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# Inflation Control in Virtual Economies

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<p>Tämä tutkimus keskittyy Massive Multiplayer Online –pelien inflaation hallintaan, niiden inflaation ja mahdollisten hyperinflaatioiden kartoittamiseksi.</p> <p>Toisin kuin oikeissa ekonomioissa, virtuaaliekonomioissa rahan arvoa ei kontrolloita keskitetty taho, kuten keskuspankki tai hallitus vaan virtuaalipelin pelaajat.</p> <p>Tähän tutkimukseen valitut pelit ovat ArcheAge, EVE Online ja Guild Wars 2. Nämä pelit edustavat kolmea Massive Multiplayer Online Role-Playing Game peliryhmän keskeisintä alakategoriaa; sandpark (hiekkapuisto), sandbox (hiekkalaatikko) ja theme park (huvipuisto), jotka on nimetty niiden pelimekaniikkojen erojen takia. Sandbox on pelaajavetoisin, theme park on pelintekijöiden vetämä ja sandpark lainaa ominaisuuksia kummastakin kuulumatta itse selvästi kumpaankaan alakategoriaan.</p> <p>Yleisesti näissä peleissä inflaatiota aiheuttaa rahan määrän nousu, koska pelaajat hankkivat jatkuvasti lisää rahaa melkein kaikesta, mitä he pelissä tekevät. Suurimmaksi osaksi inflaation määrään vaikuttaa kuinka pelin ekonomia on suunniteltu. Vastaako peli yhtä suurella rahan menolla kuin pelaajat pystyvät tuottamaan vai onko tämä jätetty huomioimatta? Lisäksi hyvä indikaattori on mistä keskiverto pelaaja saa tulonsa. Saako hän rahansa tyhjästä vai kaupankäynnistä muiden pelaajien kanssa käyttäen jo olemassa olevaa rahamassaa?</p> <p>Tässä tutkimuksessa kävi ilmi, että kaupankäynti pelaajien kesken on tärkeä osa hyvää virtuaaliekonomiaa. Jos pelaaja saa enemmän irti kaupankäynnistä kuin uuden rahan hankkimisesta, inflaatio pysyy aisoissa. Tämä tietenkin myös tarkoittaa että pelin on oltava suunniteltu käyttämään myös arvottomimpia resursseja, jotta myös pitkäaikaisimmilla pelaajilla on syy hankkia ja kuluttaa näitä hyödykkeitä.</p> <p>Verrattuja pelejä katsoessa on selvää, että kaikki pelintekijät eivät ymmärrä miten ekonomia rakennetaan kestäväksi, vaikka tämä tieto periaatteessa on ollut olemassa jo yli vuosikymmenen. Tämä ekonomian, tai ihan vain vanhempien pelien, oppeihin perehtymättä jättäminen johtaa vakaviin seuraamuksiin, eikä nämä seuraamukset ole hyviä loppujen lopuksi kenellekään.</p>	
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<p>This study focuses on inflation control in virtual economies of Massive Multiplayer Online games, to study their inflation and possible cases of hyperinflation.</p> <p>Unlike in real world economy, the value of currency in virtual economies is not controlled by centralised governing bodies such as central banks or governments, but rather by the players of these games.</p> <p>The games chosen for study in this dissertation are ArcheAge, EVE Online and Guild Wars 2. Each game represents one of the three main subcategories of Massive Multiplayer Online Role-Playing Games; sandpark, sandbox and theme park, named for their differences in game mechanics. Sandbox is the most player driven, theme park the most game developer driven and sandpark implements ideas from both former subcategories but fits neither clearly.</p> <p>Generally, the inflation in these games is caused by money being added to the system, as players are constantly generating more wealth and driving up the prices. The inflation rate largely depends on how the economy is designed. Does the game match the income with almost as high outflow of money (moneysinks) or does it neglect this? What is more, a good indicator is where the average player can make the most money. Is it through generating new money or through trading with other players using the existing wealth pool?</p> <p>This study shows that the most important factor of better ingame economy is a necessity of trade. If a player earns the most out of trading, instead of generating new wealth, the inflation should stay low. This of course means the economy has to be designed to utilize even the least valuable materials, so no matter how long the players played the game; they have a reason to acquire and consume those goods.</p> <p>When comparing the results gained from these games, it is clear that not all game developers understand how to build a stable economy even though the knowledge has existed for over a decade. This disregard for economical knowledge has serious consequences that ultimately are not good for anyone.</p>	
Keywords	Virtual economy, inflation, MMORPG, ArcheAge, EVE Online, Guild Wars 2

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# 1 Introduction

## 1.1 Purpose of the Study

The purpose of this bachelor's thesis is to study inflation and possible cases of hyperinflation in massive multiplayer online games (henceforth MMO or MMORPG, massive multiplayer online roleplaying games, when appropriate).

Unlike in real world economy, the value of currency in virtual economies is not controlled by centralised governing bodies such as central banks or governments, but rather by the amount of work players dedicate into accruing said currency by completing various tasks set by the developers within the game. Due to this reason the total amount of currency by default is always increasing at somewhat irregular pace as players can be unpredictable. Also, even small changes and additions made by the developers can have huge impact on the economy within their game. Players have a tendency to rush to acquire the newest items and can spend exorbitant amounts of currency and materials to do so. (Extra Credits, 2014.)

This thesis will delve into three hand-picked, currently active, MMOs and analyse their methods of acquiring currency with a focus on how these games and their developers attempt to rein the resulting inflation.

## 1.2 Reason of Interest

The virtual economies are a fairly unexplored field of economy which makes it an interesting research topic. The real world economical rules, such as market forces, can be applied to the virtual realm but without the fine control of any central figure. This creates hypothetical situations that would be impossible to achieve in real world because they would be unacceptable to most of the population.

For instance, every banana tree in the world suddenly is struck with a disease aptly called banana rot that kills 20% of the world's banana tree supply. Consequently, the wealthier people stock up on bananas, which are meant to be sold later as the price is speculated to rise slightly. However, it causes the price to increase by 1200% and

bananas to become a luxury ingredient, because everyone is trying to make a profit on this price increase.

The chance of this example to happen in real life economy is non-existent, while in MMOs this kind of situation can and do happen as the games are updated over time. In the example, banana rot represents developers cutting the amount of bananas that players can acquire in a day by 20%, for instance by reducing the amount of harvesting nodes. Wealthier people represent the player base which regularly does trading and can easily notice the price hike before most of the other players do.

The enabling factors for this kind of price increase are that every player in an MMO has some excess wealth, which makes trading and storing goods easier compared to the real world. It would be difficult for an average Joe to acquire the banana supply before it reaches the closest supermarket. Besides, he most likely would not have enough money to invest in any meaningful quantities of bananas. Also storing a huge number of bananas would be quite problematic as they would turn bad relatively fast and would require a large cooled space.

### 1.3 Method of Research

This thesis uses qualitative research methods for data gathering and analysis purposes. It focuses, however, on observational qualitative research instead of questionnaires and opinion polls. Since there is no significant overlap between the user bases of the chosen games due to differences in target audiences.

After making observational data gathering on income and money removal methods, in order to verify or disprove conclusions that were drawn from the comparisons between the income and money outflow mechanics, a more concrete test was made to measure inflation in each game. By using the methods learned during observation stage, an attempt was made to make as much money within an hour in each game. This money amount is then converted to euros.

## 1.4 Limitations

The sources planned for this thesis are following three MMOs: ArcheAge, EVE Online and Guild Wars 2. Additionally, in order to define and explain inflation and why inflation and money supply needs to be controlled, the European Central Bank's publication "Price stability: why is it important for you?" will be referenced. To further get into problems real world economies face, we also briefly look into Japan's economy and central banking regulation reform in 1990s using the book "Financial Policy and Central Banking in Japan" by Ito, Cargill and Hutchison. In addition to these main references the internet sources will be used to support the in-game research.

## 2 Brief Introduction on the Games Studied

### 2.1 ArcheAge

ArcheAge (AA) was originally released in South Korea on 15 January 2013; however I will focus on the Western release of the game, published by Trion Worlds. This version of the game launched on 16 September 2014 in both North America and Europe.

ArcheAge is an open-world sandbox game unlike any other available in the West today. In ArcheAge you can raise your own mount, fight your way through a dungeon, craft the best armor in the game, build your own open-world farms and houses, sail your ship on the high seas to trade with foreign ports, swoop in on airships and fight other players for plunder, claim a piece of land for your guild (then fight with them to defend your territory from rival guilds!), and lots of other amazing things. We're thrilled to be able to bring ArcheAge to the West! (Trion Worlds, Inc 2014.)

Although the marketing text says Archeage is a sandbox game, it is widely regarded as a sandpark game; it implements a number of game mechanics characteristic to the theme park games while still retaining resemblances to the mechanics of sandbox games.

ArcheAge in the West is a so-called Freemium game, meaning it is free to play for anyone who creates an account and downloads the game onto their computer; with some limitations. To eliminate these limitations player has to either pay monthly



subscription fees or make purchases in the game's real money trade shop (called the Marketplace). Moreover, players can buy the subscription (APEX) with in-game money from other players, who have bought them from Trion Worlds using real money.

## 2.2 EVE Online

The EVE Online game is described on EVE Online Wiki as:

EVE Online is an open-ended Massively Multiplayer Online Game (MMOG). Most other contemporary games in this genre focus on linear progression through leveling and the acquisition of gear. EVE Online contains no character levels to grind and all ships and equipment can be bought, sold or lost. Skill is gained over time through non-linear progression of which you are in full control. Whether you want to be the best frigate pilot or pilot a mighty armored battleship, the choice is yours. (EVE Online Wiki 2014.)

EVE Online (EVE) was released on 6 May 2003 in North America and United Kingdom and 23 May for the rest of Europe, and has since been upgraded with expansion packs to keep players engaged with more star systems to explore and new ships or structures to build.

EVE Online is arguably the most successful sandbox MMO in the world, having held its ground (and average subscriber amount being steady over a decade, with no major falls or jumps) against other MMOs and the massive influx of theme park MMOs. As a side note on the matter, another popular sandbox MMO, Star Wars Galaxies, overhauled its class system to match that of a theme park. This change is often cited as the major reason why SWG became unsuccessful as it lost its original player base.

EVE uses the standard subscription business model. On the other hand, the developers introduced an innovative subscription method which lets players to buy the subscription, called PLEX, from other players using in-game money instead of real world money. This gives the in-game money a pseudo value in real money (it is pseudo only as the in-game money is not exchangeable back to real money). When PLEX was introduced it was an original and innovative system, which wasn't present in any other MMO games at this time. Nowadays it is a common practice in subscription games.

### 2.3 Guild Wars 2

Rather than listing its feature list, Guild Wars 2 Wiki offers a less marketing oriented description of the game, which is why it was chosen here to introduce the game:

Guild Wars 2 is the sequel to the Guild Wars series of games by ArenaNet. Guild Wars 2 was released on August 28, 2012. It has been in development since 2006. Many features have integrated into the game which align it with traditional MMORPGs, such as a persistent world and a level cap of 80, but the game has been described by ArenaNet as having non-traditional elements as well, because “it doesn’t make you spend hours preparing to have fun rather than just having fun.” (Guild Wars 2 Wiki 2014.)

