

On Policy Issues “in” Virtual Worlds: — Beyond the “Seniority-Based Dragonball Economy” —

Hiroshi YAMAGUCHI

Faculty of Global Media Studies, Komazawa University
1-23-1 Komazawa, Setagaya-ku Tokyo 154-8525 JAPAN
hiroshi.yamaguchi@tokyo.nifty.jp

ABSTRACT

This paper discusses policy issues "in" cyberworlds, rather than "on" them. Many virtual worlds, online games and other online communities, develop their own exchange system, and the virtual economies have become increasingly important to our real lives. But since virtual economies have different characteristics from the real ones, we need to think about how to manage these economies accordingly. In this paper the author analyzes the basic structure of these games and proposes policy measures to counter important in-game problems. In addition, a growing trend toward interaction among virtual worlds is viewed as emergence of "international economy."

Author Keywords

in-game economics, virtual economy, cyberworlds

RISE OF VIRTUAL ECONOMIES AND ECONOMICS

Economics, in the broad sense, is an area of social science that deals with allocation of scarce resources. A person or a group of people, in the face of less-than-enough amount of resources available, must decide how to allocate them to maximize the utility.

Therefore, an economy arises at any places that have similar conditions; even if it does not involve any physical objects. In recent years, increasing number of economists becomes aware that a new frontier of economics is emerging in the cyberspace, i.e., online games or other kinds of online communities, in which people trade virtual items by using real and/or virtual currencies.

When [2] first analyzed the economy in Everquest¹ from academic viewpoint, many economists did not take it seriously; but the situation is rapidly changing. Creating, trading and consuming virtual items, money, or avatars, have now become a new field of business, and non-negligible amount of real money is exchanged. More importantly, millions of people in many developed and developing countries spend considerable money, time and

effort “in” these virtual worlds. They commit themselves to hunting and trading items, and selling and buying services in these games. The in-game economic activities, through affecting people’s behavior, have become “meaningful” to our real economy.

In most cases, each of these virtual worlds is run by different operator. But we should not think the economies of these virtual worlds in cyberspace as isolated to each other. Rather, these economies are interlinked. This tendency becomes increasingly prevalent as more and more videogames go online, and people spend more and more time by using various internet services.

Of course, each virtual economy has its own system and boundary, and not fully linked to others. But this is just the same as that in our real economy countries and/or regions have different economic systems and characteristics, and are not fully interlinked. In this sense, the partial linkage among virtual worlds resembles to the international economy. In this paper I propose that now we should think that an “international economy” of virtual economies is emerging in the cyberworld.

The paper is constructed as follows. The Section 2 describes structure of a typical virtual economy, that is, that of MMORPGs (Massively Multiplayer Online Role-Playing Games). The Section 3 analyzes the typical price behavior observed in MMORPGs, and explains how the characteristic is related to the design of the virtual worlds. The Section 4 discusses the possible “policy measures” taken by game companies, in other words, “in-game governments.” The Section 5 expands the viewpoint to many kinds of virtual worlds, and explains that these worlds are interlinked by virtual currencies. And the Section 6 concludes the discussion by proposing the importance of viewing virtual worlds from the “international” perspective.

TYPICAL MMORPG ECONOMIES

Online games are the most typical kind of virtual worlds because of their close resemblance to the real world in many respects, such as 3 dimensional representations, interaction of people, and resource allocation and exchange mechanisms. Yet still they are different from the real world

¹ <http://eqplayers.station.sony.com/>

in many aspects. Design of online games differs game by game, but the basic structure of many popular MMORPGs surprisingly resembles to each other, sharing common characteristics.

Social Structure

Many MMORPGs, typically rooted from Western legends and old stories, adopt somewhat undeveloped social structure that resembles to those in medieval Western societies.

Hunting society

Societies of most typical MMORPGs are hunting society, where the most of the players’ production activities are limited to hunting monsters. There is no possession of farming land, and the players wander place to place as traveler rather than living in the same place.

Individual artisans and merchants

MMORPGs allow players to choose their jobs from various alternatives, such as knights, magicians, artisans and merchants. But in many cases there are no in-game business enterprises that allow players to join, and thus all jobs are individual-based.

