The Blues Goes On But When Does It Stop?
- Public Goods Experiments with Non-Definite and Non-Commonly Known Time Horizons -

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Abstract

A robust finding of repeated public goods experiments is that high initial contribution rates sharply decline towards the end. This paper reports on an exploratory experiment designed to discover whether such a decline is simply triggered by the usual experimental practice of publicly informing participants about the exact number of periods to be played. The experiment compares punctual to interval information about the number of repetitions, whereby interval information can be privately or commonly known as well as symmetric or asymmetric. The results indicate that, while the overall average contribution levels do not change significantly across treatments, asymmetric information about the time horizon reduces the frequency of end-game effects.

Keywords: Public goods experiment, End game effect, Common knowledge, Asymmetric information

JEL Classification: C72, C92, D82, H41

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1 Introduction

Game theory relies on common knowledge of rationality. Applied to (supergame) experiments with a finite upper bound for the number of repetitions, the rationality assumption requires players (with unlimited cognitive and information-processing abilities) to apply backward induction to establish optimal choices. In particular, for the repeated standard linear public goods experiments with opportunistic agents and common knowledge of opportunism,[1] backward induction yields free-riding in each round.

However, experimental behavior does not conform to this theoretical prediction. Many experiments with linear public goods games (see, e.g., Davis & Holt 1993, and Ledyard 1995, for extensive surveys) show that individuals, interacting finitely often, start out by contributing substantial amounts. Nevertheless, contributions gradually decline over time and nearly collapse when the interaction terminates. This pattern of cooperation followed by an end-game-effect suggests that people are fully aware of the backward induction logic but do not follow its recommendation because of its detrimental consequences in terms of efficiency. Indeed, there are good reasons to argue that people pursue a sort of mental accounting (see, e.g., Thaler 1990) in the sense of analyzing separately what to do first and how to behave when the end is near. Or, in case of a partners design (where the same group plays the game repeatedly), people may be following strategic reasoning (cf., Kreps et al. 1982); namely, they contribute high amounts in earlier periods in order to build up a reputation for cooperativeness that they intend to exploit by defecting at the very end.

The usual experimental practice (see Ledyard 1995) is to publicly inform all participants (so as to establish common knowledge) about the terminal period, which is, furthermore, the same for all individuals. Yet, in real life, one hardly knows when some form of cooperation will end, and has at best some "interval" *subjective* expectation (in the sense of a minimum and a maximum expected number of interactions). Thus, the commonly known and symmetric definite time horizon, typically implemented in the laboratory, may be highly artificial and unrealistic.

An an alternative, few experimental studies of the prisoners' dilemma game have implemented repeated play with a fixed probability of termination (see, e.g., Roth & Murnighan 1978; Axelrod 1980; Murnighan & Roth 1983; Van Huyck et al. 2002). Thus, they avoid the end-game effect since the backward unraveling argument breaks down, and cooperative outcomes can be sustained as non-cooperative equilibria of the repeated game. Such a random stopping rule, however, appears at odds with the fact of life that the number of play is

[1] Opportunism means that individuals are interested only in their own monetary reward.

finite, and denies completely the existence of a commonly known last possible period.

In this paper, we study the robustness of the end-game effect in repeated linear public goods experiments without changing the equilibrium structure (defecting in each period is, indeed, the only dominant strategy), but by simply deviating from the typical practice of a fixed, commonly known and symmetric endpoint to the game. The intention to deviate from cooperation may remain constant or be moved forward or backward in time if the decision makers are only informed about an interval of possible terminal periods, if such interval is commonly or privately known, and if it differs from one individual to another. This exploratory study thus investigates whether, and in what ways, ruling out information about an exact, commonly known, and symmetric terminal period affects behavior.

Our findings reveal that only asymmetric information about the number of periods to be played induces people to delay defecting choices. Replacing a definite endpoint with a commonly or privately known symmetric interval does not have a significant impact neither on the timing of defection nor on the overall contribution levels, although initial contributions are slightly increased.

Section 2 discusses the experimental design in more detail. Section 3 presents our main findings. Section 4 concludes.

