

## An Investigation into Virtual Economies, Using Team Fortress 2 as a Case Study

Virtual Economies are defined by Wikipedia as “emergent economy[ies] existing in a virtual world, usually exchanging virtual goods in the context of an Internet game.”<sup>1</sup> As such, one might expect that, because of their dependence on something as trivial as a video game, they would have no actual significance in the real world. However, it is quite the opposite and in fact virtual economies can tell us quite a bit about our “real” economy. This project is an investigation into the nature of virtual economies. I want to understand their effects on gameplay and game community, and I want to understand their growth and development. I will use Team Fortress 2 (TF2), a FPS game released by Valve in 2007, since I believe it serves as a fantastic illustration and is also a game that I am quite familiar with. In order to understand the nature of TF2’s virtual economy, we must first understand its basic monetary units. In this first part of the investigation, I will explain the “Hat” system.

The greater internet community has dubbed TF2’s cosmetics to be “hat” based. The term “hat” is a generalization for the widely varying cosmetics available in the game, most of which are hats for the player models. TF2 has spawned a unique virtual economy, which has acted as a testing ground for Valve’s other games, that is has even been affectionately called the “America’s #1 war-themed hat simulator.”<sup>2</sup> TF2’s virtual economy is unique for many reasons and I will try to illustrate a few of them. TF2 itself is totally free to play and an

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<sup>1</sup> "Virtual economy." *Wikipedia*. Wikimedia Foundation, 26 May 2017. Web. 15 May 2017.

<sup>2</sup> "Cosmetic Items." *Cosmetic Items - Official TF2 Wiki | Official Team Fortress Wiki*. N.p., n.d. Web. 15 May 2017.

individual can boot up the game and play without any limitations, with access to all of the vanilla weapons. The non-vanilla weapons, which may or may not be upgrades from the vanilla set, are eventually all available to the player through a random-drop system, achievement unlocks, or through trading, all of which are free of charge. However, the player can also spend money on a micro-transaction with Valve and receive the weapon of interest for some amount of real money, typically no more than \$3. All sorts of other items are also available through micro-transaction in the "Mann Co. Store," Valve's virtual in-game store front. There, players can buy items varying from taunts, hats, and kill-tracking weapons to paint for cosmetics and mission campaign tickets. Players can even buy "Something Special for Someone Special," which is a virtual ring costing \$100 USD that can be gifted to another player and causes a global announcement of the gift to be sent out to every player online.<sup>3</sup> The main point of this is that most of the items available for purchase do not give an in-game advantage to the purchaser. All of the upgraded weapons available for purchase, eventually become available to all players either by achievement or random drop.

Another unique aspect of the economy is that, through conversions between basic monetary in game units, the economy has established a direct conversion rate from USD to the basic unit of the virtual economy: keys. In TF2 keys are available for purchase for \$2.49 in the in-game store. These keys, in turn, have a value in Refined Metal. Scrap Metal is the basic, non-purchasable in-game unit of currency and is created from crafting together unwanted weapons. Two weapons make a single Scrap Metal, three Scrap Metal make a single Reclaimed Metal,

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<sup>3</sup> "Something Special For Someone Special." *Something Special For Someone Special - Official TF2 Wiki | Official Team Fortress Wiki*. N.p., n.d. Web. 17 May 2017.

and three Reclaimed Metal make a single Refined Metal. Refined Metal (or Ref as referred to on many trading forums) is the indication of the strength of the TF2 economy. As of today, May 27, 2017, the value of a single Refined metal is \$0.07. Correspondingly, the value of a single key right now is 28.33 Refined, or \$1.98.<sup>4</sup> It is noteworthy that keys are valued at lower than market price in Valve's in game store, which has been the case for quite some time. At the height of the TF2 economy, a single key could go for as low as three refined that valued a Refined metal at roughly %0.83, a 1200% deflation from today's prices.