The official wiki’s introductory text on Guild wars 2 (GW2) was chosen for GW2 instead of marketing description as it better reflects the character of the game and relationship between the developers and players. ArenaNet tends to communicate with their player base by publishing features and mechanics that exist or will exist in the near-future updates without unnecessary additional information.

Guild Wars 2 is a textbook example of a theme park MMO. It has set classes like professions, set attractions; for instance, the different game modes, dungeons, story, etc.; and a linear progression system. Where it differentiates from other theme park games is the way it emphasizes mobility of combat, social interaction between players in the world and the periodically progressive story.

What also sets it apart from every other MMO available on the market is that it continued Guild Wars 1’s (GW1 arguably was not an MMO but rather a co-operative roleplaying game, or a CORPG) tradition of having no cost to play after buying the game. It does, however, have a real money trading shop where players can buy special armours, weapon skins and account upgrades such as extra character slots. Just like in ArcheAge and EVE Online, the currency, in this case gems, used within this shop is tradable between players through the Trading Post interface.

### 3 Price Stability Policies of European Central Bank

In this thesis European Central Bank's (ECB) policy making is used as an example of how inflation is controlled in a real economy, namely in Europe's Economic and Monetary Union (EMU). Most of the information and quotes are referenced from European Central Bank's "Price Stability: Why is it important for you?" by Dieter Gerdesmeier..

ECB's primary goal with all decision making is to maintain price stability in the Euro zone. ECB's Governing Council defined price stability in 1998 with the following announcement "Price stability shall be defined as a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the Euro area of below 2 %. Price stability is to be maintained over the medium term". By medium term a timespan of one year is understood. But how does ECB mechanically keep inflation at the desired annual 2% rate? (Gerdesmeier 2011, 59.)

The answer to this is found in ECB's operational framework, which lists interest rates, liquidity supply, open market operations, standing facilities and reserves. Let's consider the interest rates first.

To a common EU citizen the ECB interest rates are probably the most notable and easily recognizable out of the methods which the ECB uses to control inflation; the interest rates are always cited when taking a loan from the bank and also often seen in the news. By changing the interest rate at which ECB loans money to other banks, ECB indirectly influences the cost of money in the market, either making it more expensive by raising the interest rate or cheaper by lowering it. (Gerdesmeier 2011, 71.)

Liquidity supply means the money in circulation, the actual physical money not the virtual money sitting in bank accounts. ECB asks National Central Banks (NCB) to withhold some notes in reserves to help with temporary liquidity shocks and to make liquidity work smoothly. Moreover, ECB can order physical notes to be disposed of or printed at official mints should the need arise for such measures. However, often this way of controlling the value of Euro is not used. (Gerdesmeier 2011, 71-73.)

Open market operations aren't conducted by ECB itself, but rather by the NCBs with ECB only coordinating these operations. What they in actuality are, is repurchase agreements or collateralised loans between a bank and Eurosystem. A bank takes a short term loan from the Eurosystem against a sufficient collateral, with the range of collateral assets being "very wide, including public and private sector debt securities,..." (Gerdemesier 2011, 71-72.)

Standing facilities and reserves go hand in hand and their main purpose to exist in Europe's economy is to provide cover from volatility of short-term fluctuations in money markets. Standing facilities are a significantly worse option for banks than trading with other banks, as the rates asked for loans from these facilities are approximately one per cent from the market refinancing rate. This encourages banks to make transactions in the market rather than relying on the standing facilities except in most dire of circumstances. Reserves on the other hand are a minimum deposit made by the banks with their NCB and it is a fraction of their reserve base. This fraction's size is determined from average of daily balances over a month. This period is called a maintenance period. The purpose of using averaging is to allow banks to manage reserves over the maintenance period and temporary liquidity imbalances can be equalised over the period. (Gerdemesier 2011, 72-73.)

In addition to the mentioned economic mechanics to control inflation and the value of money, there are also a few more methods which ECB does not use because Euro is a free floating currency but they have been utilised in the past and are still used by some central banks around the world. These options are revaluation and devaluation and to use either of these, the currency has to have a fixed exchange rate into either other currency or goods, like gold. In short, revaluation increases the value of the currency, giving it more buying power and thus decreasing inflation level. Devaluation is the opposite of this, dropping the value of the currency and effectively raising the overall inflation level.

#### **4 Case of Economic Crisis in Japan in the 1990s**

Using the research done on the subject in the book "Financial Policy and Central Banking in Japan" by Ito, Cargill and Hutchison, this chapter describes the economic hardships Japan experienced in the 1990s and how these problems were dealt with

through policy making and banking reforms. Also worth noting is that some decisions clearly had an adverse effect on the economy, causing more problems than they solved. While this crisis deals more with deflation than inflation, it is a good example of how financial policy making to fix a country's economy is not the easiest of tasks, especially during volatile times.

#### 4.1 Description of Events

At the start of 1990s the economy of Japan was in a recession. It was caused by a collapsing bubble of equity and land prices, which had been rising at an absurd rate for the latter half of 1980s. This recession caused the economy to stagnate and at times inflation turned into deflation, which made Japan's economic growth during this time one of the worst out of all the industrialised countries. The situation had not been this dire since the reconstruction following the World War 2, and indeed for a peacetime decade this was the worst since the beginning of Japan's industrialisation in mid-19<sup>th</sup> century. (Ito & Cargill & Hutchison 2000, 9-11, 16.)

In 1995 and 1996, the economy seemed to be picking up again. This change is attributed to gradual reduction in discount rates that was started already in 1991, when the rate was reduced from 6% to 5.5% and from there gradually decreased to 5% by 1995. Other measures taken during this time was closing of housing-loan industry along with restructuring of Deposit Insurance Corporation to help the property values recuperate and decrease the amount of nonperforming loans. (Ito & Cargill & Hutchison 2000, 14-15, 20-21.)

However, the positive trend did not last for long. In 1997 the economy turned for worse as the government, in a rather heavy-handed fashion, increased consumption tax from 3% to 5% and the temporary income tax cuts were ceased. The reasoning behind making these changes in the first place was to stop the economy from growing too fast after the few good years Japan had had, a move that later was clearly seen as a mistake. In addition to the tax changes, the troubles of the banking industry made loan taking more difficult, resulting in a credit crisis that further caused declining inflation of yen. (Ito & Cargill & Hutchison 2000, 16, 21-22.)

The worst part of the downward spiral was yet to come, though. In November 1997, three securities firms, Sanyo Securities Company, Hokkaido Takushoku Bank and

Yamaichi Securities Company defaulted one after another. The latter two of these were considered part of the 'Big Four' securities companies and their failures sent a clear message: no institution was safe from this crisis as the government was unable to keep the promises it had made few years earlier of the economic problems only affecting smaller companies. This also further corroded the government's trustworthiness in the eyes of the public. (Ito & Cargill & Hutchison 2000, 23-26.)

Furthermore, failure of Yamaichi in particular prompted an international response due to its connections to international markets through its subsidiaries. This caused considerable amounts of pressure from international community, urging the Japanese government to solve the problems of its current economic state. To further encourage action, the "Japan premium" was increased by up to 100 points in all fund raising Japanese banks did in international markets. The band aid solution proposed by Japanese government was to issue bonds for total worth of 30 trillion yen to raise a fund that would help with recapitalizing the banks and for depositor protection. In the end this plan ended up with a small injection of 1.8 trillion yen given to 18 largest banks and 3 regional banks in March 1998 through purchases of preferred stock and subordinated debts. But even then no thought had been put into amounts given to each bank nor was any thought put into if these banks needed restructuring to make them work as they should. This and related scandals involving some of the Ministry of Finance officials further weakened the public's trust in the government's and the Ministry's ability to handle the crisis, leading up to Prime Minister Hashimoto's resignation upon Liberal Democratic Party's loss in Upper House elections in summer of 1998. (Ito & Cargill & Hutchison 2000, 26-28.)

#### 4.1.1 Effects on International Community

While the economic problems Japan faced can't be said to have been the cause of the international problems that arose during this time, it would be irresponsible to not at least consider there to have been some connection. Ito, Cargill and Hutchison (2000, 29) however straight-out say that Japan's situation did not contribute to any of these in any meaningful way, and that the problems these other countries faced could be traced to origins other than Japan. But one must always remember that even slight changes in balance can cause scales to tip so it should not be ruled out completely that Japan's problems had no part in the problems of the surrounding countries.

During 1997, problems surfaced in other Asian countries, starting with Thailand and spreading from there to Indonesia and South Korea. The problems manifested themselves as banking problems and general currency fluctuations through speculative attacks and depreciations. The involvement of Korea and Japan in financial crises at the same time sparked debates about financial panic and it was also widely considered to be a severe threat to the stability of the world economy for these two large Asian economies to be in such a bad condition. (Ito & Cargill & Hutchison 2000, 28-29.)

Europe and United States was not left out of this either, resulting in negative influence on currency and equity markets. Enough so that the International Monetary Fund had to intervene with multibillion bailouts to the affected Asian countries, except for Japan it seems. (Ito & Cargill & Hutchison 2000, 29.)

Russia had had problems with its economy since the fall of the Soviet Union in the early 1990s, not to mention the other problems. But in the summer of 1998 Russia's hyperinflation and declining growth finally became too much for the Russian economy to handle and the government had to devalue rouble along with defaulting the internal debts. This and issues of the Asian markets caused considerable negative repercussions in international markets and notably adverse effects on the financing of developing countries, going as far as forcing Brazil to devalue its currency in January 1999 to make up for its losses in reserves. (Ito & Cargill & Hutchison 2000, 29.)

## 4.2 Supervision and Regulation Reforms

As we can see, Japan was not equipped to deal with the bubble economy it experienced at the end of 1980s. The old supervision and regulation framework that had been set up after the war was far too rigid and overregulated by the Ministry of Finance to allow the Bank of Japan to adjust its policies to avoid problems (Ito, Cargill, Hutchison 2000, 41, 46-47). This also meant, of course, that the Ministry held the supervising rights for its own actions, which in turn meant that many of the decisions made avoided public scrutiny completely until it was too late to criticise them, allowing misconduct and general bad decision making (Ito & Cargill & Hutchison 2000, 46-47).

The first set of new laws that would liberalise the Bank of Japan and add to its supervision transparency were passed in mid-1997 with the establishment of Financial Supervisory Agency and rework of the Bank of Japan law, the latter of which will be

looked at later in point 4.3 in more detail. These changes drastically decreased Ministry of Finance's influence and control on the financial policy supervision and policy making, though these changes would not take effect until next year. While the newly established Financial Supervisory Agency most notably took over the Ministry of Finance's previous task of monitoring the financial sector, it also took over supervision of several other institutions that had previously been under jurisdiction of other ministries. These included institutions such as agricultural cooperatives and labour cooperatives. (Ito & Cargill & Hutchison 2000, 55-56.)

