



Interim efficiency with MEU-preferences[☆]

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Abstract

Recently Kajii and Ui (2009) [17] proposed to characterize interim efficient allocations in an exchange economy under asymmetric information when uncertainty is represented by multiple posteriors. When agents have Bewley's incomplete preferences, Kajii and Ui (2009) [17] proposed a necessary and sufficient condition on the set of posteriors. However, when agents have Gilboa–Schmeidler's MaxMin expected utility preferences, they only propose a sufficient condition. The objective of this paper is to complete Kajii and Ui's work by proposing a necessary and sufficient condition for interim efficiency for various models of ambiguity aversion and in particular MaxMin expected utility. Our proof is based on a direct application of some results proposed by Rigotti, Shannon and Stralecki (2008) [24].

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1. Introduction

We borrow from Kajii and Ui [17] the following model of an exchange economy with a single good and a finite set of possible states of nature. Finitely many agents exchange contingent contracts. There are two stages: ex-ante each agent's perception of uncertainty is represented by a family of priors; at the interim stage each agent receives a private signal about which states will

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not occur and his interim perception of uncertainty is then represented by a family of posteriors. Each agent is endowed with a concave utility index function from which he derives either Bewley's incomplete preferences or Gilboa–Schmeidler's MaxMin expected utility preferences. The set of priors induces preferences at the ex-ante stage (before agents receive their private signal) and the set of posteriors induces preferences at the interim stage depending on the private signal agents receive.

It is well known that ex-ante efficiency can be characterized through a necessary and sufficient condition imposed on agents' priors. Bewley [2] and Rigotti and Shannon [23] characterized ex-ante efficiency for agents with Bewley's incomplete preferences.¹ Billot, Chateauneuf, Gilboa and Tallon [4] and Rigotti, Shannon and Stralecki [24] characterized ex-ante efficiency for agents with Gilboa–Schmeidler's MaxMin expected utility preferences.²

In the standard Bayesian models, Morris [21] and Feinberg [13] provided a characterization of interim efficiency in terms of agents' posteriors. Kajii and Ui [17] proposed to address the same question when agents have multiple posteriors. They identified a key concept, called the *compatible prior set*, that plays a crucial role in their analysis. The compatible prior set of an agent is the collection of all probability measures which, conditional to each private signal, coincide with a posterior.³ When agents have Bewley's incomplete preferences, Kajii and Ui [17] succeeded to characterize interim efficiency by providing a necessary and sufficient condition in terms of compatible prior sets. For the particular case of linear utility index functions (risk neutral agents), they proved that an allocation is interim efficient if and only if the compatible prior sets of all agents have a non-empty intersection.

When agents have Gilboa–Schmeidler's MaxMin expected utility preferences, Kajii and Ui [17] proposed a condition that is only sufficient. The objective of this paper is to show that it is possible to find a necessary and sufficient condition for interim efficiency when agents have Gilboa–Schmeidler's MaxMin expected utility preferences. The condition that we propose is closely related to the necessary condition introduced by Kajii and Ui [17]. Actually we show that the concept of compatible prior set is central not only for models where agents have Bewley's incomplete preferences or Gilboa–Schmeidler's MaxMin expected utility preferences, but also for any model with general convex preferences. More precisely, we provide a general necessary and sufficient condition for interim efficiency in terms of compatible priors associated to interim subjective beliefs as introduced by Rigotti, Shannon and Stralecki [24]. All the characterization results in Kajii and Ui [17] follow as corollaries of our general characterization. In particular, having a complete characterization of ex-ante and interim efficiency, we can provide conditions under which there is no speculative trade as first studied by Milgrom and Stockey [20] for standard Bayesian models.

The paper is organized as follows. Section 2 sets up the formal framework, notation and some preliminary definitions. The characterization results proposed by Kajii and Ui [17] are presented in Section 3. Our necessary and sufficient condition for interim efficiency is stated and proved in Section 4. We illustrate in Section 5 how the results in Kajii and Ui [17] can be deduced from our general characterization. Section 6 shows how our results can be extended to encompass general convex preferences. We explore a slightly different concept of interim efficiency in Section 7 and Section 8 is devoted to no speculative trade.

¹ See also Dana [8].

² See also Dana [7], Samet [25], Tallon [27], Chateauneuf, Dana and Tallon [5], Dana [9] and Dana [10].

³ Technically, the compatible prior set of an agent is the convex hull of all sets of the agent's posteriors.

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