Developed system of money

Despite the medieval-like, relatively underdeveloped production and commercial systems, monetary system of most MMORPGs is well developed. There is basically no fake money, and the players do not doubt the true value of the virtual money when making trades.

Simplification

Despite of its similarity to the real economy in the basic characteristics, MMORPG economies are usually different significantly from the real one in many important aspects. These differences are mostly designed by game designers to make the games enjoyable to many players. Details are discussed in the later section.

“MUDflation”

Many observers of virtual economies of MMORPGs share the view that the in-game economy has a typical characteristic in price behavior. [3] called it as “MUDflation.” The term “MUDflation” is the mixture of “MUD” (Multi User Dungeon, the first, text-based MMORPG) and “inflation,” referring to typical price phenomenon observed in MMORPGs. Castronova explained it as the mixture of two, (i) a gradual increase in the price level, and (ii) a gradual increase in the amount of physical capital per player.

The economies of these games are not designed assuming continuous inflation or deflation. As analyzed in the later section, the virtual currencies in these games are produced by players’ activities to obtain items. In addition, many items (mainly low-level items) have fixed prices; NPC (Non-Player Character) merchants buy and sell them at the

pre-determined price at any time, to any players. Such a design is based on an assumption that the balance of goods and money, and thus effectively the general price level remain at the same over time. In this sense, MUDflation is a phenomenon beyond the intention of the game designer.

MECHANISM OF MUDFLATION

In this section, I analyze why MUDflation occurs. There seems to be several reasons for the phenomenon. And all of them can be explained by applying basic economic theory and experiences in the real economy.

“Seniority-Based Dragonball Economy”

A Dragonball economy refers to an economy in which ability of people rises far greater than in the real economy. Taking its name from a Japanese famous manga and anime “Dragonball,” in which characters grow very fast, the economy is characterized by “hyper-inflation” of people’s ability.

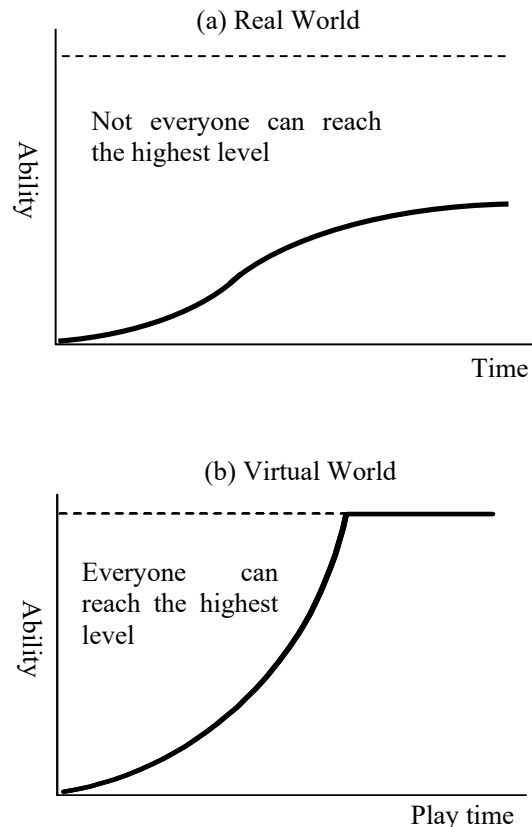


Figure 1: Comparison of Ability Development Patterns in Real vs. Virtual Worlds.

Such a rapid growth of ability is possible only in virtual worlds. As in the panel (a) of the Figure 1, people’s ability in the real world rises only gradually, and not everyone can

reach the highest level. Acquisition of any kind of real life skills requires vast amount of effort and time, and to a certain extent talent, too. After having a certain amount of experience, the growth in the people’s ability slows down, and the growth rate becomes increasingly lower, and finally saturated.

In contrast, as in the panel (b) of the Figure 1, player’s in-game ability continues to rise at an exponentially increasing rate until it hits the peak set by the game system. The difference in the ability between lower and higher level players is huge compared to the corresponding difference in the real world income.

Such rapid increase in ability is intentionally designed by game designers, of course for users’ satisfaction. The increase in the in-game ability raises income, allows prestigious occupation and clothing, and provides feeling of self-fulfillment. Much faster increase than in real economy is a fantasy of which everyone dreams.