The next piece of regulation to be passed, in temporal order, was the deregulation of the Foreign Exchange Law in April 1998, which allowed for Japanese citizen to open accounts in foreign institutions and foreign exchange no longer needed to be brokered by an authorised bank. This caused an outflow of capital from Japan as the foreign instruments offered higher yields than domestic ones, partly causing the depreciation of yen after April 1998. (Ito & Cargill & Hutchison 2000, 55.)

In October 1998 a new law was passed to establish Financial Reconstruction Commission, to manage the restructuring of the financial institutions and to supervise the Financial Supervisory Agency, which had recently started operations, on behalf of the Prime Minister. The Commission created three schemes to handle the failing and already failed institutions; a "temporarily nationalised bank" scheme, a "bridge bank" scheme, and a liquidation scheme. (Ito & Cargill & Hutchison 2000, 64.)

In short, a bank that applied for government help would be categorised as either insolvent or weakened. Insolvent banks would either be liquidated and taken over temporarily by the public control or made into "bridge banks" which would be under public control until bought by a new owner. The weakened, solvent banks could request for public funding in form of government buying common stocks, preferred stocks or subordinated debt from the bank, however these options came with prerequisite conditions. Common stocks could only be used by banks that had capital of less than 4% and preferred stocks or subordinated debt required the capital of the bank to be between 4% and 8%. If the bank's capital was over 8%, preferred stock and subordinated debt could still be used, but only if the bank agreed to assist the government by helping weaker institutions in mergers or purchased weaker institutions themselves. (Ito & Cargill & Hutchison 2000, 65.)



The October 1998 legislation also prompted establishment of Resolution and Collection Organization, whose goal was to liquidate insolvent assets, much like the Resolution Trust Corporation had done in U.S. since 1989. The Organization took over the activities of two previous institutions, the Resolution and Collection Bank and Housing Loan Administration that had been established to "...dispose of the assets of failed credit cooperatives and the *jusen* industry, respectively." (Ito & Cargill & Hutchison 2000, 65.) The *jusen* industry here meaning the housing loan industry (Ito & Cargill & Hutchison 2000, 14). In addition to the task of purchasing nonperforming loans, the Organization also was to fund special bridge banks that were in charge of taking over operations of other failed institutions (Ito & Cargill & Hutchison 2000, 65).

To avoid the non-existent effect the injection of March 1998 had had, for the March 1999 injection the Financial Reconstruction Commission made the application process more demanding by adding a higher standard of classification for loans and banks were to submit a plan regarding restructuring, which included four components; expansion of portfolio activities, cost reduction measures, strategic alliances, and balance sheet adjustments along with requirement that the banks seek new capital the from private markets. The injection also came with a condition of grace period, where the government withheld the right to convert preferred shares into common stock and this grace period varied greatly from company to company. The grace period's length was mostly determined by how weak the institution in question was, with weakest institutions having grace periods of up to five years and stronger ones only few months. (Ito & Cargill & Hutchison 2000, 66-68.)

After the March 1999 capital injections, the "Japan premium" disappeared from international markets, showing the restored faith in Japan's recovery under the new framework and legislation (Ito & Cargill & Hutchison 2000, 68).

#### 4.3 The New Bank of Japan

With the legislation passed in 1997, the bank of Japan gained greater independence from what it used to have under the old laws made in 1942. These changes aimed to give the Bank the same rights and responsibilities other central banks around the world commonly have, such as ensuring price stability and being the lender of last resort. With the new legal independence, the Bank was free to make monetary policies without

potentially damaging interference from governmental bodies. (Ito & Cargill & Hutchison 2000, 83.)

Under the new law, the main topics of changes, as listed by Ito, Cargill and Hutchison (2000, 96-97) are: central bank objective, formal relationship (independence) to government, policy-making process, transparency and accountability, budgeting, special uncollateralised loans, bank supervision, bank note issues, and government financing.

The old law regarding control of credit control was too broadly written and allowed for too much interpretation, with only requirement of it being that the Bank of Japan should act in a way that might adequately enhance the economic activities of Japan. In new law this was changed to be more specific, in that the Bank of Japan is to pursue price stability and sound development of the economy. The law does not however specify what price stability in this case means nor does it say anything about an inflation target the Bank of Japan should aim for with its policies, meaning that it is up to the Bank to decide for itself how it chooses to achieve this goal. (Ito & Cargill & Hutchison 2000, 97.)

In the 1942 law, Bank of Japan was strictly placed under control of the Ministry of Finance and the government, with the Cabinet and the Ministry together holding the power to dismiss any of the officials of the Bank whenever it was seen as a necessary action with very broad reasons. The new law states that the bank's autonomy in business operations is to be respected and officials can now only be dismissed under very strict circumstances, such as incompetence, criminal behaviour, and disability to do one's duties. The law does, however, also state that the government and the Bank should keep a close relationship, but does not go into detail about how close it means by this, meaning it could be anything from exchanging views between the two to government asking the Bank to make the monetary policy match the government's economic goals. (Ito & Cargill & Hutchison 2000, 97, 101.)

For the process of policy making, not much was technically changed in the new law because the Policy Board had the authority to make decisions, but it had fallen back to just listening and approving what the Executive Board suggested. The new law abolished the Executive Board and reinstated the Policy Board as the primary decision makers of the Bank of Japan with also some changes to the membership of the Board.

The three representatives of the Bank of Japan, its governor and two deputy governors stayed the same as in the older memberships, but the six "Deliberative Members" who are selected by the Cabinet according to their experience in field of economics, could now be of any expertise instead of representing financial institutions, agriculture and commerce. Also under the new law the government has no formal representation on the board. (Ito & Cargill & Hutchison 2000, 101-102.)

Transparency under the old law was not really required, so Bank of Japan simply took to publishing statistical information, special reports on operations of the Bank, and providing an annual report. The new law changed this by requiring far more transparency into all actions the Bank takes, from publishing the Policy Board's meetings after certain period of time has passed to documenting for the public its decision making regarding processes it took, currency decisions, and monetary control. In addition to these, the salary standards of executives and staff, and all disagreements between the Bank and the Ministry of Finance regarding the budget, must be made public. (Ito & Cargill & Hutchison 2000, 102-103.)

As mentioned above, the disagreements, if any, between the Bank and the Ministry must be made public under the new law, whereas in the old law the Ministry had full authority over the Bank's budget. But even though the Bank still has to go through the Ministry, it has far more autonomy now over its budget and the public it can turn to if the Ministry attempts to change the budget unreasonably. (Ito & Cargill & Hutchison 2000, 103-104.)

While it is Bank of Japan's responsibility to be the Lender of Last Resort and has been since the 1942 law, previously the Bank had to fulfil this role when requested by the Ministry of Finance, making it more of a duty rather than a responsibility. After the 1998 law, the Bank now could decline this request "...if the request was made to prevent or limit systemic risk." (Ito & Cargill & Hutchison 2000, 104.)

The old law does not make any statements regarding the bank supervision and on-site examination rights for the Bank of Japan, but this was changed with the new law. Now the Bank of Japan can conduct examinations into banks it has provided, or might provide loans in near future. Reports generated from these examinations can be requested by the Financial Supervision Agency. (Ito & Cargill & Hutchison 2000, 105.)

The issuing of bank notes used to be limited for the Bank of Japan, as the maximum amount was set by the Cabinet and if excess was to be issued this excess had to be approved by the Ministry of Finance. New law transferred the full issuing rights to the Bank of Japan and it now can print notes at its own discretion. (Ito & Cargill & Hutchison 2000, 105.)

Lastly, a change was made to how government financing works in form of ending the practice of having the Bank of Japan underwrite Finance Bills in March 1999 to stop undervalued Finance Bills from being issued. Other forms of financing for the government, such as making uncollateralised loans to the government, or subscribing and underwriting government bonds, stayed intact. (Ito & Cargill & Hutchison 2000, 105-106.)

## **5 Definition of Terms and Concepts Used in This Work**

### **5.1 What Are Inflation and Arbitrage?**

Inflation means an increase in the prices of goods over time which results in a reduction in the buying power of money (Investopedia 2015a). Inflation can happen due to two different reasons. The first is an increase in demand for a resource or service, resulting in an increased price on the goods in question. While this isn't "true" inflation, it can become such if the resources that are in high demand are essential for human life, such as food.

The second is increase in money supply. Adding money into the economy results in true inflation where all prices increase over time alongside the money supply. This second type is the kind that central banks of the world are largely in control of, as they usually have the right to print money and give out loans to other banks. Essentially, this creates money out of nothing.

While arbitrage is not by any means the main focus of this thesis, it has to be defined nevertheless due to the part it plays in EVE's economy. Arbitrage means taking advantage of a difference in prices in two or more different markets, and it is mainly caused by the increase in price due to increased demand versus supply of the goods.

Arbitrage is an essential market mechanism to make sure price deviations always return to fair value. (Investopedia 2015b.)

## 5.2 Terms Used in Massive Multiplayer Online Games

All following definitions for MMO elements and aspects are a result of 10 years of personal experience in the field of Massive Multiplayer Online games. They are not by any means objective definitions, as some players might have their subjective differences in defining them. However, I believe these definitions are as close to being objective as possible.

*Free To Play* – or *F2P*, is a payment model where the game, in theory, does not cost the player anything to play and players can enhance their gameplay by buying products from the in game item shop. It has to be noted though that the reason it only theoretically costs nothing is because most F2P games opt to put in limitations to the game progress for free players, or outright better items in the item shop than what is achievable through normal gameplay.

*Pay To Play* – or *P2P*, is a payment model where playing the game requires a monthly subscription, usually on top of the base cost of the game. This model is often seen as the fairest one since the game developers aren't given incentives to follow questionable business practices in order to get paid for their game. However, in a sense this model can result in less frequent updates because the developing team will put less effort in maintaining the game, as they know they are getting paid every month as long as players have a reason to stay with the game.

*Buy To Play* – or *B2P*, is the payment method used by the majority of games and it means the player only pays the box price of the game in order to play it. Out of all MMOs this method is currently only used by Guild Wars 2 and The Secret World, but The Elder Scrolls Online will be converting from P2P into this method in the coming months. This method is the middle ground between F2P and P2P and is often seen as the best one as it only requires the initial investment from the players to access all of the content. Also further paid content, be it downloadable content (DLC) or expansion packs (expac), have to be up to par or better than the base game in order to keep players paying

*Player versus Environment* – or *PvE*, generally encompasses all content where players fight Artificial Intelligence (AI) opponents, often called mobs, or complete other objectives that do not involve fighting against other players.

*Mobs* – mobs come in varying difficulties, usually a player can fight 2 or 3 mobs of normal difficulty simultaneously with ease, while some boss mobs out in the world might require 50 or more players to take down.

