817273651421448561849431,4 2 3,6 5481727355427143653064918	1 2,3 4 5 6	4804	2382	4998	1484	5390	5008
1,4,5 2,6 34808267558361470539351901,4,5 2 3,64900310754561502546952421,4,5 2 3 64637273054591365523852461,4,6 2,5 34816268658541473557450201,4 2,5,6 35064253158511597537749941,4 2,5 3,65044267453461591555651411,4 2,5 3 64724245553621418528651571,4,6 2 3,54895310854721501561450961,4 2,6 3,55031266553441587551351731,4 2 3,5,65228313952981649546350911,4 2 3,5 64791272151241440531552291,4 2,6 3 54658274654921373563448651,4 2,6 3 54817273651421448561849431,4 2 3,6 5481727355427143653064918	1,4,5,6 2 3	4835	3160	6089	1456	5410	5037
1,4,5 2 3,64900310754561502546952421,4,5 2 3 64637273054591365523852461,4,6 2,5 34816268658541473557450201,4 2,5,6 35064253158511597537749941,4 2,5 3,65044267453461591555651411,4 2,5 3 64724245553621418528651571,4,6 2 3,54895310854721501561450961,4 2,6 3,55031266553441587551351731,4 2 3,5,65228313952981649546350911,4 2 3,5 64791272151241440531552291,4 2,6 3 54658274654921373563448651,4 2,6 3 54817273651421448561849431,4 2 3,6 5481727365427143653064918	1,4,5 2,6 3	4808	2675	5836	1470	5393	5190
1,4,5 2 3 64637273054591365523852461,4,6 2,5 34816268658541473557450201,4 2,5,6 35064253158511597537749941,4 2,5 3,65044267453461591555651411,4 2,5 3 64724245553621418528651571,4,6 2 3,54895310854721501561450961,4 2,6 3,55031266553441587551351731,4 2 3,5,65228313952981649546350911,4 2 3,5 64791272151241440531552291,4 2,6 3 54658274654921373563448651,4 2,6 3 54817273651421448561849431,4 2 3,6 5481727365142143653064918	1,4,5 2 3,6	4900	3107	5456	1502	5469	5242
1,4,6 2,5 34816268658541473557450201,4 2,5,6 35064253158511597537749941,4 2,5 3,65044267453461591555651411,4 2,5 3 64724245553621418528651571,4,6 2 3,54895310854721501561450961,4 2,6 3,55031266553441587551351731,4 2 3,5,65228313952981649546350911,4,6 2 3 54658274654921373563448651,4 2,6 3 54737246053761422554649021,4 2 3,6 54817273651421448561849431,4 2 3 5,6477927155427143653064918	1,4,5 2 3 6	4637	2730	5459	1365	5238	5246
1,4 2,5,6 35064253158511597537749941,4 2,5 3,65044267453461591555651411,4 2,5 3 64724245553621418528651571,4,6 2 3,54895310854721501561450961,4 2,6 3,55031266553441587551351731,4 2 3,5,65228313952981649546350911,4 2 3,5 64791272151241440531552291,4 2,6 3 54658274654921373563448651,4 2,6 3 54737246053761422554649021,4 2 3,6 54817273651421448561849431,4 2 3 5,6477927155427143653064918	1,4,6 2,5 3	4816	2686	5854	1473	5574	5020
1,4 2,5 3,65044267453461591555651411,4 2,5 3 64724245553621418528651571,4,6 2 3,54895310854721501561450961,4 2,6 3,55031266553441587551351731,4 2 3,5,65228313952981649546350911,4 2 3,5 64791272151241440531552291,4,6 2 3 54658274654921373563448651,4 2,6 3 54737246053761422554649021,4 2 3,6 54817273651421448561849431,4 2 3,6 5477927155427143653064918	1,4 2,5,6 3	5064	2531	5851	1597	5377	4994
1,4 2,5 3 64724245553621418528651571,4,6 2 3,54895310854721501561450961,4 2,6 3,55031266553441587551351731,4 2 3,5,65228313952981649546350911,4 2 3,5 64791272151241440531552291,4,6 2 3 54658274654921373563448651,4 2,6 3 54737246053761422554649021,4 2 3,6 54817273651421448561849431,4 2 3,6 5477927155427143653064918	1,4 2,5 3,6	5044	2674	5346	1591	5556	5141
1,4,6 2 3,54895310854721501561450961,4 2,6 3,55031266553441587551351731,4 2 3,5,65228313952981649546350911,4 2 3,5 64791272151241440531552291,4,6 2 3 54658274654921373563448651,4 2,6 3 54737246053761422554649021,4 2 3,6 54817273651421448561849431,4 2 3 5,6477927155427143653064918	1,4 2,5 3 6	4724	2455	5362	1418	5286	5157
1,4 2,6 3,55031266553441587551351731,4 2 3,5,65228313952981649546350911,4 2 3,5 64791272151241440531552291,4,6 2 3 54658274654921373563448651,4 2,6 3 54737246053761422554649021,4 2 3,6 54817273651421448561849431,4 2 3 5,6477927155427143653064918	1,4,6 2 3,5	4895	3108	5472	1501	5614	5096
1,4 2 3,5,65228313952981649546350911,4 2 3,5 64791272151241440531552291,4,6 2 3 54658274654921373563448651,4 2,6 3 54737246053761422554649021,4 2 3,6 54817273651421448561849431,4 2 3 5,6477927155427143653064918	1,4 2,6 3,5	5031	2665	5344	1587	5513	5173
1,4 2 3,5 64791272151241440531552291,4,6 2 3 54658274654921373563448651,4 2,6 3 54737246053761422554649021,4 2 3,6 54817273651421448561849431,4 2 3 5,6477927155427143653064918	1,4 2 3,5,6	5228	3139	5298	1649	5463	5091
1,4,6 2 3 54658274654921373563448651,4 2,6 3 54737246053761422554649021,4 2 3,6 54817273651421448561849431,4 2 3 5,6477927155427143653064918	1,4 2 3,5 6	4791	2721	5124	1440	5315	5229
1,4 2,6 3 54737246053761422554649021,4 2 3,6 54817273651421448561849431,4 2 3 5,6477927155427143653064918	1,4,6 2 3 5	4658	2746	5492	1373	5634	4865
1,4 2 3,6 54817273651421448561849431,4 2 3 5,6477927155427143653064918	1,4 2,6 3 5	4737	2460	5376	1422	5546	4902
1,4 2 3 5,6 4779 2715 5427 1436 5306 4918	1,4 2 3,6 5	4817	2736	5142	1448	5618	4943
	1,4 2 3 5,6	4779	2715	5427	1436	5306	4918

