

Decision Support

# Unfair allocation of gains under the Equal Price allocation method in purchasing groups

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## Abstract

Certain purchasing groups do not flourish. A supposed reason for this is a creeping dissatisfaction among various members of a group with the allocation of the cooperative gains. In this paper, we analyze unfairness resulting from using the commonly used Equal Price (EP) method for allocating gains under the assumption of continuous quantity discounts. We demonstrate that this unfairness is caused by neglecting a particular component of the added value of individual group members. Next, we develop two fairness ratios and tie these to fairness properties from cooperative game theory. The ratios show among other things that being too-big a player in a purchasing group can lead to decreasing gains. They can be used to assess if EP is an unfair method in specific situations. Finally, we discuss measures a purchasing group could consider in order to attenuate perceived unfairness. Thereby, the group may improve its stability and prosperity.

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## 1. Introduction

Cooperative purchasing initiatives, such as purchasing groups, purchasing consortia, and buying offices are becoming more and more well established in the public sector and are gaining popularity in the private sector as well (Carter et al., 2000; Doucette, 1997; Hendrick, 1997; Johnson, 1999; Rozemeijer, 2000; Zentes and Swoboda, 2000). Reasons indicated for this trend are the development of e-procurement (Huber et al., 2004), shifting agendas from a short-term view and internal focus to a long-term view and external relationship focus (Dobler, 1996; Essig, 2000), an increased level of competition and cost pressure (Hendrick, 1997; Johnson, 1999; Nollet and Beaulieu, 2005), an increased awareness and importance of purchasing (Ellram and Carr, 1994), and the wish to counterbalance the power of large suppliers (Nollet and Beaulieu, 2005).

We define cooperative purchasing as the sharing and/or bundling of purchasing related information, processes, resources, and/or volumes by two or more organizations in a purchasing group in order to improve

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their performances. A purchasing group consists of two or more dependent or independent organizations that purchase together, either formally or informally, or through a third party (Hendrick, 1997). Typical advantages of cooperative purchasing follow from factors like economies of scale (Rozemeijer, 2000), reduction of transaction costs (Johnsson, 1999), cost avoidance, and improved relationships with suppliers and other organizations in a purchasing group (Hendrick, 1997). Examples of tangible advantages of cooperative purchasing are reduced purchasing prices (Nollet and Beaulieu, 2003) and reduced workloads (Schotanus, 2005). Reported disadvantages of cooperative purchasing follow from factors such as increased complexity of the purchasing process (Tella and Virolainen, 2005) and loss of flexibility and control (Schotanus, 2005). Examples of tangible disadvantages of cooperative purchasing are increased coordination costs (Johnsson, 1999), having to change specifications, and losing existing relations with suppliers (Schotanus, 2005).

Despite its increasing popularity in practice, cooperative purchasing has received relatively little attention in management research (Essig, 2000; Tella and Virolainen, 2005). In addition, cooperative purchasing research has focused primarily on inductive explanations of practice and qualitative deductive reasoning (Heijboer, 2003). One specific issue receiving particularly little research attention is the allocation of financial gains resulting from purchasing price savings obtained by cooperative purchasing while using the so-called Equal Price (EP) allocation method. This commonly used EP method is defined as all organizations paying an equal price per item (Heijboer, 2003). It is lamentable that the EP method is not well studied in literature as financial gains are often an important reason for individual organizations to join a purchasing group (Nollet and Beaulieu, 2003). Therefore, this paper focuses specifically on the EP method.

While practically and intuitively appealing, EP may lead to unfair outcomes under certain circumstances. This has been reported previously by Heijboer (2003), but a systematic analysis of this problem is lacking. Still, reasons reported for failure or stagnation of cooperative purchasing, such as disagreements caused by large differences in organization size (Schotanus, 2004), lack of commitment (Doucette, 1997), anti-trust issues, and fear of free riding organizations (Hendrick, 1997) are often related to the way the purchasing group's gains are distributed (Heijboer, 2003). To prevent these kinds of distribution problems, each of the organizations in a purchasing group should therefore receive a fair part of the total gains (Dyer, 2000). However, this may be difficult when organizations purchase different volumes through a purchasing group and use EP for allocating gains.

An example of one of the problems of EP is illustrated by the so-called hitchhikers' problem (Schotanus, 2005). This problem occurs when a small buying organization uses a contract negotiated by a large buying organization. For large organizations, there may be no incentive to allow hitchhiking while using EP. For small organizations, it can be very interesting to hitchhike though, as they lack economies of scale and can obtain a substantially lower purchasing price by hitchhiking. Granot and Sošić (2005) discuss a similar problem in which a relatively small organization would benefit from joining a specific purchasing group, but the inclusion of such an organization could possibly decrease the profits of the bigger organizations in this exchange. Furthermore, Essig (2000) notes that it is important to avoid an imbalance of incentives and contributions of organizations in a purchasing group, which can be caused by EP. Finally, reasoning from an equity theory perspective (Adams, 1963; Adams, 1965), it can be explained how perceptions of equity are developed. Equity theory states that individuals who feel under-rewarded will try to restore equity. Similarly to purchasing groups, EP may lead to under-rewarded organizations in a group. This may lead to lower commitment of these organizations or them leaving the group (Das and Teng, 2001).

Despite the relevance of the studies mentioned above, these studies do not formally analyze how and under which conditions unfairness arises while using EP. These two issues are important to all types of purchasing groups as all of them have to make a decision on how to allocate its gains. Therefore, this paper provides an analytical analysis of unfair outcomes of EP, provides recommendations for purchasing groups as how to deal with it, and contributes to more awareness and understanding of EP related problems. Hence, the main research question in this paper is: how and under which conditions does the Equal Price allocation method lead to unfair outcomes?

The organization of the paper is as follows. First, we develop a formal model of cooperative purchasing that enables us to analyze and illustrate unfairness effects while using EP. Next, we use the formal model of cooperative purchasing to analytically investigate what makes EP result in unfair outcomes. We do this by decomposing the added value of a purchasing group into three components and study how applying EP

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