

D. Yvette Wohn

Michigan State University

Eun-Kyung Na

Keio University

Extended Abstract

Virtual worlds involve activities that resemble activities in the real world that economists would call production, trade, consumption, and labor (Lehdonvirta, 2009). Virtual economies emerge out of the activities of the aggregate behavior of individuals through complex mechanisms of individual and interactive behavior. There has been relatively little literature, however, on economic behavior in virtual worlds. What has been studied on the topic is oriented towards massively multiplayer online (MMO) games. For example, Castronova and colleagues (2009) used large-scale user data from the MMO Everquest to identify real-world economic behavior within the game. They found that indeed, aggregate economic behavior mimics that of the real world, although less stable.

Previous research has examined the motivations of virtual economic transactions at a theoretical level. For example, Guo and Barnes (2007) developed a theoretical model to understand psychological processes to transaction intention of virtual items in virtual game communities. In their research, social influence was an immediate link to the players' behavioral intention to purchase virtual item.

Our study explores behavioral data from a social gaming service to see if social factors such as gift-giving and number of friends increased players' spending of real money to purchase virtual items.

We received de-identified log data from Puppy Red, a social gaming service for children and tweens in South Korea. Similar to services such as Webkins or Club Penguin, the service was launched in 2003 and has 5 million registered users, providing more than 15,000 different virtual items that range from avatar clothing and home decorations to pet accessories. Users create and dress up their own avatar and can play "house." They can also visit other users' houses or

congregate in a public space. Users can also engage in mini games and tasks such as picking apples, which will earn them virtual currency in the form of nuts. Users can then use these nuts to purchase clothes and animations for their avatar, furniture and decorations for their house, and food and accessories for their pets among others. There is no membership fee, but users have the option to purchase virtual coins with real money. Some items can only be purchased with virtual coins, while others can be purchased with both nuts and coins.

We collected data of active users—users who had accessed the site at least once during three months from November 2009 to January 2010. This timeframe was the most recent 3 months at the time of the data collection. After conducting filtering process on missing data and outliers, the dataset showed 224,827 users. Among this population, 64,076 users (less than 28.5% of total active users) had spent real money at least once and only 17,750 (less than 8% of active users) had spent real money during the most recent three months.

We ran an Ordinal Logistic Regression looking at the amount of real money spent as a dependent variable using the statistics software, SPSS18. Independent variables included factors such as number of friends, giving and receiving presents from in-game friends, and membership length, frequency of visits, total time spent on game, total number of virtual items, number of items obtained for free, and demographic factors of gender and age.

Our regression model was significant ($F(11,17738) = 1143.698, p < .001$) with an adjusted R^2 of .415. Players who spent more time on the game ($\beta = .162, p < .001$) and who had been members of the game for a longer time ($\beta = .076, p < .001$) spent more money. Social factors, such as giving virtual gifts ($\beta = .322, p < .001$) and receiving virtual gifts ($b = .084, p < .001$) were positively associated with spending of real money. Players who had more items spent more real money ($\beta = .225, p < .001$), however, players who had more free items provided by the game spent less

real money ($\beta = -.189$, $p < .001$). The number of friends had no significant influence in explaining the spending of real money ($b = .012$, $p = .061$). However, when comparing spenders with non-spenders, spenders ($M = 51.83$) had significantly more friends than non-spenders ($M = 15.94$).

This research provides insight into actual spending behaviors of young players of social games. We found that social factors of play—such as exchanging of gifts—was positively associated with spending real money. These findings inform game designers who wish to build a game that is financially sustainable. Even without membership fees, our results suggest that providing a wide range of virtual items that cater to customization and encouraging social behaviors among players such as gifting contribute to players' spending of real money.

Castronova, E., et al. (2009) As Real as Real? Macroeconomic Behavior in a Large-Scale Virtual World. *New Media & Society*, 11(5), 685-707.

Lehdonvirta, V. (2009) Virtual item sales as a revenue Model: Identifying attributes that drive purchase decisions. *Electronic Commerce Research*, 9, 97-113.

Guo, Y. & Barnes, S. (2007) Why people buy virtual items in virtual worlds with real money. *The Database for Advances in Information Systems*, 38(4), 69–76.