This incredible fluctuation of the economy is mostly natural and due to trading activity and the scarcity of goods, but it can also be largely attributed to a declining player base. TF2 has recently had a daily player base of around 50,000 people, which is quite significant considering it is a 10-year-old game, but less than half of the 117,917 players it boasted at its peak in 2012.<sup>5</sup> This decline in players can in part be attributed to its community simply moving on and growing older. Even still it has always retained a core player-base. Many also saw the release of Blizzard's Overwatch in April of 2016 as a threat to its longevity. It shared a similar gameplay style and seemed to a more modern, more complex game that attracted many former TF2 players. Even still, TF2 has a very loyal fan base and maintains an active subreddit, as well as consistently fills its servers. TF2 certainly would not be the game it is today, and would not have had such a thriving economy without the support and involvement of the community. The community-driven aspect of the economy is really the heart of TF2's economic growth and I will

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<sup>4</sup> "Pricing, Trading and Statistics for Team Fortress 2." *Backpack.tf*. N.p., n.d. Web. 30 May 2017.

<sup>5</sup> "Team Fortress 2." *Steam Charts*. N.p., n.d. Web. 30 May 2017.

spend the following part of this investigation discussing the communities' various contributions to it.

One of the main factors that has allowed TF2 to have such a successful virtual economy is the creation and wide-spread use of trading sites, such as [backpack.tf](http://backpack.tf) and [tf2outpost.com](http://tf2outpost.com). These two sites alone constitute much of TF2's trading network. [Backpack.tf](http://backpack.tf) serves as a price-setting and adjusting website, where items can also be listed for purchase. It also allows traders to look at a plethora of statistics and graphical representations about items in the game. For example, as shown in Fig. 1, you can track the growth and decay in value of the key since 2012 in coordination with the number of keys in circulation. The graph shows that as of today May 27, roughly 910,000 keys exist valued at \$2.12. According to [backpack.tf](http://backpack.tf) market prices, their total value is roughly \$1,930,00. This number is just determined exclusively from those users who have logged in [backpack.tf](http://backpack.tf), which itself is a fraction of all users in game who own keys. That monetary value is also solely representative of the value of all cumulative keys, excluding all other items in the game. One can only speculate as to the estimated total value of the economy itself, but it is certainly well above 10 million USD. This number was certainly surprising for a virtual economy based solely in virtual, electronic goods. [Backpack.tf](http://backpack.tf) is used to speculate and establish prices, based on proof taken from [tf2outpost.com](http://tf2outpost.com) where users can make trades of items for Ref, keys, or any other item they desire. Fig. 2 and Fig. 3 show prime examples of these trades that might be used as evidence for a price adjustment of a given item, but themselves are simply an individual looking to trade away his particular item for value. Trades like those and the constant adjustment of item values are what keep the economy in motion. The system is incredibly complex and is constantly adapting to Valve's updates and the

release of new items. Many of these trades are mundane and are valued for below \$1, but certain items are extremely valuable and have gone for upwards of \$10,000. One of the single most coveted items in the game, The Burning Flames Unusual Team Captain, is hat with an ambient orange flame effect on top of it. The hat has fluctuated in value, depending on scarcity, between \$20,000 and \$13,000, but it is currently valued at \$14,023 according to backpack.tf. There are currently 7 of those particular hats in circulation and it is not likely that anymore will be introduced anytime soon.

It can be interesting to attempt to correlate major gameplay updates with the strength of the economy because often trends do present themselves. For example, in August of 2012 the Mann vs. Machine update was released which introduced an entirely new game mode that also released a whole new suite of weapons and cosmetics into the game. It saw a huge jump from 62,00 players to its peak of roughly 115,000 players and a subsequent growth in the economy. This move on Valve's part was almost certainly strategic, as TF2 had been around for 5 years and needed a breath of fresh life. It was also the time period when schools around the US get out for the summer, suddenly giving teenagers hours of free time to spend playing video games. Valve also has a habit of releasing themed updates for the holiday season that flood the market with new, seasonal cosmetics. The annual Halloween update is called "Scream Fortress" and the annual Christmas update is called "Smisssmas." Each of these updates see a sudden addition of cosmetics items or specialized weapons to the game that momentarily hold a huge economic value then drop to some equilibrium price that is typically less than \$1.