2 Experimental design

2.1 The games

All the experiments are based on the standard linear public goods game as introduced by Isaac et al. (1984). Groups of size $N = 3$ interact for several periods in a partners design (i.e., groups are fixed for the entire session). In any one period, each group member is endowed with 20 ECU (Experimental Currency Unit), and must privately decide about the amount to be contributed to a public good, keeping the remaining ECU for herself. Let c_i denote individual i's contribution to the public good (with $c_i \in \{0, 1, \ldots, 20\}$), and let $C = \sum_{j=1}^{3} c_j$ be the total amount of public good provided. The monetary payoff of individual i (for all $i \in N$) is linear in c_i and C and takes the following form:

$$u_i(c_i, C) = 20 - c_i + \alpha C,$$

where α is the marginal return from a unit of the public good. In all our treatments, we set α equal to 0.5.

We study four variants (treatments) of this game, which are linked to each other by simple deviations from usual assumptions. Our control treatment is the *standard protocol* (SP), in which all three group members receive the same publicly announced information that they are going to interact for exactly 10 periods.

We first give up the assumption of a fixed endpoint. In its place, we provide public information about an interval of the possible number of periods. Specifically, in the *interval protocol* (IP), all three group members are publicly informed that they are going to interact for at least 8 and at most 12 periods.

To deviate one step further, we remove the common knowledge assumption. In the *private information protocol* (PIP), all three group members are also informed that they are going to interact for at least 8 and at most 12 periods, but are told that others might have received different information about the time horizon.

Finally, we withdraw the symmetry assumption, and provide different group members with different interval information. In the *private asymmetric protocol* (PAP), each participant is informed that the experiment will consist of at least t_1 and at most t_2 periods, and that t_1 and t_2 differ across group members. We set $t_1 = 8$ and $t_2 = 10$ for one group member, $t_1 = 9$ and $t_2 = 11$ for another group member, and $t_1 = 10$ and $t_2 = 12$ for the third group member, where the actual horizon is 10 periods (i.e., the intersection of the three information sets). As participants are warned that the biggest t_1 and the smallest t_2 determine the number of periods to be played, if they could pool the individual information, they would discover that the final period is the 10th.

Regardless of the type of information provided (common or private, symmetric or asymmetric), all four treatments are bounded with respect to the number of repetitions. Hence, folk theorems do not apply and, due to $\alpha < 1$, the unique subgame perfect equilibrium of the four games is for all players to free-ride in all periods.

2.2 Subjects and procedures

The computerized experiment was conducted at the laboratory of the Max Planck Institute in Jena, using the z-Tree software (Fischbacher 1999).[2] Participants were undergraduate students from different disciplines at the University of Jena. After being seated at a computer terminal, participants received written instructions (see Appendix A for an English translation). Understanding of the rules was ensured by a control questionnaire that subjects had to answer before the experiment started. Each session took about an hour. We implemented an exchange rate of 100 ECU = €4.00, and the average earning per subject was €12.92 (including a show-up fee of €2.50).

[2]We would like to thank Torsten Weiland for writing the program for the experiment.

In total, we ran six sessions. Four sessions involved 27 participants (matched into nine 3-person groups), and each employed one of the four protocols. The other two sessions involved 18 participants (matched into six 3-person groups), and employed either IP or PIP. Therefore, there are 9 independent group observations for SP and PAP, and 15 independent observations for IP and PIP. The additional sessions with IP and PIP were conducted in order to gather data for each possible final period in the interval $t \in [8, 12]$. In particular, we have 3 observations for each of the five possible terminal periods.

3 Experimental results

In this section, we first address the effects of the different protocols on average contribution levels. This part of the analysis relies on the independent group observations ($n = 9$ for SP and PAP, and $n = 15$ for IP and PIP). Then, we focus on the robustness of the end-game effect with respect to deviations from the standard protocol. In doing so, we construct a "defection index", which allows us to detect when subjects start making defecting choices.[3]

3.1 Contribution levels

Figure 1 displays the evolution of average contributions in each of the four protocols.

