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Quality in competitive fresh produce supply chains with application to farmers' markets

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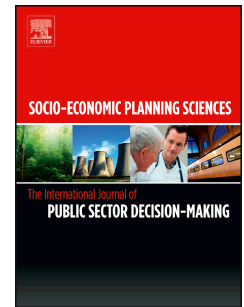
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**Quality in Competitive Fresh Produce Supply Chains  
with  
Application to Farmers' Markets**

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**Abstract:** Fresh produce supply chains have special characteristics, notably, that the quality of the product (fruit or vegetable) deteriorates continuously over time, even under ideal conditions. In this paper, we begin with explicit formulae for fresh produce quality deterioration based on chemistry and temperature and provide a path-based framework. We then focus on farmers' markets, the popularity of which has been growing due to consumers' greater awareness of and interest in product quality and emphasis on health. Farmers' markets, as examples of direct to consumer channels and shorter supply chains, are studied in the framework of game theory in both uncapacitated and capacitated versions. A case study of apples in Massachusetts, under various scenarios, including production disruptions, provides quantitative evidence of the applicability of our supply chain network approach.

**Key words:** quality, food supply chains, fresh produce, oligopolistic competition, food deterioration, product differentiation

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