

Differences in Opinion and Equilibrium Asset Returns
in a Multi-Asset Market

Xiao Zhang, He & Liu Shi

University of Technology Sydney

Singapore Finance Workshop on Quantitative Finance
22-23 July 2014, Singapore, China

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Math. Standing Committee

Time preferences (Cont'd)

- The manager's time preference is the degree to which he values consumption today over consumption in the future.
- A higher time preference means that the manager values consumption today more than consumption in the future.
- When $\delta = 0$, the manager is indifferent between consumption today and consumption in the future.
- When $\delta > 0$, the manager is indifferent between consumption today and consumption in the future.

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Hyperbolic discounting (A case of time inconsistency)

- Interest rates are higher for longer time horizons.
- Quasi-hyperbolic discounting structure (Laibson 1997): Time is divided into two periods: The present period and all the future periods.
- Payoffs in the current period are discounted by a discounted rate ρ .
- Payoffs in a future period which is t -period ($t > 1$) away from the current period is discounted by ρ^t and then further discounted by an additional factor $\beta \in (0, 1]$.

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Multi-dimensional Quadratic Backward
Stochastic Differential Equations
of Diagonally-Quadratic Generators

Shanjian Tang
Fudan University, Shanghai
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$$\frac{\partial u}{\partial t} + \frac{x^2}{2} \frac{\partial^2 u}{\partial x^2} + \frac{\partial u}{\partial x} = 0, \quad u(0, T) = f(x).$$

Source: Evans, p. 116

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Theorem

Assume

$$f(x) = \frac{1}{2} \left(\frac{x^2}{2} + \frac{1}{2} \right)$$

Then the value function $V(x) = \frac{1}{2} \left(\frac{x^2}{2} + \frac{1}{2} \right)$ is a continuous state constrained viscosity solution of the following problem:

$$F(V) = 0 \text{ in } S, \quad V = 0 \text{ on } \partial S, \quad -F(V) = 0 \text{ on } \partial S \quad (6)$$

Boundary condition at S :

$$V \in C^1 \Rightarrow \left[\frac{\partial V}{\partial \nu} \right]_{\partial S} = \sup_{\lambda \in \partial S} \left(\frac{\partial V}{\partial \lambda} - \lambda \right) = 0$$

Theorem

Then the value function $V(x) = \frac{1}{2} \left(\frac{x^2}{2} + \frac{1}{2} \right)$ is a continuous state constrained viscosity solution of the following problem:

$$F(V)$$

Boundary condition at S :

$$V \in C^1$$









Portfolio Selection with Capital Gains Tax

Optimal Exercise Regions: CGMY with Fixed Number of Rights



Figure - Optimal strategy: CGMY model with $N = 5$ fixed rights

Optimal Exercise Regions: CGMY



Figure - Optimal strategy: CGMY model







Optimal Dividend Strategy with
Time-Inconsistent Preferences and Cost Constraints

Zhonglin Li

Joint work with Shumin Chen and Yan Zeng

Sun Yat-sen Business School, Sun Yat-sen University

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July 13, 2015

Zhonglei Li (SYSBS)

Optimal Dividend Strategy





- State space

$$x(k+1) = Ax(k) + Bu(k), \quad x(0) = x_0, \quad x(k) \in \mathbb{R}^n, \quad u(k) \in \mathbb{R}^m$$

- A the set of admissible control

$$A(x, k) = \{U \in \mathbb{R}^m : \|U\| \leq M, \quad U \in \mathbb{R}^m\}$$

- Value function $v(x, k) \in \mathbb{R}$

$$v(x, k) = \sup_{u \in A(x, k)} E \int_k^T \gamma^t (x_t, u_t) dt + \phi(x_T) \quad (4)$$

subject to state equation (1)-(3)

- Stopping time

$$\tau = \sup\{t \geq 0 : x_t \in \mathbb{R}^n\}$$

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