Fairness, price stickiness, and history dependence in decentralized trade

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ABSTRACT

The paper investigates price formation in a decentralized market with random matching. Agents are assumed to have subdued social preferences: buyers, for example, prefer a lower price to a higher one but experience reduced utility increases below a reference price that serves as a common fairness benchmark. The strategic equilibrium reflects market fundamentals, but it is markedly less sensitive to the buyer–seller ratio near the fair price benchmark. Prices may be sticky around very different reference levels in markets with otherwise identical fundamentals. The implied history dependence turns out to be mitigated rather than exacerbated by friction.

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1. Introduction

Fair behavior in bilateral bargaining situations has been one of the most extensively researched areas in microeconomics, both experimentally and theoretically. Whether the robust evidence that people are concerned with fairness in bilateral bargaining (see, e.g., Camerer, 2003) has implications for interaction on markets, however, remains unclear. Early studies by Kahneman et al. (1986), followed up by Kachelmeier et al. (1991) and Franciosi et al. (1995), have demonstrated that there are fairness effects on markets. However, they have been observed mainly as a transient phenomenon: the prices in the reported experiments typically approach the standard competitive equilibrium as time passes and unsustainable expectations are unwound. Many experimental studies have failed to find significant fairness effects on markets altogether. In their seminal paper, Fehr and Schmidt (1999, p. 818) summarize that

> ". . . in competitive experimental markets with complete contracts, in which a well-defined homogenous good is traded, *almost all* subjects behave as if they are only interested in their material payoff. Even if the competitive equilibrium implies an extremely uneven distribution of the gains from trade, equilibrium is reached within a few periods."

The experimental investigations referred to by Fehr and Schmidt (1999) mostly concern double auction settings and are therefore difficult to interpret: the zero-intelligence trader results of Gode and Sunder (1993) have highlighted the strong

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built-in tendency of double auctions to reproduce the competitive equilibrium. Whether agents lose their concern for fairness when they interact in market environments or if their social preferences are simply overwhelmed by institutional structure is hard to discern. In fact, Brown et al. (2004) have recently shown that social preferences can play an important role in the presence of contractual incompleteness. Their experimental results complement empirical findings by Young and Burke (2001) that testify to the importance of custom and focal division rules.

Many market forms other than double auctions are of practical interest. The *search* or *matching markets* studied by Diamond and Maskin (1979), Mortensen (1982), or Rubinstein and Wolinsky (1985) are cases in point. They feature prominently in labor, real estate and monetary economics.[1] A key property of these markets is that they temporarily involve one-to-one interaction. This establishes a direct social relation and, moreover, creates leeway for prices to reflect the attitudes towards risk, delay, and possibly fairness of any two trade partners.

This paper investigates the implications that social preferences have for the stationary strategic equilibrium of such a decentralized market. Agents are supposed to be averse to unfairly unfavorable as well as unfairly favorable deals in the spirit of Fehr and Schmidt (1999),[2] but we stay rather close to standard individualistic preferences: the negative weights on advantageous and disadvantageous deviations from what is considered as the fair benchmark are such that utility remains strictly increasing in own surplus share. In contrast to the original Fehr–Schmidt model, the fair split need not automatically be a 50–50 division; any price between sellers' cost and buyers' willingness to pay may be the one which, for whatever reasons, is agents' reference point in a given market. This makes it possible to consider a more flexible notion of fairness than is usually done. It is in line with cognitive dissonance theory from psychology and the noteworthy experiments of Binmore et al. (1991, 1993), where subjects who were triggered to play different bargaining equilibria ended up considering very different surplus distributions as 'fair'.[3]

Apart from agents' concern with fairness, the investigated model is a simple version of the bargaining markets investigated by Rubinstein and Wolinsky (1985), Gale (1986a, b) and Binmore and Herrero (1988). Buyers and sellers are randomly divided into pairs, and one randomly selected partner in each match suggests a deal. Rejection dissolves the match and agents wait to be rematched; successful traders leave the market and new ones enter. For simplicity, buyers and sellers are considered to be perfectly homogeneous, and all relevant information, most notably about agents' preferences, is assumed to be common knowledge.

Examples of real world markets in which agents can be thought of as interacting loosely as in our model include housing markets with approximately stationary landlord and tenant populations, similarly stationary labor markets with individual contracting, consumer-to-consumer sales of used cars, or direct procurement of differentiated commodities such as specialty tea, coffee, or wine. Agents in these markets may have an idea about the 'right', 'fair', or 'appropriate' rent, wage, or price that affects their subjective evaluation of a proposal (irrespective of informational imperfections, which we completely leave out of our model). We show how a rather weak concern for fairness can already give rise to price stickiness. This fairness effect is predicted to persist over time for the considered market setting. It provides an explanation for price or wage rigidities that complements the traditional ones based on imperfect information, menu costs, long-term contracts, or money illusion (see, e.g., Woodford, 2002 for the first, Fehr and Tyran, 2001 for the last, Golosov and Lucas, 2007 for menu cost, and Ball and Mankiw, 1994 or Taylor, 1999 for general overviews).

If the fairness benchmark itself is affected by agents' market experience, aversion to deviations from the given reference price gives rise to a continuum of possible self-confirming price conventions. This can explain distinct price levels in fundamentally identical markets. Interestingly, the larger the scope of history dependence is, the less friction is associated with the rejection of an offer: friction turns out to erode the effects of fairness concern. Similarly, price stickiness is reduced rather than increased by friction.

We will now introduce the model. The ensuing strategic market equilibrium is studied in Section 3. We first discuss the market price's response to changes in the ratio of buyers to sellers for a given reference price, and then investigate the implications of endogenizing the latter. Section 4 concludes.

2. The model

Our basic market set-up mimics that of Rubinstein (1989, Model A: agents can trade a single indivisible good at discrete points of time indexed by $t = 0, 1, 2, \ldots$. An agent is either a seller endowed with one unit of the good that she wishes to sell or a buyer with at least one unit of disposable income. The sets of active buyers and sellers have cardinalities B and S, respectively.

In each period, agents are drawn randomly from the current population and matched with an agent of opposite type if there is one. For simplicity, the matching technology is assumed to involve no friction other than delay after the rejection of

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[1] See, for example, Mortensen and Pissarides (1999) or Rogerson et al. (2005) for labor search models, Krainer and LeRoy (2002) or Albrecht et al. (2007) for housing markets, and Shi (2001) or Rocheteau and Wright (2005) for monetary applications.

[2] Prominent related models of social preferences include the ones by Bolton and Ockenfels (2000), Charness and Rabin (2002), Dufwenberg and Kirchsteiger (2004) or Falk and Fischbacher (2006).

[3] An endogenous notion of fairness also features prominently in Binmore's (1994,1998) theory of distributional justice. It interprets the human sense of fairness as an efficient means to reach agreements quickly; it has evolutionary advantages only if it can adapt to changes in actual bargaining strength.