*Dungeon* – dungeons are instanced content separated from the rest of the world, where players have to fight against tougher mobs and defeat bosses with relatively small numbers (usually 3-8 players) for better rewards than what normal mobs would award.

*Loot* – mobs, and sometimes players depending on the mechanics of the game, drop loot upon death. Loot is an all-encompassing word for any items or gold gained through killing opponents or from possible treasure chests.

*Player versus Player* – or *PvP*, refers to all activities where the player engages in fights with other players. May or may not award loot upon kills.

*Auction House* – or *AH*, is the main form of trading between players. There are multiple ways to set up an auction house but by far the most common form is where players place items on sale with a bid price, time limit and possibly a buyout price. AH takes a cut from all sales no matter how it is set up.

*Gold* – the common name of currency in any fantasy based MMO. Usually it is divided into gold, silver and copper/bronze coins, with each level being 100 times the lower one in value (so 1 gold is 100 silver and 1 silver is 100 copper/bronze).

*Moneysink* – moneysinks are mechanics within games that usually cost massive amounts of gold without giving the player any physical items in return, or if they do give an item, the item's actual worth is minuscule or its purpose is very specific and cannot be used otherwise than for that purpose. And while it is called a moneysink, a moneysink can also refer to such mechanics that drain resources out of the economy as well.

*Random Number Generation* – or *RNG*, is a mechanic of obtaining certain loot. An example of this is if a boss has 0.01% chance to drop a particularly nice looking sword, players who wish to get this sword curse the bad RNG for not being lucky enough to obtain it.

*Gear* – gear is the common word for all equipment a character can wear or wield, be it weapons, armour, clothing or various trinkets.

*Class* – refers to character's abilities in combat and often what weapons and armour they can use.

*Guild* – guilds are player communities, brought together by common interests, play styles, language, nationality or any other conceivable reason why people would stick together for longer term goals. Guilds commonly have a special interface for information on the guild and a chat channel all guild members can see no matter where they are within the game.

*Mounts* – mounts are animals, mechanical contraptions and other player mountable transportation methods that can be either controlled by the player or operating on set paths. Most mounts offer a speed boost that is higher than the highest movement speed character would normally be able to achieve on foot.

*Crafting* – crafting is an activity in the games where players turn resources into usable items, be it armour, weapons, trinkets, food, and anything else players are allowed to create out of available materials. Creating better items usually requires higher proficiency in crafting disciplines.

*Zone* – areas within MMOs are often referred to as zones and they can either be separated from each other seamlessly or by loading screens. Zones generally contain different atmospheres, climates and mobs fitting the setting.

### 5.2.1 The Separation of Sandbox from Theme Park

A sandbox game, as the name implies, is like a sandbox at a playground. The person playing on it creates their own fun with tools available to them, be it building sandcastles or virtual castles. What is also very typical for a sandbox game is the lack of linear character progression, which is to say there can be character progression but

it is not linear like a common levelling system where players gain experience from killing opponents and grow in strength upon reaching a new level.

Also equipment the player can use usually has no pre-requisites for equipping it, making it so that even a beginner theoretically could be wearing the best armour and wielding the strongest weapons from the start if they somehow manage to acquire them. However, it is more beneficial for the game to have some requirements for using the most powerful items. For example EVE lets beginners fly ships of frigate class without any skill point investment and the skills required to fly the largest Titan-class ships take years of active playtime to train. It should be noted that EVE ships of all sizes have their roles in battles, including the very small frigates most newcomers get their hands on within only a few hours of play.

What should be also mentioned is that with the freedom of being able to do whatever the players want, this includes also destruction of player owned structures and other assets. Sandbox games often offer very little handholding which also means the game won't protect the players needlessly. In EVE for example, player owned space stations are fully destructible and they can only be built in low security star systems where the game's peacekeeping force, Concordia, will not interfere with any actions the players might take. This means it is always a calculated risk to own anything. How players in EVE get around this risk is by having their guild (called corporations) guard the station at all times because owning such a station is an important asset to the corporation.

Theme park games are likened to amusement parks, with various attractions and advancement through it happening through set paths. Unlike in sandboxes, the fun activities for players are created by the developers of the game and then given to players to play through and there usually is no way for the player to modify the experience whatsoever. Theme park games include a levelling system that revolves around killing mobs and completing quests & other activities. Most theme parks also include one – or a few more at the most – linear levelling paths through quests and quest hubs that every player goes through in order to advance through the game.

Because of this linearity of progression, a new player is always at a disadvantage to an older player in terms of knowledge, skill, gear, raw power gained through levels and financially. Though this last disadvantage is true in all Massive Multiplayer Online games, not just theme parks. This obviously means that a new player cannot wear the



best equipment until they reach the maximum level and any other possible requirements set on the equipment, so unlike in sandbox games a new player is not competitive from the start even theoretically.

Moreover, as players out-level areas in the game, those areas effectively stop being relevant content to the player and, in a sense, the world shrinks as the player advances through levels. It needs to be said though, that this particular problem does not apply to Guild Wars 2 as it uses an innovative system to keep even the lower level areas relevant to the players by scaling higher level players down to the level of the area while they are in the PvE game mode. This system is not used in any other MMO to my knowledge, despite its obvious beneficial effect on keeping the entire game world relevant to the players even after reaching the level cap.

A sandpark is a mix of these two different schools of games, trying to choose the best sides of both, mixing and matching mechanics to suit the developers' vision. There is no set mechanics that have to be present from both sandbox and theme park, thus it is hard to generalize what is common in games that are labelled as sandparks. Sandpark could have a linear levelling system, but without the level requirements for equipment (something akin to how a single player game The Elder Scrolls: Skyrim does it) or the game has no levels but the equipment requires certain amounts of character statistics points to use, like a very powerful sword could require a large investment in strength to wield it.

Of course the examples mentioned here are very limited and a sandpark could do it very differently. ArcheAge is classified as a sandpark, because it has similar elements to sandbox games in player owned structures and land, and with a very flexible class system that allows some very diverse character builds. But while it has sandbox mechanics, it also uses linear levelling progression along with equipment that is bound to level requirements and also possibly one of the most linear questing experiences one could have as there is no alternative to levelling up through this one set questing path.

It also utilizes more handholding with player owned structures as player housing and farms are completely safe as long as the taxes are paid, no matter how much of a warzone the area they are in is and even ships can be repaired if they are destroyed in naval combat by using a special item. The only exception to this is the fully destructible

guild owned fortresses in Auroria, a free-for-all continent to the north where player killing and raiding the guild fortresses is encouraged.

### 5.2.2 ArcheAge

The following terms are specific to ArcheAge and do not apply to the other two games studied here.

*Trade run* – trade runs refer to an activity within ArcheAge where players carry a tradepack from one zone to another for rare resources, Gilda stars or gold. The further away the starting zone and drop-off zone are, the higher the base profit margin is.

*Tradepack* – tradepacks are crafted goods made of simple materials players can grow themselves or buy relatively cheaply from other players. Tradepacks also slow down the carrying player and if the player is killed by another player who isn't carrying a tradepack already they can pick up the dropped pack.

*Labour Points* – or *LP*, are an account bound resource used for crafting and some other activities, like handing in tradepacks or opening bags of loot. LP is generated every 5 minutes, at a rate of 5 LP for free to play players and 10 LP for subscribed players while they are online. Subscribers also receive 5 LP every 5 minutes while offline.

*Gilda star* – Gildas are an alternative currency used to buy some of the more expensive items, usually blueprints, such as house, ship and furniture blueprints. They are acquired through completing the main quest line and traderuns and are not tradable between players as Gildas, but blueprints can be traded so Gildas have a value in gold too.

*Bus* – is an AI operated carriage that moves along a set path between or within zones, helping tradepack burdened players move faster. Using a bus is free to any and all players but fitting more than 8 players on one is difficult.

*Airship* – is like the bus in that it is free and operates a set path, but airships can fly over zones, making their range much larger than that of the buses. However the

amount of airship is more limited and waiting for them usually takes longer on average than buses as their routes are longer.

*Haranyan Alliance* – or the East faction, is made of players who have chosen to play as either harani or firran characters, and their zones are situated on the eastern continent.

*Nuian Alliance* – or the West faction, is made of players who have chosen to play as either nuians or elves, and their zones are situated on the western continent.

*Pirate Faction* – pirate faction is made of players who've been outcast as criminals by the other factions. The only way to join this faction is by committing crimes and their base of operations is a small island to the north of the western continent.

### 5.2.3 EVE Online

The following terms are specific to EVE Online and do not apply to the other two games studied.

*Corporations* – corporations are EVE's form of guilds and it is only a different word for the same thing.

*Interstellar Credits* – or *ISK*, is EVE's currency, playing the same role gold would in any other MMO.

*Market* – EVE's auction house system which differs from the norm by having stock market like listings for buy and sell orders. Markets are divided by regions of star systems, which allows for prices to differ from region to region. In addition to this the interface also offers sales data for any and all items listed.

*Star System* – Star Systems are akin to zones of other games but they are most of the time more massive than any other game's zone. Star systems are connected with Stargates, that act as loading screens between systems but they cannot be used by the capital or super-capital ships but those ships have their own jump drives and as such do not even require the stargates.

*Concordia* – Concordia is the AI controlled peacekeeping force of EVE and they will aggressively attack any lawbreakers that catch their eye.

*Security rating* – Star systems are divided into high security and low security systems, often abbreviated either as hi-sec and low-sec respectively. These ratings go from 1.0 (perfect security) to 0.0 (no security) in increments of 0.1 and the lower security rating the system has the less likely it is for criminals to be caught red handed by Concordia.

#### 5.2.4 Guild Wars 2

The following terms are specific to Guild Wars 2 and do not apply to the other two games studied.

*Waypoints* – Instead of using mounts for faster travel, GW2 uses a teleportation system that utilizes fixed points in the world where players can teleport to for a small fee that increases the further away the player is teleporting. Waypoints also serve as resurrection points should the player die.

*Structured Player versus Player* – or *sPvP*, is a small scale PvP in GW2 played out in small PvP only maps with teams of 1 to 10 people, with common team size being 5. SPvP is its own entity from the rest of the game and all players regardless of their level elsewhere are automatically wearing the best gear possible and are equalised to level 80.

*World versus World* – or *WvW* is a massive PvP format with large maps and capturable objectives such as supply camps, towers and keeps. WvW is meant to be unbalanced and as such a lower than 80 level player only gets upscaled to level 80, which unlike in sPvP, does not make the player equal to a true level 80 player, but still more competitive than what the player would be on their true level.

*Dynamic Events and Renown Hearts* – GW2 does not feature quests as they are in other MMOs, but rather it has repeatable world events known as dynamic events whose completion objectives range from capturing chickens on a farm to defeating massive dragons. Renown hearts operate on almost the same premise as dynamic events but they can be completed only once per character and are more of substitute content for when events are not happening for players to do and also to give players some sense of direction while levelling up.