Insert Figure 1 about here

Due to the different termination of IP and PIP as compared to the other two protocols (both terminating at the 10th period), an unequal number of repetitions results across individuals and games. Average contribution levels in the first 8 periods can, however, be compared across various sessions because subjects played at least 8 times in all four protocols.

The predictions of the subgame perfect equilibrium are clearly rejected. On average all players make significant contributions to the public good, regardless of the protocol. The average contribution over the first 8 repetitions and over all (9 or 15) groups is 10.1 ECU in SP, 12.8 ECU in IP, 13.3 ECU in PIP, and 14.6 ECU in PAP. Although the three experimental protocols (IP, PIP, and PAP) seem to trigger higher average contributions than the control standard protocol in any period, this difference is not statistically significant using the two-tailed Wilcoxon rank-sum test.

[3]The average contribution per period and per independent matching group in each of the four protocols as well as the corresponding defection indices for the first eight periods and for all periods actually played are reported in Appendix C.

A further interesting analysis concerns initial contribution levels since (common or private, symmetric or asymmetric) interval information about the number of periods to be played may affect the "intrinsic" attitude of people towards cooperation. Figure 2 shows the distribution of initial contributions in each protocol.[4]

Insert Figure 2 about here

Both Figure 1 and Figure 2 suggest that, in the first period, participants in IP and PIP start out with a higher contribution level than participants in SP. Applying a series of Wilcoxon rank-rank tests (two-tailed), we can reject the null hypothesis that initial contributions in SP and in IP or PIP are equal at the 5 percent level. In contrast, there is no statistically significant difference in initial contributions between SP and PAP.

3.2 Defecting behavior and end-game effect

To investigate defecting behavior and the robustness of the end-game effect, we construct a *defection index*, DI, relying on the general idea that "defectors" make most of their contributions only in early periods whereas "late contributors" gradually increase their contributions over time. In particular, DI measures whether an individual's cumulative contributions are, *on average*, concave or convex functions of time (see Appendix B for a formal definition). Accordingly, DI takes on higher positive values the earlier the player defects, and lower negative the later she contributes. If the level of contributions is held nearly constant in all periods, DI is close to zero.

Figure 3 displays the distribution of the defection index, calculated over the first 8 periods, for each protocol. Although our experimental protocols somewhat reduce the variation of the defection index as compared to the standard protocol, we are not able to detect any statistically significant difference in the average level of defection when considering only the first 8 periods (Wilcoxon rank-sum test, two-tailed).

Insert Figure 3 about here

However, the incidence of defecting behavior is significantly different between SP and PAP if we consider all 10 periods of play: in this case, PAP significantly decreases the value of the defection index as compared to the benchmark protocol SP (the Wilcoxon rank-sum test for 9 independent observations in each protocol yields a p-value of 0.031). Interestingly, there is

[4] The boxes show the limits of the middle half of the data (the line inside the box represents the median). Extreme points are also highlighted. Box-plots not only show location and spread of the data, but indicate skewness as well.

no difference at the 5 percent significance level among subjects with different information intervals under the PAP. This suggests that the decrease in the defection index observed in PAP is not due to the particular information given to each individual, but to the fact that there is *common knowledge about the asymmetry in information* regarding the number of periods to play.

On the other hand, comparing the distribution of the defection index over all rounds of play in IP and PIP yields no significant difference. Thus, removing common knowledge alone does not seem to affect the frequency of early defection in the finitely repeated public goods game.

4 Conclusions

We conducted an experimental public goods game which deviates from the standard laboratory practice of publicly announcing a definite and symmetric end period. In particular, participants in our experiment received information about an interval of possible terminal periods, which could be commonly or privately known as well as symmetric or asymmetric. We thus explore whether the behavior typically observed in repeated linear public goods experiments − with high cooperation rates declining abruptly before the end − is robust to deviations from the usual procedures.

