Ping or Skill?

An empirical study about the influence of ping on M&B combat performance.

g0ldenroman

2017

[MnB Experts – Lab]

Abstract: Using a self-generated data set from the tropical paradise server, I demonstrate that ping is a significant predictor of K/D. Based on a log-linear regression with robust standard errors, I conclude that a player's ping is negatively correlated with combat performance measured by K/D. On average, increasing ping by one unit, corresponds to a decrease in K/D of approximately 0.4%.

A Qualitative Assessment

Before conducting a quantitative test, it pays off to analyse whether there is qualitative argument that speaks for the quantitative relationship I am looking for. In Mount Blade Napoleonic Wars (M&B), players of various skill levels regularly meet on open servers. One of these servers is the "tropical paradise". The server is based on a free-for-all principle and thus encourages players to fight each other. Obviously, some players perform better than others in terms of their Kill-Death-Ratio (K/D). But why is that? In fact, most players will tell you that combat performance depends on the following three factors:

- The weapon one uses.
- Experience (~hours played).
- Ping.

The first two points are quite clear. Different weapons have different advantages and disadvantages. Experience can tell you how to time your attacks, or how to properly aim. However, ping is a more controversial issue. In fact, ping measures the speed of one's connection to a host server. It follows that players with a high ping have a faster connection than players with a relatively low ping. In theory, players should be able to react faster to in-game attacks. Also, some players like Grozni (2016) argue that lower ping levels allow for specific melee attacks like "spam strikes". In contrast, JackieChan's (2013) melee guide specifies at least one attack called the "high-ping-block-kick" that might give you an advantage as a high-ping player. Nevertheless, in the same sentence he mentions that high ping players are generally at a disadvantage. So, is ping really that important when it comes to combat performance, or is the topic overemphasized? A quantitative test is needed.

The Data Set

In 2015, I collected a data set from the tropical paradise server. I looked at the K/Ds and pings of 96 players in four different sessions. Furthermore, I eliminated obvious non-fighters[1] with negative K/Ds or persons that had just entered the server. The statistical parameters for the

[1] For example musicians.

remaining observations are summarized in table 1. From the comparison of the means with the medians, we see that for both variables, the distribution is skewed to the right.

Variable	Minimum	Mean	Median	Maximum
Ping	15	55.4	45.5	181
K/D	0.3	1.3	1.1	4.4

Table 1. Data set analysis (N=96).

The Model

Since ping is by definition a strictly positive variable, it allows for the application of a log-linear model. This means that regression equation looks as follows[2] (Verbeek (2012)):

$$\log(K/D_i) = \beta_0 + \beta_1 * Ping_i + \varepsilon_i$$

Where ε_i is the error-term and β_0 an unspecified constant. From the property of the log-linear model it follows that the coefficient β_1 can be interpreted as the (average) percentage change in K/D given a one unit change in ping. By the application of an OLS regression with robust standard errors, one receives the following result:

	Estimate	Standard Error	t value	Significance
Intercept	0.373	0.107	3.500	***
Log(Ping)	-0.0040	0.002	-2.397	*
R^2 = 6.5%	*Significance Codes:*	*** 0.01%,*	** 1%,*	* 5%* N=96

Table 2. Regression Result.

One can see that the result is significant on a 5% level. However, the measured effect suggests that on average an increase in ping of one unit, results in a decrease in K/D by approximately

[2] The log(x) function is of base "e", which is equivalent to the natural logarithm.

0.4%. Nonetheless, the result must be treated with a lot of caution. First of all, the R^2 of 6.5% means that (logarithmic) ping can only explain 6.5% of the total variation in the K/D data. This is a stunningly low result. Secondly, it does also indicate that the model suffers severely from omitted variable bias. One might include proxies for player experience like hours played, or a dummy for regiment tag in order to compensate for this.

Practical Application

In order to demonstrate what the result means, consider the following situation: Suppose that player "A" has a ping of 50. This means the model would predict his K/D to be:

$$K/D_A = e^{0.373-0.0040*50} = 1.19$$

For the same player, a ping of 100 would mean a K/D of:

$$K/D_A^{new} = e^{0.373-0.0040*100} = 0.97$$

Keeping such a relationship in mind, regiments might consider to check for the average ping of their members and use this information for restructuring lines.

Conclusion

It has been demonstrated that ping seems to be related to performance in terms of K/D ratio. On average, increasing ping by one unit, corresponds to a decrease in K/D of approximately 0.4%. This result, must be treated cautiously since significance is limited to the 5% level, while the R^2 strongly indicates an omitted variable bias. The effect could vanish if other variables for performance, like e.g. experience, were included. Future research might also increase the size of the data set or extend the analysis to other servers with less "noise" due to non-fighters.

References

Grozni, 2016, Reply to "Re: What is "Spam" in Melee?", http://www.fsegames.eu/forum/index.php?topic=30984.msg1341502#msg1341502.

JackieChan, 2013, "JackieChan's Bayonet Melee Guide", http://www.fsegames.eu/forum/index.php?topic=8449.msg300274#msg300274.

Verbeek, Marno, 2012, *A Guide to Modern Econometrics* (Wiley, West Sussex).