An important thing here is that every player can reach the highest level as long as she played long enough. High-level in-game skills in fact can be attained typically by repeating relatively simple chore: hunting monsters. The only required resource to spend is player’s time. This assures that every player can enjoy the game. But on the other hand, in such games, busy players face severe handicap. Avatars become stronger only by spending much time. No knowledge (on physics or history, for example) or real-life skills (such as handling of game controller) can help; it is “seniority-based.”

For example, let us take Final Fantasy XI (FFXI)². In the game, a player hunts monsters to earn experience points and dropped items. The Figure 2 shows the relationship between the level of the monster and their hit points (representing physical strength of the avatar gained when the avatar hunts the monster)³. Increase in physical strength is directly translated to the ability to hunt stronger monsters, and effectively the ability to earn more game money. As the avatar’s level rises, the experience points (and thus the income level) rise exponentially. This corresponds to the increasing part of the Dragonball economy as in the panel (b) of the Figure 2.

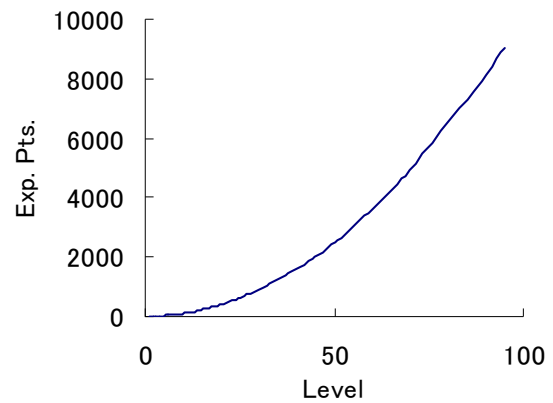


Figure 2: Dragonball Economy in FFXI.

Dragonball economy is seen in many games, both online and offline. The Figure 3 shows how much in-game money the player in “Pokemon” (Diamond/Pearl edition), a typical offline game for handheld game players, earns as the game sequence proceeds. In the game, a player fights against non-player characters by using pokemons, and gets prize money when she wins. Each game sequence consists of several such fights, and the player gets a penalty if she quits during the fight sequence. The strength of enemy pokemons, and correspondingly the amount of prize, rises as the game sequence proceeds. And then we see a similar exponentially increasing pattern of prize as in the figure.

Such exponentially increasing pattern is rare for real life income, at least those for ordinary people. The Figure 4 shows the average income earned by individual and household for different age group of people in Japan, based on the 2004 Basic Survey on Wage Structure conducted by the Ministry of Health, Labour and Welfare (MHLW). On average, household income hit its peak when the major earner is in the age group of “50-59.” But the average monthly income of this age group is only about 2.5 times greater than the age group of “under 29,” those who earn the least. This difference in income is far less significant compared to the in-game Dragonball economies; in FFXI, the hit points of the highest-level monster is higher about 4,500 times than the lowest-level ones; in Pokemon, the highest prize money of a game sequence is as more than 120 times greater as the lowest. In addition, unlike in the Dragonball economy, the marginal increase in real life wages is typically decreased as people retired, and thus the wage curves is concave rather than convex.

² <http://www.playonline.com/ff11/index.shtml>

³ The data is taken from a fan site “Lineage Capture Information” (<http://www.lineinfo.jp/database.htm>).

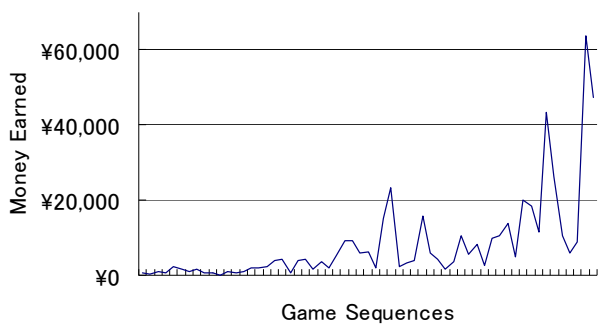


Figure 3: Dragonball economy in *Pokemon*.