Some experimental studies have avoided the end-game effect by introducing a random stopping rule, hence letting the equilibrium spectrum explode. In contrast to these studies, our experimental protocols do not change the game-theoretic predictions as compared to the standard repeated public goods game, since folk theorems do not apply in any of our treatments and free-riding in each period is always the unique subgame perfect equilibrium. We test whether the (common or private, symmetric or asymmetric) interval information affects behavior in the sense of modifying *when* people intend to terminate cooperation, thereby questioning the occurrence of end-game effects.

To detect when people start making defecting choices, we constructed a "defection index" based on the idea that defectors exhibit high contribution levels only in early periods, whereas late contributors gradually increase their contributions over time.

Analyzing both the average contributions and the defection indices, we find rather comforting results for the usual practice of performing public goods experiments with a publicly announced, fixed number of periods. Only the most generic treatment, namely the protocol with private and asymmetric interval information, triggers statistically significant deviations from the timing of defection in the standard protocol: When it is commonly known that group members receive asymmetric information about the numbers of periods to be played, participants tend to sustain cooperation over more periods.

We conclude that, as far as linear public goods games are concerned, the standard (and maybe unrealistic) laboratory practice of publicly announcing the same definite time horizon does not appear to alter results significantly. Especially, the finding of high initial contributions gradually declining over time till the drastic end-effect is quite robust, since it is also observed when deviating from the standard protocol in various ways.