*Karma* – this currency is accrued by players through various gameplay elements, but it cannot be used in trades between players and turning it into gold can be difficult. It can however be extremely helpful to players as it can be used to buy decent armour and trinkets and thus bypassing the need for spending gold on it. These karma-bought items cannot be salvaged though if the player later on replaces them with something else.

*Dungeons* – while I already defined dungeons earlier as a general MMO term, GW2 does dungeons a bit differently from other MMOs. Dungeons in GW2 are divided into 4 paths, 1 story and 3 explorable paths. The story path is theoretically easier than explorable paths (however this is not true for some explorables as they can be speedran very easily) and as such give lesser rewards than explorables. Each path can be repeated as many times as players want, but the person who opens the dungeon must have done the story path at least once.

*Speedrunning* – an act of skipping over “unnecessary” fights that can be left undone without fear of hindering the dungeoneers’ progress. It also involves specialised tactics of dragging bosses into spots where players are both safe from some/all of the boss’ attacks and where they are easily dispatched fast.

*Trading Post* – or *TP*, is GW2’s version of the auction house and it combines the real money trade shop (gem store), gold to gem trade and auction house services into one. Instead of the more common system with bids, time limits and buyout prices, TP uses the same system stock markets use where sellers list items at the price they want for the item and buyers can list buy orders if the sell prices are too high. Orders are filled in order from highest to lowest for buy orders and lowest to highest for sell listings.

## **6 Qualitative Research**

Qualitative research is often used in humanistic sciences, where the research material is either difficult or outright impossible to quantify. The research subject itself usually dictates which methods are used to research it and often these days it is common to mix methods of research, not only qualitative methods amongst themselves but also with quantitative methods, when appropriate. (Syrjäläinen & Eronen & Värri, 2007, 7-8.)

## 6.1 Why Qualitative Instead of Quantitative?

This research, however, will focus solely on documenting different currency and resource acquisition methods available to players, and how these games tackle the problem of inflation caused by players being in control of creating this wealth. Because of this, the method chosen for this thesis is observational qualitative research, which allows describing objectively what the economies of these games are like and how each of them work. Afterwards more subjective notes will follow on how well the economies are set up and if the chosen inflation control mechanics work to an outside observer, and if they do not work, how they could be improved.

The reasoning for not using quantitative research method instead is simply lack of data points for such research with the chosen games. Out of the chosen three games, only Guild Wars 2 has vast amounts of market data available through a 3<sup>rd</sup> party website called [www.gw2spidy.com](http://www.gw2spidy.com), which draws sales data directly from within the trading post in-game. Of course one could argue that EVE holds the same kind of data in its market interface in-game. This data however is unattainable outside of the game, making it rather difficult to turn the data into excel tables.

## 6.2 Methods Used in Detail

To measure inflation in each game, documentation is made of how much in-game money a player would be able to acquire within one hour of normal gameplay using most common methods. Then this amount is compared to what it can buy within the game while taking into account the age of the game. In addition to this each in-game money amount is converted into real world money using each game's own Real Money Trade instruments and then they are compared with each other.

The basic rules for data gathering are as follows; any and all materials gathered are sold to the highest buy orders as soon as possible, any materials and tools bought are bought at the cheapest price possible. Any activity that goes over the time limit is extrapolated to only count for the part that was within the time limit.

The activities chosen for each game are; for ArcheAge the activity is trade runs between Arcum Iris using Lavaspice tradepacks. For EVE the activity is a standard mining operation in a high security space, using a mining frigate gained from starter

mining quests. For Guild Wars 2 the activity is dungeon running, namely Citadel of Flame explorable paths 1 and 2 and Ascalon Catacombs path 3.

A note on objectivity of the chosen activities; all these activities do require some knowledge and basic skills in each game, however no more than two weeks of experience of casual, few hours of playing every day, at most. The most 'difficult' one being Guild Wars 2's activity of dungeon running which also could be said to require a level 80 character, despite Citadel of Flame being a level 75 dungeon and Ascalon Catacombs a level 35 dungeon. However, even this should not prove to be a problem as long as the party knows the player is new to the dungeons and often long time players are willing to teach the mechanics to new players.

As an alternative method for measuring inflation, one could set up a portfolio of investments in each game for a set period of time. The items chosen for the portfolios should resemble each other as much as possible from game to game to make the portfolios as equal as possible. After the portfolios have been made, the task is simply to track each one's price changes on a week to week basis for at least a period of 6 months. From this data it would be an easy task to analyse the inflation rates by the changes in the portfolios' values.

This alternative method was not chosen for this study due to time constraints and general ignorance on part of the researcher regarding what to choose for such a portfolio in each game. Had it been possible to use this, though, the results of determining the inflation rates could have been much more accurate.

## **7 The Economical Comparisons**

### **7.1 ArcheAge**

#### **7.1.1 Primary Sources of Income**

The main source of income for players in ArcheAge are trade runs. Trade runs attempt to emulate arbitrage without the actual arbitrage. This means that the rate of gold or rare resources the player gains by doing trade runs depends on how far the player is

willing to go; how much risk they are willing to take to safely trade in their precious tradepacks and how often tradepacks of the same kind have been traded to that location within last 24 hours (the time here is speculative as there does not seem to be a definite source for how this mechanic works).

The amount in game is represented with a per cent value, with 100% meaning the player gets the default value developers set for this trade run (for example Arcum Iris to Ynystere, the more common eastern faction trade run route, yields 6.6 gold at 100%) and the amount of trades made is not too many nor too few. These percentages change between 70% and 130% depending on the amount of that particular tradepack being traded in at that particular end location. This is why this system is only emulated arbitrage, the contents of these tradepacks are never used by the players nor do they change anything in the game world except this trivial percentage. Their only purpose is to generate gold and rare materials out of fairly easily acquired materials and LP.

It should also be noted that the player cannot make a loss on successful trade runs. Even when trading between zones that are right next to each other and at 70% rate, the player will always gain at least twice the amount of gold they spent on the base materials. It is in a sense a license to print money at will if the player is willing to go through the tedious trips between the crafting point and the drop off and have the LP to craft & hand in the packs. For subscribed players it is not problematic, however, for free players it can be, but the imbalance of wealth generation between these two player groups is irrelevant in this research study.

The second most common way to acquire gold is through opening coin purses, which drop occasionally from mobs. Coin purses are divided into level ranges, the lowest being levels 1-10 and the highest 51-55 (there are also 40-55 coin purses but the amount of silver within is much lower). Opening a coin purse requires an investment of labour points and this LP cost goes up the higher level coin purse the player is opening. There is a mechanical reason to this. Opening coin purses counts towards crafting discipline called Larceny, which specializes in acquiring materials through "unlawful" means. However the curious thing developers of ArcheAge opted for in regard to loot, is that unlike in other MMOs, the mobs do not drop any trash loot. Coupled with the fact that you need LP to open the coin purses too, for a new player the only way to get money without spending LP is through quests and those are not even repeatable except for the daily quests that give very little rewards compared to



the other quests. Noteworthy on the loot issue is that equipment loot is extremely rare, even when killing massive hulking world bosses out in the world, which a normal player would expect to be rewarded for killing. What is more, player kills award no loot to the player whatsoever.

The third most common way to get wealth in AA is piracy and larceny. Piracy is the more attractive of the two, because it involves sailing the common trade run routes and killing other players who might be carrying tradepacks. This of course requires an initial investment in getting a boat or finding friends who already have a boat and are already in the pirating business. After the boat is secured, pirates only need to find victims to mug in order to get their money.

Larceny in AA is arguably not actually criminal activity due to the fact that you can only steal items that are not on tax protected lands. What a larcenist is really stealing is materials a tax evader tried to grow in an illegal farm. Larceny does require LP to engage in, but it also provides an easier option for would be pirates to gather materials for their ships and other necessities.

The fourth and final major revenue acquiring method for player in AA is simple farming and crafting. Although the crafting is very questionable as it does not turn profitable until after the player has invested at least 10 000 LP into the crafting discipline. This is because until they reach this second level of crafting proficiency, the players simply cannot craft anything even remotely useful and thus items created before reaching that next level of crafting are not really wanted by other players. Farming on the other hand is a viable way for players to get some money made by growing materials that are commonly used for other crafts or for tradepacks. There are always other players who simply buy the materials from the auction house rather than do the farming themselves (they still make profit after all even if they buy the materials). It should, however, be noted that the auction house's selling function is only usable by people who are current subscribers, have had at least 1 month of subscription or bought a special auction house license from the item shop.

As a side note, as mentioned above, quests also provide some gold income to the new players, but only really to the new players and this is why this method cannot be counted as a major income type. It is not repeatable and once the initial gold flow from quests is over it won't happen again without players creating new characters to do

them again. Players are limited to two characters per server unless they pay up real money for character slots.

### 7.1.2 Primary Methods of Removing Money or Materials

The most important and the only moneysink players will definitely run into is equipment repair costs. These costs scale according to how broken the player's equipment is and how high level the player is. Generally all armour and weapons wear down over time in use, by very small amounts, which is why at some point every player has to fix their equipment no matter how good they are at staying alive. Dying dents the armour far more, usually by 10-20% of the full durability of the piece (larger items have higher durability than smaller pieces, usually chest armour is in range of 90-100 durability and trinkets are 20).

The second most important moneysink is actually a resource sink and it is the whole crafting system, because no matter what form of crafting the player does it will consume labour points. This includes the gathering disciplines, like larceny, farming, gathering and mining, etc. However, the production disciplines require massive amounts of materials and labour points to level up to the usable level as mentioned above. Any player who wishes to make items of any usability value will have to dedicate hundreds if not thousands of materials and the above mentioned 10 000 LP. Of course this requirement for huge volumes of materials also keeps the items valuable as they are consumed in mass quantities and not every crafter has the patience to gather the materials themselves.

This leads to the next moneysink, the auction house fees. The way auction house works in ArcheAge is players list items they wish to sell for a time period (6 hours, 12 hours, 24 hours and 48 hours) and based on the value the player sets for their items and this time period they get charged a listing fee. Should the timer run out or player withdraws the items prematurely, the listing fee is not refunded and the money is effectively removed. If the items are sold however, the listing fee is given back to the player but the total sale amount is taxed with a flat 10% sales tax. This system prevents people from listing items at frivolous prices nobody else would ever pay as the would-be-seller will always lose money should they list items at undesirable costs.

And finally ArcheAge also has a decay timer on the tradepacks as long as they are not being carried (which also resets if someone picks them up). This expiration time is 6 days and usually does not come into play with normal tradepacks. The idea behind it is to keep players from hoarding up tradepacks for too long and to remove these tradepacks from the economy when piracy goes wrong and the tradepacks sink into the abyss. They can still be recovered with diving gear or special underwater breathing potions, but unless the pirates dive immediately or mark the spot where the packs sunk, they won't find them in the middle of the ocean later on, effectively forcing the timer to expire.