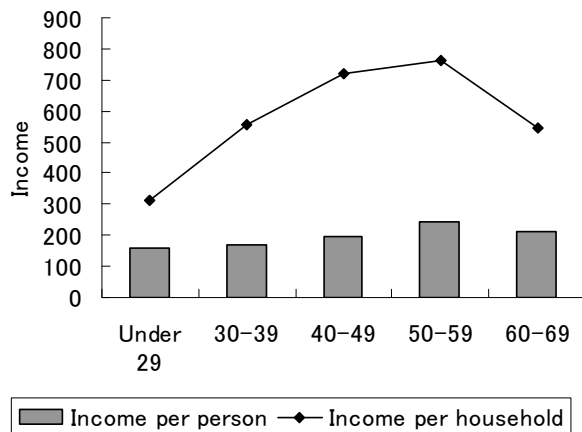


Figure 4: Average Monthly Income by Age. The data is taken from the Basic Survey on Wage Structure 2004 (MHLW).

Although the Dragonball economies of off line and online games have similar characteristics, there is a significant difference between the two. Required time to reach high level is much longer for online games. This arises from a difference in business models. As for offline console games, the revenue of game companies primarily comes from the sale of packages. The revenue is realized at the time of sales. This means that the business horizon of typical offline console games is rather short, often months or even weeks. On the other hand, online game operators earn money typically from revenue stream of monthly payment. This means that the business horizon of typical online games is much longer, often years.

Enhanced growth of in-game capability in the Dragonball economy is a source of players' fun. They enjoy the great effect of their in-game power and skills, which are far greater than they actually do in the real world: pushing buttons of controllers. This characteristic causes no problem in off-line games, but story is different in online games.

In off line games, players do not interact with other players in game. Thus, the "economy" that each player faces is only *imaginary*, meaning no transactions have real (living) counterparts. In such an "imaginary economy," game designers can freely design the economy that the players face. Whatever market structure or price behavior is possible because they affect only parameters in the game. No problem arises even if a player becomes the richest in the game world.

But if it comes to online games in which players interact with each other, this causes problems. Richness is defined by the relative economic status of players. In this sense, it is practically impossible to design an economy so that all players in the economy become the richest. If a player becomes relatively rich, others by definition become relatively poor. Typically, a Dragonball economy in multi-player environment causes unequal income distribution between veteran and novice players. This keeps the newcomers out from much of enjoyment of consumption for a considerable length of time. Fixed prices for low level items are designed to avoid this problem.

But the most serious problem of the seniority-based Dragonball economy is that it becomes increasingly difficult to maintain vitality of the in-game economy as time passes. In a Dragonball economy, senior players become increasingly richer, and newcomers find difficult to catch up the difference. Such a situation discourages new players to join the game, and eventually the vitality of the economy is likely to be deteriorated.

Systematic Overproduction

In a typical MMORPG economy, variety of activity is rather limited. For "Achievers" described by [1], the group of game players whose aim is to raise the levels of their avatars, the only way to do it is to hunt monsters. But this very activity at the same time produces items, which is exchanged for in-game money.

In the real world, there are many kinds of occupations and the required skill for each job is also diverse. For example, to become a successful businessman, a high degree of intellectually sophisticated knowledge and skills is needed. But if you want to be a professional athlete, you need to have a high level of physical strength. Each occupation has a required set of skills and knowledge, and people learn and prepare for it by spending long time.

Players have different preference in favorite activities and objectives in the games. Some players wish to be stronger, which requires a higher character level. And other players wish to be richer. In typical MMORPGs, these wishes can

be achieved by the same activity: hunting monsters. Hunting monsters, in typical MMORPGs, can do everything. Such a characteristic causes structural overproduction of items. Many players spend long hours by hunting monsters to become strong, even if they do not need items.

In addition, safety is secured with respect to the quality of items in the game world. In the real economy, some apples are decayed, some swords are broken, and some drugs are poisonous. So basically we do not trust the quality of items unless we buy them from qualified merchants or they are guaranteed by professionals. But in typical MMORPG, we can buy anything from anybody. Buying expensive items from someone we come across on the street is perfectly OK because we do not need to doubt on the quality of items. Apples are apples, swords are swords. This reduces the entry barrier for production and commercial activities for players significantly. Any players can produce items by hunting monsters. Furthermore, the items, once produced, can be sold all the time. You can sell any apples even if you found it on the street. NPC merchants always buy the items at fix price. All these characteristics lead the in-game economy to systematic overproduction.