Figure 1: Time paths of average contributions in each protocol

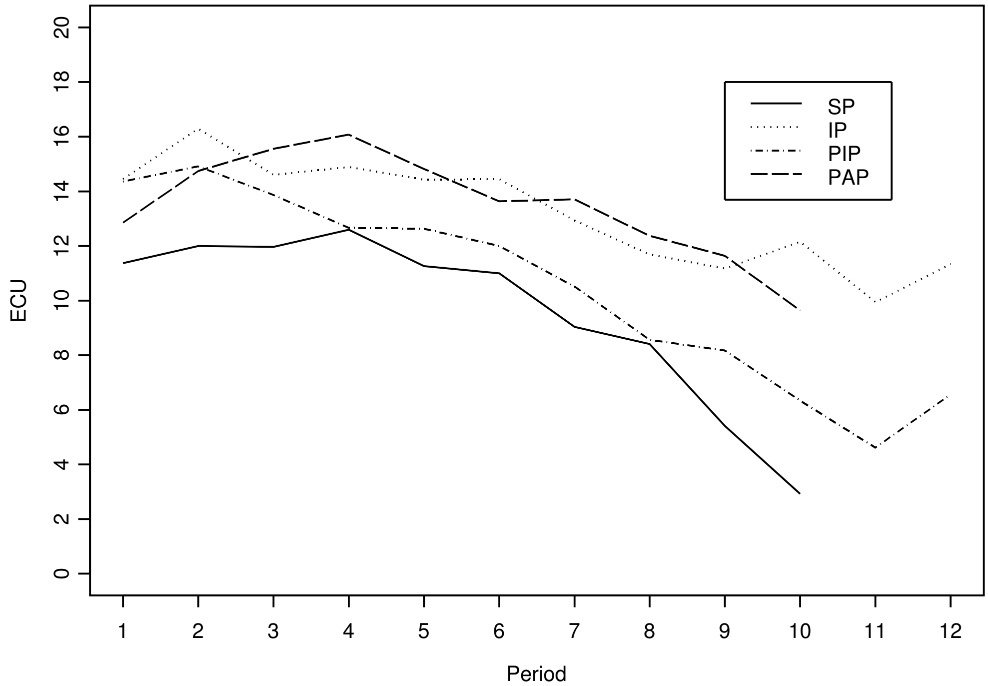


Figure 2: Distribution of initial contributions in each protocol

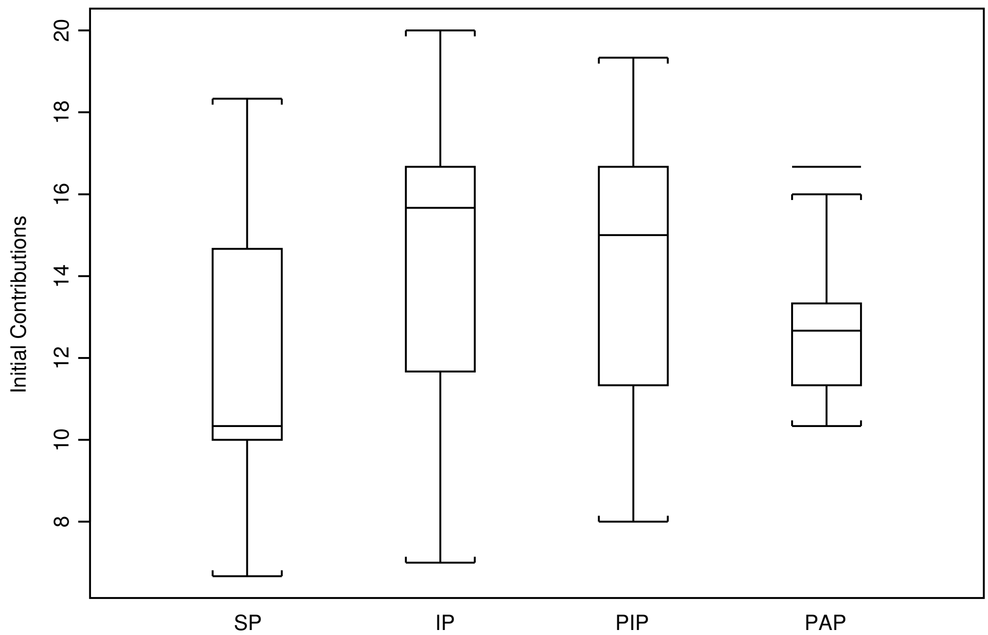
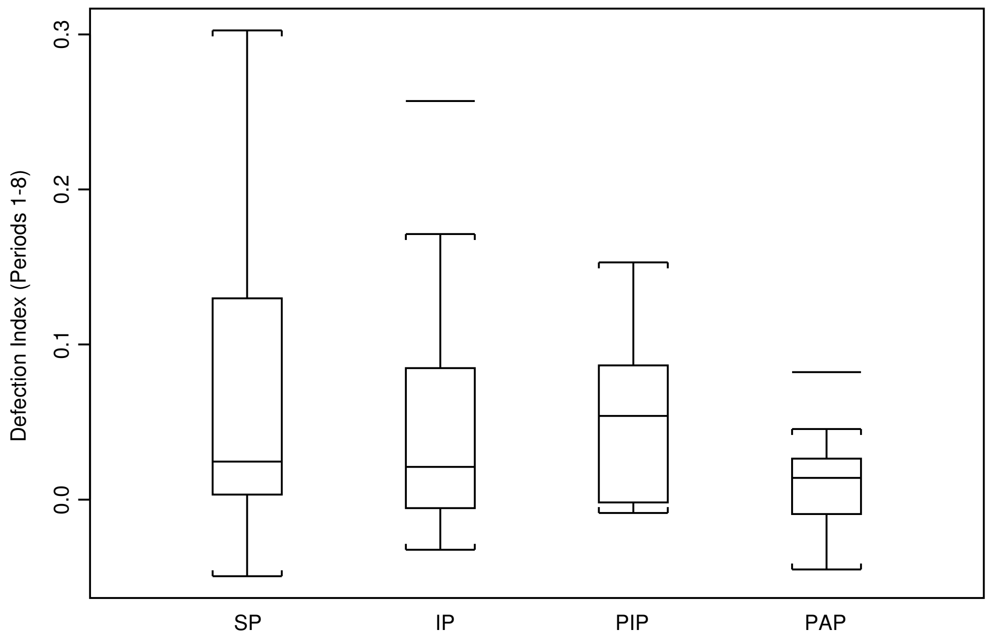


Figure 3: Defection index in the first 8 periods of each protocol



Appendix A: Experimental instructions

Welcome and thanks for participating in this experiment. You receive €2.50 for having shown up on time. If you read these instructions carefully, you can make good decision and earn more money. The €2.50 and all additional money will be paid out to you in cash immediately after the experiment. During the experiment, amounts will be denoted by ECU (Experimental Currency Unit). ECU are converted to euros at the following exchange rate: 1 ECU = €0.04.