In short, the TF2 economy behaves much like our own economy. Valve may have created the economy as a small aspect of the gameplay, but it has taken on a life of its own. It

has prompted the creation of “trade servers,” which serve the sole purpose of being forums for trades between players. Players certainly play the game exclusively to trade in the economy and collect rare items, foregoing the core fps gameplay for the thrill of trading in the economy. A certain user “Bosplosion,” who owns two Burning Flames Team Captains that were mentioned earlier, is an avid trader and is a collector of rare and valuable TF2 items. His in-game inventory, or backpack, is valued at approximately \$47,000.<sup>6</sup> It is players like Bosplosion that keep the economy thriving and growing by taking part in the community and investing thousands of their own dollars into the game. Though TF2’s player base is slowly declining as the game gets older and the trading community may not be as active as it once was, it still is alive and well. Additionally, with the opening of the Steam Marketplace in 2012, many other games suddenly have had the opportunity to create their own virtual economies and to take part in one large virtual economy operated by Valve. All of the new economic innovations by Valve on their marketplace and in their newer games can largely be attributed to techniques and systems that were tested within the TF2 community. For many TF2 is a cartoon-animated FPS, but for others it is the “hat simulator” where a player can go and take part in a virtual economy.

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<sup>6</sup> "Bosplosion's Inventory." *Backpack.tf*. N.p., n.d. Web. 30 May 2017.

Figure 1

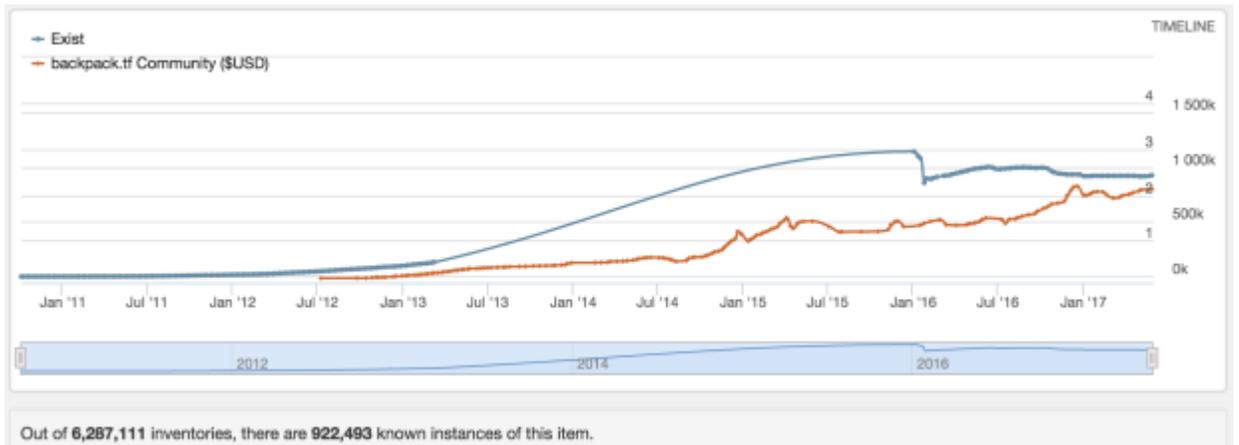


Figure 2

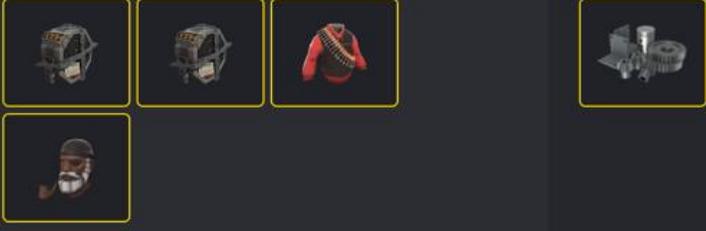
**DOUBLE DRAGON** wants to trade: for: 7 seconds ago

australlium bushman bristle: 17.55 ref  
biker: 1.66 ref  
iam also accepting item overpay  
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Figure 3

**Arthur Dayne** wants to trade:

for: 3 seconds ago



The trade offer interface is divided into two main sections. The left section, titled "Arthur Dayne wants to trade:", contains four item icons: two identical grey vehicle-like items, a red jacket with yellow accents, and a character head with a white beard. The right section, titled "for:", contains one item icon: a set of three metallic gears. All item icons are enclosed in yellow rectangular borders.

Selling only for pure, bp.tf price and no lower.

Add me or send an offer.