Systematic Underconsumption

Despite the overproduction, in typical MMORPGs, have a tendency of underconsumption. There are no necessities in typical MMORPGs. Avatars do not starve and thus do not need any food and water, and can live without any everyday items like soap, tooth paste, or tissue papers. In addition, most items neither break or decay, and last forever as long as players have. Avatars can drink even a bottle of 1-year-old milk. Therefore the quantity of item holding is uniformly increased unless the player intentionally commits to consumption.

The underconsumption and the overproduction make players increasingly richer over time. The items are eventually sold to be exchanged for in-game money. It is because money is more convenient to use as the medium of transaction, and because money has no in-game weight; avatars can carry any amount of money. Therefore, over time, the quantity of money relative to items tends to be increased.

No Monetary Control

An important characteristic of in-game currency is that there is no central bank to control money supply in MMORPG economies. The amount of money issued and circulated in the economy is determined basically by the players’ activity. Players hunt monsters and sell items to NPC merchants, the activities which add money to the economy. [6] categorized typical in-game currencies as LETS (Local Exchange Trading System). It is issued based on people’s activities, there are no interest rates, and it is effective only in communities. An in-game currency is a LETS in the game world.

And since there are no central banks, no interest rates, and (in addition) no financial systems, ordinary monetary policies are impossible to implement. Therefore, the amount of money in the economy is basically uncontrollable for game operators by ordinary monetary policy measures.

“POLICY MEASURES”

When we see a MMORPG as a virtual world, the game company is the “government” of the world. It determines society design, and is responsible for the management.

Table 1: “Policy” Measures to Counter MUDflation

Categories	Policy Measures in Game World
Agricultural	Reduce probability of monster-encounter, or make them stronger Reduce the probability and content of item-drops
Public	Raise the price of NPC services
Labor	Separate activities for level-up and item acquisition Fixed income system or regulation on labor hour Allow new occupations that require more advanced real-world skills
Economic	Introduce consumption items Let items perishable Promote new fashions to make the old ones obsolete
Immigration	Set up new servers and promote migration of old (rich) players to the new frontier

Countering MUDflation

Notice that all these problems arose from requirement with respect to game design. That is, games should be reasonably easy to make the game enjoyable to all players; should retain players for long period of time to keep enough amount of revenue stream; should be reasonably simple to avoid excessively consuming system resources, and so on. Game designers can elaborate details of the games as much as possible technically, but it is practically difficult.

How the game companies counter the problem as the “governments” in the respective game worlds? Although it is basically an economic problem, the “policy measures” covers wide range of policy areas because ordinary economic policy measures are difficult, if not possible, to implement. The Table 1 lists examples of possible policy measures taken by game companies.

Agricultural policies

Overproduction can be solved by reducing the yield from production activities, which reduces average income of players. This can be achieved typically by reducing probability of monster encounter or item dropping.

Public policies

Inflation arises when money becomes abundant relative to goods. Thus the game companies can reduce the amount of money in the economy by offering new services to players to absorb the money from the economy.

Labor policies

Overproduction arises partially due to that the level-up activities accompanies production. Thus separating these two is a way to avoid unnecessary production activities. Or, it would also be possible to limit the income of players to avoid overproduction. Introducing new ways to earn virtual money, especially those that require more advanced real-life skills rather than just hunting monsters might also be effective. Not all players can exercise such skills, and thus it would function as deterrent against overproduction.

Economic policies

In the real world, we consume a fair amount of income for fashion items. Fashions become obsolete over time and are replaced by new ones, and thus it is good for enhancing consumption.

Immigration policies

The problem of MUDflation becomes more severe as the proportion of veteran (rich) players in the game economy rises because average player wealth tends to be proportionally increased with the player's experience. Thus reducing average player wealth by promoting migration of aged players to new servers might revitalize economy.