It is strictly forbidden to communicate with other participants during the experiment. If you have any questions or concerns, please raise your hand. We will answer your questions individually. It is very important that you follow this rule. Otherwise we must exclude you from the experiment and from all payments.

DETAILED INFORMATION ON THE EXPERIMENT

[*Participants in SP read:* The experiment will consist of **10 periods**. This means that you know exactly when the experiment will end.]
[*Participants in IP and PIP read:* The experiment will consist of **at least 8** and **at most 12 periods**. This means that you do not know when the experiment is going to end, but surely it will last not less than 8 periods and no more than 12 periods.]
[*Participants in PAP read:* The experiment will consist of **at least $\mathbf{t_1}$** and **at most $\mathbf{t_2}$** periods. This means that you do not know when the experiment is going to end, but surely it will last not less than t_1 periods and no more than t_2 periods. Information about t_1 and t_2 will be displayed on your computer screen when the experiment starts.]

Before the first period participants are divided in groups of three members each. You will therefore interact with two other persons, whose identity will not be revealed to you at any time. The composition of your group will remain THE SAME throughout the experiment. That is, the members of your group will not change from one period to the next.

[*Participants in SP and IP read:* ***Please, note that the other two members of your group have received the same information as you about the duration of the experiment.***]
[*Participants in PIP read:* ***Please, note that the other two members of your group may have received different information than you about the duration of the experiment.***]
[*Participants in PAP read:* ***Please, note that the other two members of your group may have received different information than you about $\mathbf{t_1}$ and $\mathbf{t_2}$ and, therefore, about the duration of the experiment.*** Of course, you will be interacting in at least as many rounds as the largest t_1 and in at most as many rounds as the smallest t_2 included in the information given to all group members.]

What you have to do

At the beginning of each period, each participant receives 20 ECU. In the following, we shall refer to this amount as *your endowment*.

Your task (as well as the task of the the other two members of your group) is to decide **how much of your endowment you want to contribute to a project**. Whatever you do not contribute, you keep for yourself ("ECU you keep").

In every period, your earnings consist of two parts:

1. the "*ECU you keep*", i.e.: your endowment *minus* your contribution;
2. the "*income from the project*". This income is determined by adding up the contributions of the three group members and multiplying the resulting sum by 0.5:

Income from the project = 0.5 × sum of group contributions to the project.

Your period-earnings therefore are:

ECU you keep	+	**Income from the project**
(20 − your contribution)	+	(0.5 × sum of group contributions)

• Each ECU that you keep for yourself increases "ECU you keep" but does not affect the "income from the project" of any group member (including yourself). The other members of your group do not receive anything for the ECU that you do not contribute.

• Each ECU that you contribute to the project rises "income from the project" by 0.5 ECU. Since "income from the project" is the same for all three members of the group (i.e., all receive the same income from the project), each ECU that you contribute to the project rises YOUR "income from the project" *as well as* the "income from the project" of THE OTHER TWO MEMBERS OF YOUR GROUP by 0.5 ECU. Similarly, you benefit from each ECU that any of the other members of your group contributes to the project.

EXAMPLE: Suppose that each person in your group contributes 10 ECU to the project. Both you and your group members receive an "income from the project" of: $0.5 \times (10 + 10 + 10) = 0.5 \times 30 = 15$ ECU. The "ECU you keep" are $(20 - 10) = 10$. Hence, your period-earnings are: $10 + 15 = 25$ ECU.

The information you receive at the end of each period

At the end of each period, you will receive information about the number of ECU contributed by *each* member of your group as well as about your period-earnings.

Your final earnings

Your final earnings will be calculated by adding up your period-earnings in each of the 10 periods. The resulting sum will be converted to euros and paid out to you in cash, together with the show-up fee of €2.50.

Before the experiment starts, you will have to answer some control questions to verify your understanding of the experiment.

