

A Study of The Equipments Market in The E-Sim Game

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1 Introduction

1.1 The E-Sim game

The E-Sim game is a boring browser game where you work everyday to make weapons and use them to fight for the country you born for no reason. The most important stat of a player is how many damage they can make, which in turn depends mostly on their strength and equipments. Since the first game server, *primera*, has already been running for more than 6 years, most players have similar strength about 3200+, which almost don't grow anymore, so equipments is the dominant parameter of a character.

1.2 Equipments

Each character can equip an equipment on each of his 8 slots. Equipments have 6 qualities: Q1 - Q6. Equipments last forever until being merged or split by it's owner. A player can get equipments by battle drops, buying from others and special events. Each equipment have 2 parameters, which are generated randomly according to it's type and quality.

Players can merge and split their equipments to make new ones. Merging takes 3 equipments of the same quality and makes a new equipments of higher quality. The 3 materials are destroyed from the game. The parameters of the new equipment is random, but it's slot is same as one of the materials. For example, you can merge 2 Q2 Helmets with a Q2 Vision, and you will get a Q3 Helmet or a Q3 Vision, whose parameters, however, are totally random and independent of the materials. The game charges a fee for merging equipments.

Splitting is basically the reverse of merging. Players can split an equipment of at least Q2 into 2 equipments of lower qualities. One of the new equipments is guaranteed to be on the same slot of the one split. Splitting charges no fee.

1.3 The Auction

The auction in game is where players trade their assets like companies, drugs and equipments. The currency used in the auction is glod, referred to as "g". The auction uses the Vickrey mechanism, aka. *sealed-bid second-price auction*. Players can put their equipments on the auction with an initial price. Others can bid for any price higher than the current. The current price is either the initial price or the second top offer. The actual price of the top offer, however, is hidden. When a sell ends, the top bidder will get the asset for the current price, and the remaining part will be returned to him. A typical auction last for 24 hours. The seller can cancel a sell as long as no one gave an offer yet.

The game charges 2% of the initial price when creating an auction and 1% of the final price when the auction ends.

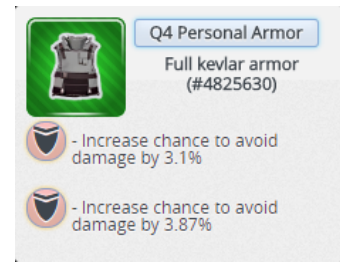


Figure 1: Example of an equipment

1.4 Some Definitions

Defective: There are three types of parameters of equipments, those increasing damage by absolute values, those increasing damage by percentages, and those related to economics. Since the game have been runing for over 6 years, most players have very high stats, thus increasing damage by percentage is significantly better than increasing by absolute value. As a result, no player wear equipments that increasing absolute stats seriously. I call the equipments that have at least one parameter of this type *defectives*.

Material: Still, as a result of the game having been running so long, players have a lot of money but limited slots. So no one will wear equipments of low qualities. The only usage of the low quality equipments is being the materials of merging. I call equipments whose average price is below 10g *materials*. Precisely, they are:

- Q1 Pants, Shoes, Lucky charms and Personal armors
- Q1 and Q2 Offhands
- Q1 - Q3 Helmets, Visions and Weapon upgrades

2 Equipment Appraisal

2.1 Regression of price \sim quality

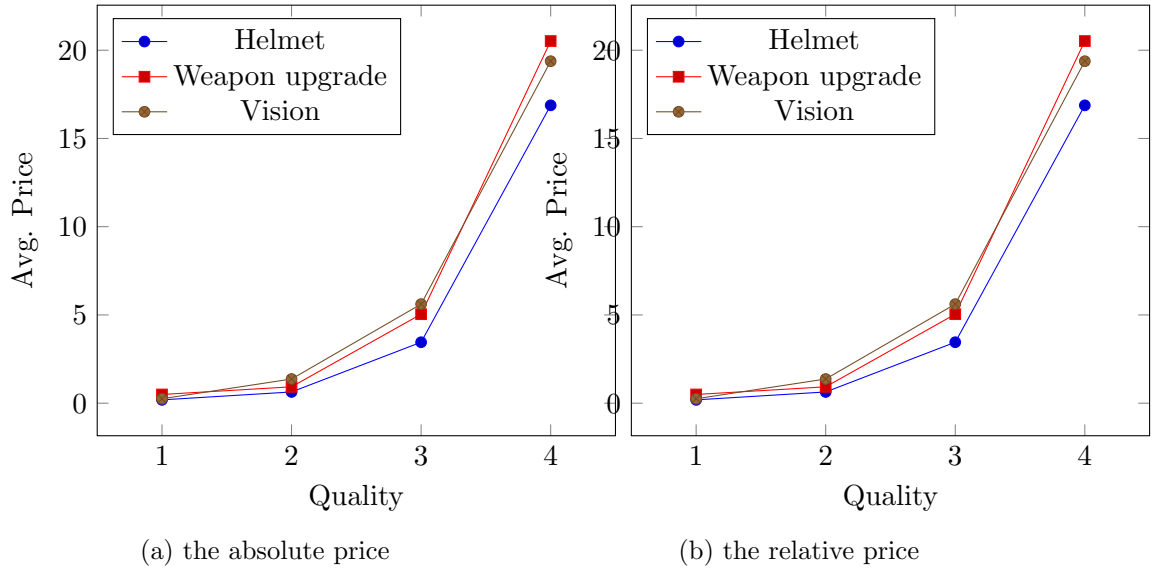


Figure 2: The average price of material equipments