An Example

Some of these policy measures are consistent with those adopted by game companies. In August 2006, Gung-Ho Online Entertainment Co. announced a set of in-game economic policies to recover the balance of the economy of Ragnarok Online after an incident in which a game master issued 691.0 billion zeny (unit of the in-game currency) without authority, and sold 600 billion to RMT (real money trade) businesses to earn at least 14 million yen⁴. In the press release, the company explained that the unauthorized currency issue caused serious inflation in the game economy. And the policy measure to counter the problem included the following.

Policing

The company strengthened policing activities against off-the-rule conducts (unauthorized access from abroad and/or

use of bots) to reduce the amount of money supply in the game economy;

Consumption items

The company introduced consumption items or fashion items in the market to enhance consumption.

Goods-money balance

The company increased the number and quantity of items in the economy to reduce the relative abundance of money.

Countering RMT

As in [6], RMT is basically a trade among players with different resource endowments and comparative advantage. Some players have abundant time but not enough money, and some others have abundant money but not enough time.

Such trades are not illegal in most countries. But in many MMORPGs, RMT of in-game items or characters is prohibited by EULA basically because it distorts the game balance, and causes problems for players and game companies. Many popular MMORPGs are not designed in presence of RMT. These games provide players with only relatively simple but time-consuming tasks to extend the time for the players to raise the levels. Under the monthly subscription model, it was expected to maximize the revenue stream for the game company.

In this regard, RMT from item-buyers' viewpoint is a short cut of this process by utilizing an unused resource that players have: real money. From the view point of sellers, who are interested only in earning (real) money, it is natural to exploit cost advantage of their labor to the maximum. And then the amount of money in the game economy is increased to a greater extent than the game designer expected. In both cases, the level of economic activities exceeds the game designer's expectation.

For game companies, RMT makes the game economies less manageable. RMT induces overproduction, which leads to MUDflation. This is particularly harmful for players not committing RMT because they are not benefited from RMT (faster level up or real money income) but face its harms (higher item prices). Thus it is natural for the companies prohibit RMT by EULA in such MMORPGs, but eliminating these trades is actually difficult. The situation is just like that for the real-world government that faces illegal trading activities. Direct enforcement is powerful but does not cover all economic activities of people. Game companies, as the in-game government, should think the problem more practically.

Various policy measures in the Table 1, or their combinations, would help to some extent. RMT is linked with overproduction that causes MUDflation. In addition to such in-game policies, game companies can implement measures for the outside of the game world. Since a RMT is partially conducted in real world, game companies should see what is happening in the real world, too.

⁴ <http://www.gungho.co.jp/press/096.html>

Let us consider the consumer surplus of a player regarding the demand for MMORPG. The shaded area in the Figure 5 represents the consumer surplus of a game player, drawn in an ordinary price-quantity (p-q) plain. The thick downward sloping curve represents the demand function. Notice that in this analysis, we put our viewpoint in the real world. The player as a real person determines how much money to use for the game.

The panel (a) shows the case for monthly subscription system, in which the player pays monthly fixed amount of money to unlimitedly access the game within the month. This payment method has formerly been employed by most operators of MMORPGs. This freed the players from worry about skyrocketing subscription bills, and allowed them to devote themselves to the games.

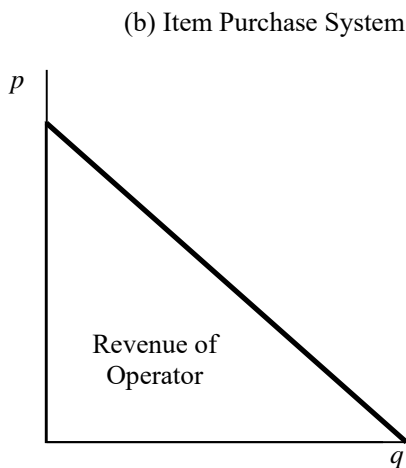
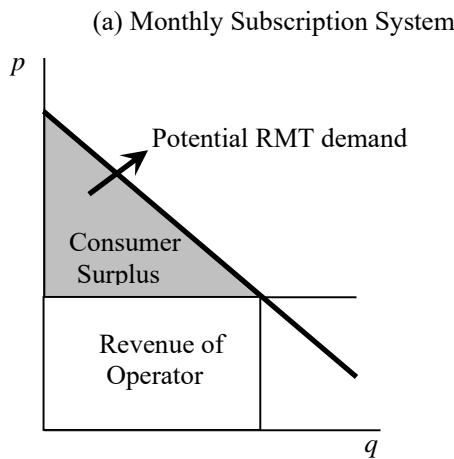


Figure 5: Comparison of Consumer Surpluses by Payment Systems.