Please, remain quiet until the experiment starts and switch off your mobile phone. If you have any questions, please raise your hand now.

Appendix B: Definition of the defection index

Let $c_{i,t}$ be participant i's contribution in period t. We define the *normalized cumulative contribution curve*, $NCC(t/T)$, over the (discrete) reference periods $t = 1, \ldots, T$ as the straight segments joining the points

$$NCC(t/T) = \frac{\sum_{s=1}^{t} c_{i,s}}{\sum_{s=1}^{T} c_{i,s}}.$$

This is a non-decreasing continuous function on the unit interval, with $NCC(0) = 0$ and $NCC(1) = 1$, whose shape depends on whether the individual is a defector, a late contributor, or something in between. If "on average" the NCC function is concave, we say that the individual is a defector, and if it is convex we classify her as a late contributor. This observation leads to our definition of the *defection index* (DI) as the area between the NCC curve and the 45° line, or

$$DI = \int_0^1 (NCC(x) - x)dx.$$

Notice that the NCC curve may cross the 45° line more than once. In this case, DI results from adding up several positive and negative areas.

Appendix C: Contributions and defection indices

In this appendix we report the average contributions by matching groups in each protocol as well as the corresponding defection indices for periods 1–8 and for the total number of periods actually played.

SP

Period	MG 1	MG 2	MG 3	MG 4	MG 5	MG 6	MG 7	MG 8	MG 9
1	6.67	10.67	15.00	18.33	10.00	14.67	6.67	10.00	10.33
2	6.67	13.33	18.33	18.67	1.67	17.33	6.00	12.67	13.33
3	3.33	14.00	18.33	18.33	2.00	17.67	2.67	14.67	16.67
4	5.00	14.33	18.33	18.33	6.67	13.33	0.67	16.67	20.00
5	1.67	14.00	18.33	16.67	8.33	5.00	0.00	17.33	20.00
6	0.00	15.67	18.33	17.00	4.33	5.00	0.00	18.67	20.00
7	0.00	8.67	15.00	18.33	3.33	3.33	0.00	12.67	20.00
8	0.00	8.33	10.00	18.33	2.33	6.67	0.67	9.33	20.00
9	0.00	8.00	6.67	11.67	0.00	4.67	0.33	3.33	14.00
10	0.00	4.67	0.00	5.00	0.67	2.33	0.33	0.00	13.33
DI	0.30	0.06	0.10	0.05	0.14	0.16	0.31	0.08	-0.01
DI(1-8)	0.25	0.02	0.02	0.00	0.06	0.13	0.30	0.00	-0.05

PAP

Period	MG 1	MG 2	MG 3	MG 4	MG 5	MG 6	MG 7	MG 8	MG 9
1	16.67	16.00	12.67	13.33	11.67	11.33	13.33	10.33	10.33
2	20.00	16.00	13.00	15.33	12.33	10.67	19.33	13.33	12.67
3	20.00	16.67	14.00	18.67	14.33	10.67	19.00	14.00	12.67
4	20.00	14.33	13.00	20.00	15.67	10.67	20.00	17.67	13.33
5	20.00	12.67	10.00	19.67	16.00	10.33	18.33	13.33	13.00
6	20.00	10.00	5.00	19.67	17.00	9.67	20.00	11.33	10.00
7	20.00	10.67	6.67	19.33	18.33	11.33	13.67	13.33	10.00
8	20.00	11.67	6.33	13.33	19.00	8.67	11.67	12.67	8.00
9	20.00	9.33	6.00	16.67	18.33	8.00	8.33	10.33	7.67
10	20.00	12.33	0.00	17.67	18.33	7.67	1.67	7.33	1.67
DI	-0.01	0.05	0.13	-0.01	-0.04	0.03	0.08	0.03	0.08
DI(1-8)	-0.01	0.05	0.08	-0.01	-0.05	0.01	0.02	0.00	0.03

