

# Stochastic Dynamic Business Game

## Overview

A Stochastic Dynamic Business Game (SDBG) is a mathematical model designed to simulate the real business situation faced by business firm. Each business firm is regarded as a player and at the same time a competitor to the others in the market (or industry) where they compete in. Basically, the industry is formed and shaped dynamically and stochastically (randomly) by both uncontrollable factors (i.e., business environment) and controllable factors (firm's strategy). Furthermore, a crucial aspect of competition known as strategic behavior (i.e., strategic game) also influences firm's strategy and the overall market as well.

The SDBG works systematically by a mathematical model representing the nature that governs the industry. The nature aspects of dynamic game and stochastic dynamic are captured by the mathematical modeling approach. Once the inputs, the information of both controllable and uncontrollable factors up to a current time, are plugged in the SDBG will continuously gather new information and update its model (parameters) then compute business results of both market level and firm level. Each player's business results will be based partly on her strategy on key business functions namely, marketing, operations, and finance, and partly on current industry condition. The player's job is to achieve business objective: to maximize shareholders' wealth in the long run (a predetermined time period), by managing her business strategy properly.

## Objective

To provide a learning tool for business student to assimilate and practice business strategy decision making.

## The System

The mechanism of the SDBG can be explained diagrammatically as shown in figure 1. Business environment data such as economic variables: economic growth, interest rates, commodity prices, firms' stock prices, etc., and firms' strategies are the input to the model. Economic variables change continuously with some degree of uncertainty (mathematically speaking, their values follow stochastic processes) and also each player can freely adjust and input her business strategy at any time which means all players need not to move simultaneously as required by standard business simulation game. Rather, the players can either move simultaneously or alternately. This resembles a typical characteristic of business competition. The model is designed to calculate, update itself, and produce results continuously. Hence, the player can monitor her business results as closely as she needs as a part of strategic control.