# Land Investment in the Presence of Price, Quantity and Entitlement Risk

**Richard Buttimer**
**Belk College of Business**
**University of North Carolina Charlotte**
**Charlotte, North Carolina 28223-0001**
**(704) 687-7695**
**buttimer@uncc.edu**

**Steven P. Clark**
**Belk College of Business**
**University of North Carolina Charlotte**
**Charlotte, North Carolina 28223-0001**
**(704) 687-7689**
**spclark@uncc.edu**

**Steven H. Ott**
**Belk College of Business**
**University of North Carolina-Charlotte**
**Charlotte, North Carolina 28223**
**704-687-7630**
**shott@uncc.edu**

**Sean Brunson**
**Belk College of Business**
**University of North Carolina Charlotte**
**Charlotte, North Carolina 28223-0001**
**sbrunso2@uncc.edu**

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***Abstract***

We develop a model of land valuation and development in a real options framework that combines traditional price uncertainty with quantity uncertainty and entitlement risk. We explicitly model each phase of the general development process: pre-entitlement, pre-development, construction, and post development. Within this framework, we solve the model numerically for a given set of input parameters, and determine undeveloped land values (with and without entitlement), the preleasing/presales necessary to initiate development, and expected time to development for speculative land investment, i.e., land without the requisite presales to begin construction. We also determine the expected (required) return to investing in undeveloped and speculative land. Our model results generally support the empirical evidence and investor surveys on land investment and shed light on what factors drive risk and return on land investment.