The last major moneysink is the property tax, paid weekly by people who own farms and houses. The amount of tax that needs to be paid goes up the more land the player owns and by the size of the player base on the server, but generally a single small house and a large farm is easily covered by a profitable trade run (5 gold a week is enough). Property can only be owned by players who are active subscribers and thus only they can pay this tax as well, free players and ex-subscribers have to make do with free public farms and/or using a friend's property to grow their vegetables.

## 7.2 EVE Online

### 7.2.1 Primary Sources of Income

The first and most fundamental wealth acquiring method in EVE is mining. It forms the basis of the economy as all materials gained from mining are useful to either the players themselves if they are a crafter or simply selling the ores on market to other players. Even the lowest grade ore, Veldspar, is massively important to every player as its refined form is Tritanium, which is used in the construction of all ships. Without the dedicated miner players who choose to mine asteroids instead of engaging in politics or higher risk profit making like trading or pirating, the economy of EVE would collapse as no new ships would be made, not to mention other professions would lose their suppliers as well.

Production or manufacturing is the next step up after mining, and a miner can be also operating in production. It is perfectly viable for players to specialize in only buying materials from miners to further refine them and craft these materials into ships,

weapons, ship parts, upgrades, ammunition, etc. and sell these products forward with a profit margin. It is noticeably riskier business as the price for the products could change overnight due to market changes.

Predicting these market fluctuations is what traders excel at. As the markets between star systems are not connected with each other, prices of certain ore could be lower in one system due to there being too many miners in the area. Consequently, prices of this same ore could be 10 times higher in a system further away where the asteroids for this ore do not exist and their supply has just run out. Of course price differences this radical are not allowed to happen by the players as any sign of possible quick profit is immediately dried out by the traders. The first ones to notice these differences are the ones who make the most profit and EVE is possibly the only game where true arbitrage is possible.

Trading or mining in lower security systems comes with a considerably higher risk however. Instead of focusing on doing any of the research into markets or finding good mining spots themselves, more combat oriented players may opt for piracy and either extort other players into giving them items for safe passage, or simply destroy the trading and mining ships and loot the cargo so they can sell it forward. Attacking other players will incur a criminal flag and kill rights to the wronged player though, and often if the cargo that was stolen was precious the victim might place a bounty on the pirate's heads as well. Criminal flag simply means that CONCRD will attack the player if they are spotted and kill rights are a right to kill another player without getting flagged for criminal activity.

As mentioned above, players can place bounties on other people's heads or even on whole corporations. These bounties are often collected by bounty hunters, another combat oriented player type who simply track down known pirates and attempt to kill them. Having a bounty on one's head does not give the bounty hunters kill rights however and as such bounty hunters themselves are, in CONCORD's eyes, also criminals. This can be circumvented by buying the kill rights from the wronged player, if possible, but no security space it makes no difference as there is no CONCORD around anyway. There is another type of bounty hunting too, in killing NPC pirates that can appear in medium to null security space asteroid fields. Like player pirates, they have bounties on their heads as well but these bounties are determined by the game depending on how strong ships the pirates are piloting. In a sense hunting down these

NPC pirates is very much like killing mobs in other MMOs and it is suitable way for a new player to make money if mining or trading is not their thing.

Missions are offered by agents in space stations and they are akin to quests to make a comparison to other games. Missions can provide players with ISK, minerals, blueprints and faction points that improve the player's standing with the faction whose mission they've undertaken. Basic mission objectives range from killing NPC pirates, delivering goods to another station to mining missions. In addition to these there are special mission types; storyline, cosmos and epic arc. These special missions have special conditions for receiving them and often give much better rewards than standard missions due to being longer and more difficult to complete.

Deadspace missions are an offshoot of the basic kill missions, and they are EVE's dungeons, intended for groups of players as harder PvE content. As such they are also more rewarding than normal kill missions but players risk losing their ships if they try to tackle a deadspace that is clearly too difficult.

### 7.2.2 Primary Methods of Removing Money or Materials

EVE features one of the harshest death penalties in any MMO. If a player's ship is destroyed, it is gone for good and all of the materials used to construct it are unsalvageable. The only things that might remain in the cargo wreckage is the any cargo the ship was carrying and possibly some of the upgrades that the ship was outfitted with. Every ship has however 40% insurance on them by default so even in case their ship is destroyed the players are not left completely empty handed. This insurance is especially valuable lifeline if the player loses a titan as their real world value is in thousands of Euros (Drew, 2010).

In addition to the default insurance, players can buy extra insurance on their ships. This insurance comes in 6 levels of payout and cost. It will not cover the whole remaining 60% of the ship's value, but it will help the player get back on their feet faster should their ship be destroyed. All bought insurances are valid for period of 12 weeks, after which it will have to be rebought to enjoy the protection it gives. The insurance is also nullified if the player sells/trades their ship, gets shot down by CONCORD, or puts it as a part of a contract. If the player is unlikely to engage in active combat, they most likely

will not need this insurance in medium and high security space as the likelihood of losing one's ship is very minor in these areas.

As mentioned in the mining section, crafting consumes massive amounts of materials. This is not just for ship building either, as all ammunition used in EVE, be it bullets, laser crystals or missiles, have to be crafted by the players as well and all of these are consumed when fired so there is always need for more to be made. Building player controlled stations and star bases consume humongous amounts of resources, so even in the extremely unlikely event that players stop losing their ships there is still an avenue to channel the materials into. As a side note, crafting does also cost ISK depending on the size of the crafting done, a small ship costs next to nothing to craft, but massive capital ship parts could cost tens of millions of ISK.

Like in other MMOs, EVE's market also has the normal sales tax for making sales, but unlike other MMOs, EVE's sales tax is very lenient 1.5% of the full price. In addition to this player can be charged with Broker's Fee, which goes up or down depending on player's Broker Relations skill level and their faction standing with the market broker's faction. In effect it can be anything between 0% and 4%.

## 7.3 Guild Wars 2

### 7.3.1 Primary Sources of Income

Currently the best method to make gold for GW2 revolves around speedrunning dungeons for their daily completion rewards, which give gold in range of 1 gold and 5 silver to 3 gold and 5 silver depending on the dungeon path length and difficulty along with 40 dungeon tokens (that can be used for buying equipment once enough is collected). On top of this, players also receive the base reward of some silver, karma and 20 tokens that all players gain every time they complete a dungeon path, no matter how many times they do so per day.

Event chain and boss farming are the second most common ways for acquiring gold and resources on the side. For event farming, the most gold comes from event completions along with karma, and mobs that are killed often drop large quantities of loot over the farming period that can be salvaged into materials players then can sell

forward if they don't need them themselves. Boss farming or training as it is sometimes called, involves players running after champion mobs that spawn every 15-20 minutes for their champion bags, which may contain very rare equipment which can be sold for a really good price. Even if the rare items do not happen to drop from these bags the players are still left with massive amounts of salvageable items which make this activity somewhat worth their time.

A subcategory of previous two farm activities is world boss farming, which can be more profitable per monster killed. These bosses have sometimes considerable waiting times in-between them and their events might happen at same time which means player has to choose one over the other. These bosses are also considerably harder to kill than the boss train champions are and some of them have strict tactics needed to defeat them.

Even if the player doesn't care for farming for their money, there is some money to be made in roaming the mists in world vs world mode. Especially joining a "zerg" of players can be very profitable as the effects of this are same as event farming. Every camp, tower and keep is an event and all larger objectives also have a champion guarding them (champion bags). Also any enemy players killed provide extra loot and money, just like mobs would (note though that in GW2 the loot gained from players is not from the players' pockets like in EVE, it is randomly generated on the corpse). Ultimately this doesn't provide as much revenue as pure farming does, but it is considered more fun and engaging activity.

Less than year ago, ArenaNet made a major overhaul to reward systems of sPvP. Whereas it used to be completely isolated from other game modes, players now can work on reward tracks that provide same kinds of loot as player would get while playing in PvE, be it champion bags, dungeon armour and weapons, special skins etc. In addition to this, players now receive some silver for each match played, with amount depending on whether the match is a practice or competitive match and whether the player's team won or lost. The rate of acquiring gold a player can achieve through sPvP is not however as high as farming in PvE yields.

### 7.3.2 Primary Methods of Removing Money or Materials

For GW2 by far the largest moneysink is the crafting, in particular ascended and legendary crafting. Both of these consume massive amounts of materials and for ascended the end product is not even tradable as it is account bound. How the item is made, is forcing people to either farm the materials or buy them from trading post from other players. For legendary crafting the limiting factor is the rarity of the precursor weapons needed to craft the legendary so legendary weapons are supposedly very rare and difficult to get. They also have a 2<sup>nd</sup> limiting factor in needing 250 of all the rarest fine materials. In lower tier crafting fine materials determine which attribute the armour has, and as a comparison, a single exotic item, one tier below ascended crafting, requires only 5 of one category of these same fine materials of which legendary weapons need 250.

Much akin to other MMOs, GW2's trading post features fees for trading on it. The first fee a seller will run into is Listing Fee, which is 5% of the total amount the seller is selling for (listing fee is paid even when selling to a buy order). This fee is deducted from the player's wallet immediately upon listing and it is not returned on successful sale.

This form of listing fee also has a dark side to it in that if a player finds an extremely rare weapon, for example, a legendary precursor. In order to sell this weapon even to buy orders they will need to have the 5% listing fee in their wallet before they can sell the weapon (precursors at the time of writing average around 1000 gold so this 5% listing fee is around 50 gold, which for a new player is a lot of money). Mainly the listing fee's purpose is to discourage players from relisting items multiple times to undercut the current lowest price.

The second fee on TP is Exchange Fee, which is 10% and is deducted from the full price of the sale upon completion of the sale. This fee is agreed to be the more sensible of the two fees on GW2's trading post as it does its job of being a tax on making trades and applies to everyone in fair manner. It scales up for larger trades and scales down for small trades, of course it could be progressive fee that incrementally increases when the prices go higher, but flat 10% is easily understandable and does not complicate trading too much.



A small, but still pretty significant goldsink in GW2 are the waypoint costs. These scale with player level and distance travelled and at hindsight these costs are very small with base cost of travel at level 80 being 1 silver 39 coppers, on top of which distance cost is added, and highest cost for single waypointing is around 5 silver from furthest point on map to furthest waypoint on opposite side of the world map (Guild Wars 2 Wiki, 2015). However players use the waypoints often and quickly it becomes an automatic reaction to waypoint if there is a waypoint next to the place where the player wants to go, slowly removing gold from players' pockets as they pay for the convenience of fast travel.

Also worth mentioning is the gem exchange, where players can exchange gold for gems, that then in turn can be used to buy items from the gem store. All gems are bought with real money and sold by the players for gold, the supply is in this way completely in players' hands, but the nice thing ArenaNet did with gem exchange is that when trading gems to gold or gold to gems the exchange fee is massive 15%, causing it to be very unproductive to exchange gold to gems and back too often. This fee comes into play a lot when ArenaNet introduces new armour or weapon skins in the gem store and players exchange gold to get these new skins, sometimes causing the price to spike by several gold pieces.