1,4 2 3 5 6	4590	2519	5160	1341	5350	4961
1,5,6 2,4 3	4848	2789	5969	1635	5427	5051
1,5 2,4,6 3	4945	2549	5825	1472	5520	5028
1,5 2,4 3,6	4992	2751	5390	1613	5558	5182
1,5 2,4 3 6	4692	2507	5401	1434	5291	5193
1,6 2,4,5 3	4941	2553	5831	1474	5414	5144
1 2,4,5,6 3	5473	2482	5894	1419	5324	4938
1 2,4,5 3,6	5423	2557	5356	1477	5420	5150
1 2,4,5 3 6	4963	2382	5370	1348	5200	5165
1,6 2,4 3,5	4981	2750	5400	1613	5557	5182
1 2,4,6 3,5	5416	2552	5359	1474	5525	5034
1 2,4 3,5,6	5560	2797	5267	1639	5437	5062
1 2,4 3,5 6	4998	2510	5100	1435	5295	5198
1,6 2,4 3 5	4707	2519	5428	1441	5584	4914
1 2,4,6 3 5	4982	2390	5391	1353	5557	4814
1 2,4 3,6 5	5024	2523	5116	1443	5590	4920
1 2,4 3 5,6	4986	2504	5395	1432	5287	4895
1 2,4 3 5 6	4732	2373	5136	1337	5331	4939
1,5,6 2 3,4	4881	3133	5637	1647	5455	5083
1,5 2,6 3,4	4933	2663	5438	1586	5510	5169
1,5 2 3,4,6	5063	3110	5306	1502	5617	5098
1,5 2 3,4 6	4718	2719	5194	1439	5312	5225
1,6 2,5 3,4	4935	2671	5450	1590	5552	5138
1 2,5,6 3,4	5437	2533	5481	1598	5380	4996
1 2,5 3,4,6	5447	2691	5230	1476	5582	5028
1 2,5 3,4 6	4957	2456	5130	1419	5288	5159
1,6 2 3,4,5	5046	3107	5309	1502	5469	5244
1 2,6 3,4,5	5428	2679	5221	1472	5399	5199

1 2 3,4,5,6	5678	3169	5257	1461	5421	5050
1 2 3,4,5 6	5056	2734	5046	1368	5244	5254
1,6 2 3,4 5	4734	2733	5220	1447	5614	4939
1 2,6 3,4 5	4971	2461	5143	1423	5548	4905
1 2 3,4,6 5	5088	2751	5069	1376	5642	4872
1 2 3,4 5,6	5020	2716	5188	1438	5308	4920
1 2 3,4 5 6	4758	2520	4994	1342	5352	4963
1,5,6 2 3 4	4742	2851	5687	1696	5327	4947
1,5 2,6 3 4	4757	2513	5495	1643	5346	4989
1,5 2 3,6 4	4842	2814	5240	1676	5415	5035
1,5 2 3 4,6	4713	2717	5431	1437	5309	4986
1,5 2 3 4 6	4610	2570	5252	1497	5213	5046
1,6 2,5 3 4	4760	2520	5507	1646	5380	4965
1 2,5,6 3 4	5122	2426	5537	1654	5258	4867
1 2,5 3,6 4	5102	2524	5171	1649	5386	4971
1 2,5 3 4,6	4952	2454	5359	1417	5284	4928
1 2,5 3 4 6	4784	2373	5189	1478	5190	4989
1,6 2 3,5 4	4833	2813	5249	1676	5414	5034
1 2,6 3,5 4	5090	2516	5168	1645	5350	4995
1 2 3,5,6 4	5279	2858	5160	1700	5337	4958
1 2 3,5 4,6	5027	2720	5122	1439	5313	4992
1 2 3,5 4 6	4850	2573	5016	1499	5218	5052
1,6 2 3 4,5	4722	2725	5449	1442	5380	4928
1 2,6 3 4,5	4958	2455	5365	1419	5322	4894
1 2 3,6 4,5	5045	2729	5132	1444	5386	4934
1 2 3 4,5,6	5039	2726	5451	1363	5233	4839
1 2 3 4,5 6	4747	2514	5150	1338	5191	4953
1,6 2 3 4 5	4625	2583	5277	1504	5442	4833

1 2,6 3 4 5	4796	2378	5202	1482	5385	4799
1 2 3,6 4 5	4875	2586	5033	1506	5448	4839
1 2 3 4,6 5	4753	2518	5157	1340	5348	4797
1 2 3 4 5,6	4838	2567	5246	1495	5209	4814
1 2 3 4 5 6	4641	2428	5043	1392	5245	4849

Grand coalition, onl	y one deviated for all	players and 2,4,6,7 3,5 are	γ-stable.
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