IP

Period	MG 1	MG 2	MG 3	MG 4	MG 5	MG 6	MG 7	MG 8	MG 9	MG 10	MG 11	MG 12	MG 13	MG 14	MG 15
1	10.33	17.33	16.67	7.00	16.67	13.33	20.00	15.67	17.33	11.67	12.67	11.33	14.00	16.00	16.67
2	10.00	20.00	20.00	5.67	20.00	16.67	20.00	17.00	19.33	15.67	14.33	10.00	16.67	20.00	19.00
3	3.00	20.00	13.33	3.67	6.67	18.33	20.00	18.67	20.00	15.00	15.00	8.00	17.33	20.00	20.00
4	0.00	20.00	9.00	3.33	13.33	18.33	20.00	19.33	19.33	17.67	16.33	6.67	20.00	20.00	20.00
5	1.67	20.00	8.33	0.00	13.33	15.67	20.00	19.00	19.33	19.33	16.00	4.67	19.00	20.00	20.00
6	3.33	20.00	8.33	0.67	10.00	15.00	20.00	20.00	17.33	20.00	14.67	7.33	20.00	20.00	20.00
7	3.33	20.00	7.00	0.67	6.67	13.33	20.00	18.33	16.00	19.33	6.67	5.00	19.33	20.00	18.33
8	1.67	20.00	10.00	0.00	6.67	10.00	20.00	16.00	14.00	16.67	4.33	6.00	11.00	20.00	19.00
9	-	-	-	0.00	6.67	3.33	20.00	17.33	10.33	17.00	1.67	2.67	15.00	20.00	20.00
10	-	-	-	-	-	-	20.00	15.67	5.33	17.00	0.33	4.33	6.67	20.00	20.00
11	-	-	-	-	-	-	-	-	-	15.33	0.00	2.33	2.00	20.00	20.00
12	-	-	-	-	-	-	-	-	-	-	-	-	0.67	13.33	20.00
DI	0.17	-0.01	0.09	0.28	0.09	0.07	0.00	0.00	0.07	-0.01	0.17	0.11	0.10	0.01	-0.01
DI(1-8)	0.17	-0.01	0.09	0.26	0.08	0.03	0.00	-0.01	0.02	-0.03	0.06	0.07	0.00	-0.01	-0.01

PIP

Period	MG 1	MG 2	MG 3	MG 4	MG 5	MG 6	MG 7	MG 8	MG 9	MG 10	MG 11	MG 12	MG 13	MG 14	MG 15
1	16.7	10	16.7	8	18.3	13.7	15	19.3	16.7	11.3	15	12.7	16.3	14.3	11.3
2	20	7.3	16.7	7.7	20	15.7	16.7	20	17	9.3	16.7	11.3	19	13.3	13
3	17.7	6.3	16.7	7.3	20	14.7	11.7	20	16.7	10.3	18	9.3	20	11.7	7.7
4	13.3	5.7	16.7	5	20	17.3	11.7	20	11.7	11.7	18.3	1.7	20	5	12
5	12.3	6.3	13.3	7.3	20	17.3	13.3	20	10	3	18.3	6.7	20	10.7	10.7
6	13.3	6.3	10	9	20	17	8.7	20	7.3	4.3	15	4	20	17	8
7	7.7	4	10	6.7	20	15.7	6.7	20	5	3.3	11.7	11	20	11	5
8	6.7	2.7	6.7	4	20	14.3	3.7	20	0	4	8.3	6.7	18.7	7.3	5.3
9	-	-	-	1.7	20	11.3	7	20	0	1	7	1.7	19.3	8.3	0.7
10	-	-	-	-	-	-	3.7	20	0	0.3	3.7	0	13	10.7	5.7
11	-	-	-	-	-	-	-	-	-	0	2.3	6	7.7	5	6.7
12	-	-	-	-	-	-	-	-	-	-	-	-	8.3	5.7	5.7
DI	0.08	0.09	0.07	0.07	0.00	0.01	0.12	0.00	0.22	0.21	0.12	0.11	0.05	0.06	0.10
DI(1-8)	0.08	0.09	0.07	0.03	0.00	-0.01	0.10	0.00	0.15	0.12	0.04	0.05	-0.01	0.03	0.07

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