The consumer surplus in the panel (a) represents the amount of (real) money that the player is willing to pay in excess of the actual payment charged by the game company. The unmet demand for game spending can go to RMT businesses. In this sense, aggregating these consumer surpluses of all players would represent the potential market size of RMT.

Recently, newly launched MMORPGs tend to adopt item-purchase based payment system, in which the game company does not charge on game itself, rather on items sold in the game. The player buys in-game items by paying real money. The panel (b) shows the consumer surplus of the player under item-purchase based system. In this case, all of the consumer surplus can potentially be absorbed by the game company rather than outside RMT businesses. The player can spend as much money as she wants to pay for the game. In this sense, the item-purchase based online games can be viewed as the games with internalized or official RMT. In contrast, we can see RMT among players as external or private RMT.

In reality, even item-purchase based games do not eliminate all external RMT, but at least a part of potential market of RMT is absorbed by the game company. In this sense, this method is a way to cope with RMT. In anyways, game companies should design the games in presence of RMT. Now, increasing number of online games introduce item-purchase based system.

In a recent example such as Second Life⁵, a game is designed explicitly to incorporate RMT activities as a fun of the players. There are no levels of players, and it requires real life skills in various areas to earn the in-game money, which can be exchanged for real money. Items are created by players rather than the game company. The items do not decay, but become obsolete as fashion shifts and the system is upgraded over time. In this setting, the Dragonball economy does not exist. RMT does not distort game balance, and the exchange rate of the in-game currency to real money is maintained relatively stable.

VIRTUAL WORLDS AND ECONOMIES

Virtual worlds constructed in the cyberspace of internet are not limited to online games. Online community sites, social networking sites, online markets or even community of bloggers and internet users can also viewed as virtual worlds.

These are virtual worlds because of several common factors: committed participants, goods or services to be transferred, virtual money (medium of exchanges), and some (virtual) area with boundaries. In addition, they all are equipped with specific system of rewarding some status or activities. The examples include point and mileage

⁵ <http://secondlife.com/>

programs, affiliate programs, and virtual money or reputation systems of various websites. Information flows in these worlds now often accompany flows of values through these programs and systems.

Virtual World Classifications

Virtual worlds that satisfy these conditions are in fact common in the cyberworld. The Table 2 classifies such virtual worlds with respect to 3 criteria: person (P), world (W), and money (M). For example, in a typical monthly subscription based MMORPG, players participate in the community as virtual avatars, and their activities take place in virtual world setting, and use a virtual money, so it is (V, V, V). In an item-purchase based MMORPG, the people and the world are virtual, but real money is used, so it is (V, V, R). Likewise, the combination of these 3 factors characterizes the virtual world.

Table 1: “Policy” Measures to Counter MUDflation

P	W	M	Examples
R	R	R	e-commerce, online trades
R	R	V	Mileage & point programs
V	R	R	} Prediction markets, Blogs, SNS
V	R	V	
R	V	R	
R	V	V	
V	V	R	Item-purchase based games, RMT
V	V	V	Subscription based games

E-commerce or online security trading sites provide virtual platform of economic activities but all these 3 factors in the Table 2 are real. Mileage & point programs offered by many companies can also be viewed as virtual economy consisting real people and the world, but use virtual unit of money. Prediction markets (virtual security markets designed to make predictions), Blog communities and SNS can have various forms with respect to the 3 factors. In RMT of typical MMORPGs, people and the world are virtual, but the money is real, the same as the case of item-purchase based MMORPGs.

Why important?