## 7.4 Room for Improvement?

### 7.4.1 ArcheAge

ArcheAge distinctly feels like it lacks sufficient moneysinks to counterbalance the massive income a player can get from trade runs. Not to mention the fact that ArcheAge does not really offer alternatives for moneymaking either. One can make money opening pouches, but that is a boring activity and ultimately eats more LP per gold than trade runs do, making it much weaker option. The problem is that as there is no counter to massive gold influx from trade runs, players who can make trade runs most efficiently and more often are getting richer than other people, making them able to drive up the prices on goods they need which in turn makes it harder for the less dedicated players to advance.

Add to this the frustration of steep curve of crafting advancement by being so time and resource expensive, a casual player will not be able to stay on par with more hard-core players in terms of power and/or competitiveness. A player that does not have the time to dedicate 12 hours a day in the game has no other choice but to pay up for APEX in real money just so they can sell it to another player and gear themselves to be on equal footing with other players.

Ultimately what AA desperately needs is to remove the trade runs for gold, for rare resources. It is an interesting concept but for straight up gold it is a tedious and unrewarding mechanic. In addition to this, the developers need to introduce gold drops from mobs, without being tied into opening pouches. Additionally, to accommodate the switch to this new scheme the old gold needs to be revaluated by hundredfold, with 100 old gold coins being same as 1 new gold coin. Moreover, fixing the crafting to be less of a grind would be advisable to make it more accessible. Introducing more convenience goldsinks would be advisable, the public transports being one of the main things that could cost money to use. If it was made so that getting on board requires a ticket which is valid for a set time period and is bought from an NPC.

#### 7.4.2 EVE

At first glance the prices of items on EVE's market may seem daunting, with the smallest ships costing hundreds of thousands of ISK. Once the player does the tutorial missions, they are given some of these frigates for free as rewards for completing the missions along with decent amounts of ISK, decent here being close to a million from single tutorial mission chain. These of course cannot be repeated, but they set the player on career path of what they want to do in EVE, be it bounty hunter, miner or trader while also giving the player basic tools for these paths. The player will also notice that mining is perhaps most lucrative of these once they advance through the mining tutorials and receive their specialized mining frigate that allows them to mine rather large quantities before needing to empty the cargo hold.

The main reason for this is because the value of basic crafting material, Tritanium, has stayed on par with the inflation for the most part due to it being needed for nearly all crafting recipes, while bounties on NPC pirates is around ten thousand ISK for lowliest pirate ships. Now at first this disparity might seem odd, why make it so that one career is inferior to another? Or rather, why aren't all careers updated to be as lucrative as

mining? That is because mining technically does not generate ISK by itself, it only generates materials which then affect the inflation indirectly through supply changes. ISK generated from pirate kills and missions however only cause more inflation and that is why they cannot be brought up to be on same level as mining in terms of income without causing a massive inflation change as well.

CCP recently removed one of the oldest goldsinks in EVE, the clone grade costs, citing it to be confusing and unfair to new players. This of course still leaves the other goldsinks but the clone upgrading used to be a massive goldsink at higher levels of play as it easily removed billions of ISK from wary players who wanted to protect their hard earned skills. The effects of this removal are yet to be seen.

Overall EVE feels like it has a very natural low inflation, considering its age of 12 years this year, and the options for playing it do not feel limited even though mining obviously gives best return for players' time. If the best method of acquiring wealth was from generating new wealth from NPCs instead of from existing wealth pool in the market, the inflation would be massive and nigh uncontrollable.

#### 7.4.3 GW2

Guild Wars 2 originally did the mistake of over-rewarding dungeon completions, and in a way it still does. Completing dungeons is the most solid way of making money without much randomness involved, especially if the player has friends who know how to do the dungeons. The way dungeons used to work allowed players to farm the same dungeon path over and over in ridiculously fast times and get decent amount of money for it every time. To fix this problem ArenaNet changed the way dungeon completion rewards are handled and now majority of the reward can only be earned once a day per path, which in turn forces players to do other paths and dungeons as well if they want to maximize their gold gain.

The beautiful thing about GW2 however is that the accepted "full exotics" level of gear is easy to attain even to a casual player through any play mode and after reaching that all player has to worry about is getting better looking items or the optional ascended gear which offer only a marginal 6% more attributes than exotics. The problem to the player though is that the better looking gear tends to cost a lot more than the basic looking gear, with some exotic skins going for as much as 1800 gold (Molten Jetpack

Backpack skin) simply because it looks good and the supply is very limited by either randomness of drops or the skin was available only for limited time, like the mentioned jetpack skin was.

The fact that players can make, in theory, more money from selling randomly found rare items to other players is good as it takes that 15% trading post fee every time a trade is made and no new money is being generated, but rather old money is being circulated and this counteracts the inflation caused by dungeon farming somewhat. The introduction of ascended gear also was a brilliant move in this regard as it raised the value of lower tier materials and made it more profitable to gather these for money purposes than it previously was.

This of course could be further improved by making copper (the lowest tier metal material), jute (lowest cloth) and green wood (lowest wood) more used in higher tier crafting to emulate EVE's use of Tritanium as the basis of all crafting. Currently the only use for these materials apart from the initial need for levelling crafting disciplines is upgrading them to next tier of materials in very random process of using mystic forge, the randomness coming from yields being anything from minuscule (major loss) to amazing amount (major profit).

## **8 The One-hour Income Test**

The purpose of this test is to put made observations into use in an attempt to make as much money in one hour as possible with as little risk as possible. The risk aversion clause in this test is to make this test have as few random factors as possible so biggest changes in worth of the earned gold are inflation or deflation if the test is repeated later on. Additionally, it would serve no purpose to lose money in this test due to a random encounter with a hostile player and end up with less money than the test was started with.

While in hindsight it would make sense to choose same methods in every game (IE, mining for example). This would skew the results with randomness and mechanics working against you, for example, had mining been chosen as the activity for one hour in every game. In EVE this method works as there is plenty of safe mining areas and access to market is one warp jump away, but in ArcheAge and Guild Wars 2 finding

mining nodes without outside aid is purely random. In addition to this, ArcheAge would not have let to sell any of the ores on the market as this test was conducted on free to play account. Methods were chosen based on consideration of profitability and for them to be risk free enough to be easily repeatable.

A short description about each individual test before the results (the data gathered can be found in the appendix).

For ArcheAge's test it was decided to do as many trade runs as possible within the time limit. Applying to this the risk aversion clause, all overseas drop-off points and maps with open PvP enabled were not considered. Even though trading in tradepacks at those traders would have given a higher yield. In addition to this, all materials used to produce the tradepacks had to be bought off the market due to the time limit set for this experiment (waiting for crops to grow on public farms would have taken far too long and using available stocks of materials would have skewed the test). There was already a concession made in allowing trade runs into this test in the first place with their 22 hour mailing time. For the purposes of this test, the 22 hour waiting time was not accounted for in any way because the player is told the full amount they receive upon tradepack drop-off and this amount won't change during the waiting period so in effect it as good as earned when the tradepack is traded in.

For EVE the test was set up as a very straightforward mining operation in hi-sec space (to avoid pirates of all kinds) and while it could have been more profitable to mine in lower security space for rarer minerals, the risk of losing the cargo and the mining ship was against the risk aversion clause. The ship used was earned through the tutorial mining missions before the test was conducted and it was outfitted with two slightly better mining lasers than what is given through the mining missions.

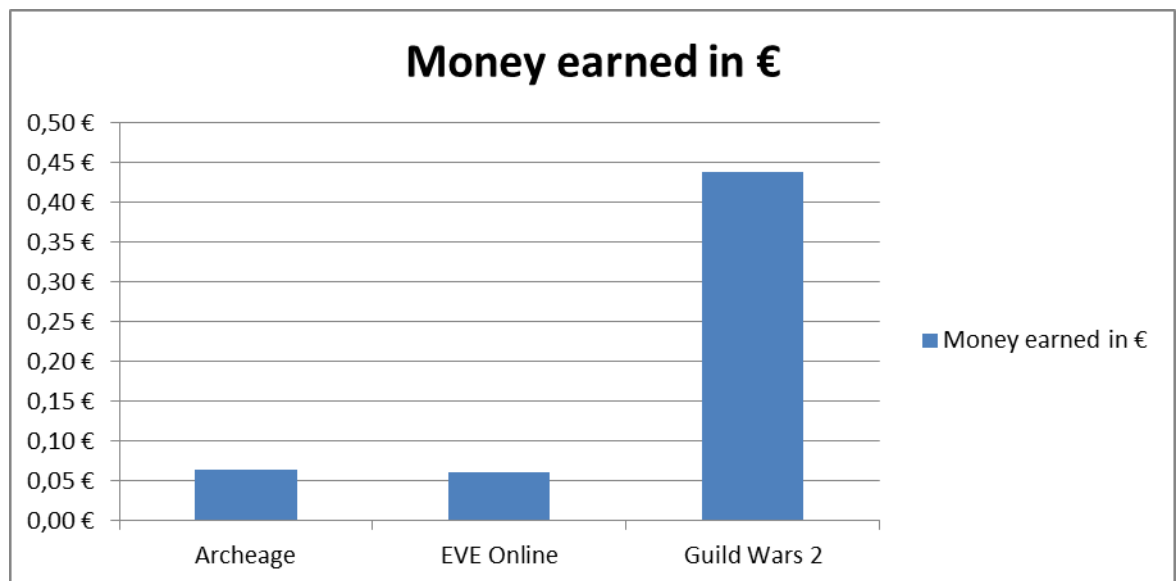
For Guild Wars 2, the original plan was to do three very commonly done dungeon paths and if there was time left, farm events in a map called Dry Top. These three paths, Citadel of Flame paths one and two, and Ascalonian Catacombs path three, were chosen because there are people going for them at almost any time of the day which makes it easy to get a decent party for these dungeons.

**Table 1 The money earned in in-game currencies and converted to Euro.**

Game	Money earned	Cost of Instrument (gold/ISK)	Cost of instrument (€)	Money earned in €
Archeage	35301,30	5480000,00	10,00 €	0,06 €
EVE Online	2402536,04	780098018,36	19,95 €	0,06 €
Guild Wars 2	48772,73	1093622,86	10,00 €	0,44 €

The money earned column is the total of money made in this hour in each game. For AA and GW2 the amount is in copper to simplify it (normally these amounts would be written as 3 gold and 53 silver for AA, and 4 gold and 88 silver for GW2). For EVE the amount is in ISK, there are no higher or lower forms of coin in EVE.

Cost of Instrument columns show the worth of each game's real money to in-game money items, first in in-game currencies and second in Euros. Instrument as a term was chosen here as it would be arduous to refer to each instrument by their name (APEX for AA, PLEX for EVE and Gems for GW2). The last column is the calculation of what the earned money amount is in Euros, using the conversion rate the instruments give (Money earned divided by Cost of Instrument (gold/ISK) and then multiplied by Cost of Instrument (€)).