Why do we need to think about virtual worlds? First, we take online games. Some people think that games are only imaginary and thus are (or should be) irrelevant to the real world. However, what we have been observing for these several years is that online games become something more than just fun stuff. Even if the “world” does not exist physically, interactions among players within these worlds, such as conversation, mutual help, or transactions are “real,” in the sense that these interactions affect real personalities of the players, and alter their decisions in the

real world. This effectively means that the virtual worlds of online games have become “meaningful” to our real lives. This is the same logic as that in [6], in which in-game currencies were analyzed as “meaningful” to our real lives.

This insight applies to other types of virtual worlds listed in the Table 2. These are also meaningful to our real lives. They attract their respective users who form cyber communities, and have their own “quasi-money.” The “quasi” here implies that in many cases these “currencies” may not possess all of the three functions of money: a medium of exchanges, unit of value, and the mean of value storage. For example, typical airline mileage points are not tradable, so they do not belong to a mean of exchange among people. But still, in these virtual worlds, the participants allocate their available resources by using these systems, and the collective decisions of the participants determine the value of the resource in the world.

These virtual worlds in the cyberspace are developed due to technological advancement and change in people’s lifestyle. Broadband internet access becomes popular in many countries, and the computer power continues to improve. In addition, people are increasingly willing to commit themselves to these virtual worlds. As [2] analyzed, people’s utility becomes now affected by how they spend time, in addition to what they consume. They find better off by spending a part of the available time in the cyberspace. Virtual and real worlds have started to be interconnected to each other.

In this regard, it is natural that values and goods in the virtual worlds become valuable in the real world, too. Similarly, at least some of activities in the virtual worlds also become economically valuable services to others.

What is valuable differs world by world. In MMORPGs, some in-game items or services are valuable, while links from famous websites are valuable in blog communities, and friendship with many people provides valuable reputation in SNS. However, it is common for these communities that people’s activities in the communities produce values and exchanged. And the value of their work is determined by “quasi-market” mechanism; in other words, the wisdom of crowds.

In ordinary economics, we think that people maximize their utility by choosing what to consume. But in reality, as Castronova pointed out, quality of life for a person is greatly affected by how to allocate time across activities. People live multiple lives in respective “worlds.”

VIRTUAL INTERNATIONAL ECONOMY

What has happened during last few years is that two worlds, real and virtual, have begun to interact with each other. Real world activities go online, and virtual world activities have greater impact on real economy. In the middle, we see fast-growing economic activities, such as e-commerce,

online security trading, mileage and point programs, and online games.

Formerly, point programs typically deal with the company's own products and services. However, now, these programs have started to merge with other programs. Aggregation services of such programs become increasingly prevalent. In some cases, the companies even exchange these points to real money. In this sense, what we are observing now is the emergence of "international" economy of virtual and real worlds.

When virtual economies become more integrated, Dragonball economies in typical MMORPGs face increasing level of difficulty in managing the game. This corresponds to a country that limitlessly prints the money to pay for public services. Within its boundary, such a monetary policy leads to hyperinflation, which is itself a problem. But in the face of the "international" economy, such a policy causes confusion in other virtual worlds, too. Excessive money supply in one game economy may cause increase in demand for services in other point programs. Some coordination among virtual world operators like "Bretton Woods system" may not be needed for the time being, but there may become necessary in near future.

Such a trend of aggregation further raises the importance of virtual worlds, and opens a new possibility. As in online games where people obey whatever rules in the worlds, cyberworlds can determine new rules of resource allocation. As the impact of these virtual worlds is increased, our resource allocation in the real world is also affected by these virtual worlds. This effectively means, by setting the rules of resource allocation in virtual worlds properly, we can alter resource allocation in the real economy, which is currently not necessarily the best possible.

As [5] stated, in the past, many social systems adopted the form of play, and plays mimicked the real social systems. But today we tend to forget the former aspect. It is the time for us to remember that plays can be helpful in designing or

altering the real world. Fear for hunger becomes less persuasive for many people in developed societies to drive them for work. People's activities have increasingly become fun-based. To make our society better, we should design it more enjoyable. Or, people with different nationality or cultural background may have more equally opportunities in game setting than in the real world.

In this understanding, games become more than just entertainment. Games become communication tools, stages of businesses, the place to live, or social infrastructure. In-game economies, just like the games themselves, become more important to our real lives than before. We should think in-game policy issues more seriously not only for games themselves but also for our real society.

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