**Chart 1 The amount of money earned in Euros.**

Data of the fourth column organized into a chart. While this does not describe inflation in any way yet, what it does say is, when converted to Euro value, GW2 has the best per hour income rate out of these three games at not-so amazing 44 cents per hour.

To keep this test from only being compared to Euro and to also give it context within their respective games, a check on each games' markets was done to see what the best items are one can buy with the amounts that were earned. The full calculations and prices are in the addendum with the more detailed earnings, but here are briefly the findings.

In ArcheAge, there was not a single item of even lowest quality for a level 50 character (highest level attainable at the time) that was within reach of what had been earned. Best the market had to offer was a level 45 lowest quality ring for 3,2 gold, which is considered to be without any value and the attribute point increase it gives is much lower than what best maximum level rings would confer. If the ring was not of any interest, a player could also have used the money to buy 85 bottles of 2<sup>nd</sup> tier healing potions for 3,5 gold, 2<sup>nd</sup> tier here meaning it is the second kind of healing potion a new potion maker can brew and thus not very useful (it heals around 800 health per potion when a level 50 player's health is anything between 12 000 to 20 000). Even if we had foregone including all the expenses that went into earning the gold (11,96 gold), it would still not have been enough gold to buy a single piece of level 50 gear as even the lowest quality and the lowest priced items were just over 30 gold.

In EVE it was somewhat positively surprising what one could buy with the money. It was able to buy a near-fully outfitted destroyer class ship and there still was some money left over. While this might not be much for long time players, for a new player it is be rather morale boosting to be able to buy such an improvement over the frigates they would have been accustomed to having up till this point. The best thing about EVE being a true sandbox is the lack of levels, with only skills improving over time that give minor boosts to various things (e.g. Small Energy Turret skill improves small energy turret damage by 5% per skill level or Ship Command makes manoeuvring with ships easier) and this lack of levels makes this newly bought destroyer useful to even "endgame" things such as wars in nulsec (zero security) space or just general pirate frigate hunting.

In Guild Wars 2 liberty was taken to pick items with attributes that are considered "meta" (the best possible under current conditions), which meant power, precision and ferocity. And while items with Berserker prefix are the best of this kind (focusing on power), Assassin often is close 2<sup>nd</sup> (focusing on precision). This meant excluding attribute combinations that had any of the other attributes; toughness, vitality, healing

power and condition damage. Also of consideration was the armour class as the game is divided to three such categories, heavy, medium and light. Every item is of exotic quality and level 80 (maximum level), exotic being acceptable quality of gear for all content and with only extremely expensive ascended gear above it. Ascended quality offers only a marginal attribute boost over exotic and is seen as optional as it is not required for normal gameplay. For heavy armour users, the money could buy an Assassin's coat and helmet for combined price of 4,3 gold, for medium armour users just an Assassin's coat priced at 4,68 gold and for light armour wearers a Berserker coat for 4,74 gold. A note should be made here about all Berserker gear for heavy and medium wearers costing above the earned gold amount so here is why best in slot Berserker couldn't be bought and buyer would have to make do with Assassin gear. In addition to armour prices, prices on items that are not bound to specific armour classification and that can be used more broadly were also checked. Best of these items were Ruby Orichalcum Amulet (Berserker amulet) for 4,25 gold, Berserker's Pearl Broadsword for 4,66 gold and Superior Sigil of Fire, arguably one of the best sigils a player can slot into their weapon, for 3,99 gold.

## **9 New Possible Systems and Ideas for Controlling Money Supply**

At this point it is safe to say ArcheAge is doing remarkably worse in the inflation management than other games. It is seemingly mostly due to the best moneymaking method being generating new gold from trade runs rather than circulating the already existing gold. New players have no chance whatsoever to gain from crafting until they have slaved away to begin crafting level 50 items. Not to mention that the lockout of not being able to sell on market without paying real money for it is another large problem. ArcheAge sells itself as a sandbox game, but it cannot live up to that name. There is absolutely no equality at all in this kind of system where one has to be rich and have hours on end of free time to dedicate into the game to be able to stay competitive with other players. ArcheAge needs to bring the requirements of crafting down and possibly get rid of the entire labour point system as it only really benefits the rich players. In addition to this, all the gold trade-ins of trade runs need to be removed or cut to tenth of current gold amounts and revalue the gold by introducing new gold that is worth 100 old gold and make old gold otherwise unusable, as mentioned above in the Room for Improvement part.



The seemingly best ways to have a healthy economy is to make all the materials useful in some way, with the most common materials being also the most used. However, material gathering also has to have a drawback in time consumption; else nobody will bother buying the materials as it's easy to just go pick them up. This could be anything from mining taking a long while, much like it takes time in EVE, or inventory space being limited so the player has to make trips to market/bank often. For a game like GW2 this latter option wouldn't work as waypoints negate the time consuming effect of running back and forth, unless the waypoint system charges extra for having the inventory bags full (kind of like how plane companies charge for extra luggage) to discourage players from teleporting.

Using GW2 as an example of how things could be changed, currently the lowest tier crafting materials are essentially useless to the players after the players have reached the 2<sup>nd</sup> tier of crafting. In order to promote the consumption of these, they could easily be implemented as being needed for exotic crafting, just like the tiers two through five are required for ascended crafting. For example, in order to make one orichalcum ingot the player in new system would need to melt 10-20 copper ores with 1 orichalcum ore instead of the current system where 2 orichalcum ores make 1 orichalcum ingot. For lore justification this could be explained as orichalcum being too brittle alone and thus it needs to be combined with much softer copper.

By setting up the system to require all materials at all levels of play, the economy is much better off as it promotes trading as the primary method of income, which in turn reduces the influx of money caused by players intentionally generating more money into the system through other income means. The inflation rate becomes far more manageable as even the latecomer players can easily catch up on the inflation just by trading and tapping into the existing wealth.

## **10 Recommendations for Further Research**

This area of study, inflation control in virtual economies, would definitely benefit from further research into: why labour point system is ineffective for ArcheAge in its current form, and into other games that are still forthcoming (Camelot Unchained, Warhammer 40,000: Eternal Crusade, etc.) to see how they have handled their economy and if there are any similarities in the results.

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## The one hour income test, comprehensive results

ArcheAge

Traderuns between Arcum Iris and Solis Headlands								
Chosen because it is a safe route to travel alone.								
Individual variables:								
Level 50 character.								
Free to play account for purposes of LP generation.								
Level 21 donkey, able to use carrots for a 30% speed bonus for 1 minute per carrot.								
Carrots used deducted from final earnings based on their cheapest market price.								
Missed busses on both trips.								
Tradepack yield was at 130% for both trips.								
All gold amounts are in copper.								
Gold is mailed to the player 22 hours after the trade-in with a 5% interest.								
There was only 2 minutes left on the clock after 2 trips, not enough time to do anything productive.								
Traderun	Gold earned	Material cost	Hereafter Stone cost	Labor cost	Carrots used	Carrot cost	Carrot total	Final total
Trip 1	59801	34600	0	120	23	225	5175	20026
Trip 2	59801	34600	4525	120	24	225	5400	15276
								35301
What does this buy?								
Shroudmaster Ring,	32000							
OR								
85x Hushed Star pot	34850	410 x85						
Note: all lvl50 equipment is even at cheapest and worst quality over 30g.								
Earned gold in real money								
5480000		10 €		22.2.2015				
0,06 €		Bit surprising that it's so close to EVE's PLEX value						

## Eve Online

Mining in Kor-Azor region, Conoban system (0.9), between asteroid field Conoban VII Asteroid Belt 1 and space station Hedion University.						
Ship used is Venture class mining frigate outfitted with two Particle Bore Compact Mining Lasers.						
Individual variables:						
Date 17.02.15, the market data will most likely change and thus these numbers will change in the future as well.						
Mining skill is level 3, meaning 15% total increase in mining yields.						
Each mining laser yields 127 cubic meters of ore per 60 second cycle (above mining bonus included).						
Veldspar fits 10 units of ore per one cubic meter.						
Venture can hold total of 5000 cubic meters of ore in its Ore Hold.						
Venture's max speed is 385.25 meters per second.						
Venture's maximum warp speed is 5.00 AU per second.						
Primary target to mine is Veldspar						
					17,76	
Trip	Veldspar mined	Unit price	Price total (pre-tax)	Tax (1,5%)	Price total (taxed)	
1	50000	17,76	888000	13320	874680	
2	50000	17,76	888000	13320	874680	
3	37338	17,76	663122,88	9946,84	653176,04	Had to return before hold was full due to time limit
					2402536,04	
What does this buy?						
Coercer (destroyer)	1200000					
4x Small Focused E	200000	50000 x4				
4 x Small Focused	107976	26994 x4				
8x Microwave S fo	16800	2100 x8				
10MN Afterburner	95700					
Small Automated C	59999,99					
Stasis Webifier 1	45000					
Experimental Kine	119000					
Upgraded Adaptiv	119000					
Amarr Destroyer s	100000					
Total	2063475,99		With plenty of money to spare			
Current (17.2.15) highest value of PLEX buy order in the region				lowest sell		
780098018,36		19,95 €		819877000		
Value of the gained money in euros						
0,06 €		0,06 €				

## Guild Wars 2

Clearing dungeons and doing events for money				
Dungeons and paths cleared:				
Citadel of Flame path 1				
Citadel of Flame path 2				
Ascalonian Catacombs path 3				
Rest of the hour in Dry Top map farming events. - didn't make it				
Selling items/materials whenever possible, recording each individual price nigh-impossible without having an adverse effect on remaining time.				
Gold from sold item/materials is the total after all fees.				
Individual variables				
Level 80 character with exotic or higher gear (Necromancer).				
Gold Find (increased gold from mobs) 116%				
Magic Find (increased chance of finding rare items) 233%				
Both Gold and Magic Find are boosted by 100% because of Birthday Booster buff I had put on previously without thinking of the 24hr timer on it.				
All gold values presented in copper.				
Gold gained from dungeons				
Dungeon	Gold (copper)			
CoF p1	13100			
CoF p2	13100			
AC p3	10273	10 minutes 40 seconds over timer	0,567568	18100
Gold from random loot	1995			
Gold from sold materials/items	11687			
Total value	11536			
basic salvage kit uses	43	151	A single basic use cost	4
master salvage kit uses	0	0	a single master use cost	61
Gold from events	0			
Total amount gained within an hour	48773			
What does this buy		Gained amount converted into euros		
<b>For heavy armor user</b>		800 gems		10 €
Assassin's Draconic Coat	30303	35 gems	47846	23.2.2015 (15:35)
Assassin's Draconic Helm	12714			
	43017		0,44 €	1093623
<b>For medium armor user</b>				
Assassin's Emblazoned Coat	46789			
<b>For light armor user</b>				
Berserker's Exalted Coat	47368			
<b>For any armor grade</b>				
Ruby Orichalcum Amulet	42499			
OR				
Berserker's Pearl Broadsword	46600			
OR				
Superior Sigil of Fire	39994			

