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## Article

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## Factors affecting the Revenue of Auctioneers in One Thai Pay-to-bid Website

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### ABSTRACT

**Purpose:** The purpose of this study is to examine whether the six independent factors (i.e., the item retail price, the number of bidders, the bidding duration, the shipping cost, the bidder option and the fee return option) could significantly explain the revenue of the auctioneers in one pay-to-bid (PTB) website.

**Design/methodology/approach:** The data were collected using a python script that crawled into one PTB website in Thailand. They were gathered in two steps. First, the script collected the bidding-level data. Among them were the transaction number, the time at which the bid was placed, the bidding price, and the other identifications that allowed us to keep track of all bidding transactions. These details further helped to create the auction-level data on which the main analyses were performed.

**Findings:** Based on the regression analytic results, all independent variables except the shipping cost significantly explained the PTB auctioneers' revenue. The other statistics confirmed the quality of the findings. The retail price of the bid item and the bidding duration have the most significant explanatory effects on the revenue for their highest Beta values.

**Research limitations/implications:** The findings offer practical implications, one of which is based on the significance of the bidder and the fee return options. PTB auctioneers should offer non-winning bidders the compensation for the sunk cost of the paid bidding fees. One limitation in this study is that the retail value of the bid item is overpriced. Fellow researchers may therefore calibrate it with the similar information from other credible sources before performing the analysis.

**Originality/value:** The study's unique contribution is the empirical validation in which the bidder and the fee return options are significant factors in explaining the PTB owner's revenue. This is in addition to the success in extending theoretical insights into research inspecting factors affecting the revenue in the Thai context.

*Keywords: Auctioneers, Revenue, Affecting Factors, Pay-to-Bid Website*

## I. Introduction

Online auctions make a remarkable contribution to the global economic system (Kim, 2019). eBay, for instance, has been one of the world's top auction

websites and it has changed how an auction operates (Schlaegal, 2015). Basically, a player will post an item for bidding on an auction website with a time limit and an initial price. The bidder with the highest bidding offer within the time limit will win the auction and pay the final price to the auctioneer.

A pay-to-bid (PTB) auction; however, has a distinctive format. The PTB auctioneer is the same as the seller who posts an item for bidding on a website. Within the initial time limit, a bidder pays a non-refundable

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fee each time a bid is placed. Then, the price of the bid item will rise by a given amount and the time limit will be extended by the fixed increment. When the time period expires before another bid is placed, the last bidder will be the winner and responsible for the final bid. Hence, the revenue of the auctioneer (or the seller) is primarily from all bidding fees and the item's final price. The PTB auction is also known as a penny auction. Compared to a typical auction, the PTB transaction may be perceived as having a higher risk for the bidder's high expense. In most PTB auctions, however, the item's closing prices could be as low as 0.90 of its retail price (Wu, et al., 2018). This may contribute to the great success of PTB auctions (Platt, et al., 2010; Caldara, 2012; Byer, et al., 2018).

While much research on online auctions has had a focus on the English auction, a relatively small amount has been given to PTB transaction (Wu, et al., 2018). Among these, studies examining the PTB auctioneer's revenue or their influential factors are even rarer (Caldara, 2012; Odegaard & Anderson, 2014; Lam, 2011). Information asymmetries are the major cause of the high closing price in the Swoopo PTB website (Byers, et al., 2018).

Previous research has addressed variables influencing PTB seller's revenue, six of which are of interest (Byer, et al., 2018; Caldara, 2012; Haruvy & Leszczyc, 2016; Lam, 2011; Ma, et al., 2014). They are the item retail price, the number of bidders, the bidding duration, the shipping cost, the bidder option, and the fee return option. According to Hinnosaar (2016), most revenue of the PTB auctioneers comes from bidding fees with a relatively little contribution from the item final price. However, his statement still waits for empirical support. The number of bidders may also affect the auctioneer's revenue. Herrman, et al. (2013) remark that the number of bidders and their bidding behavior should impact the revenue in English and the PTB auctions. Similarly, Ma, et al. (2014) and Wu, et al. (2018) claim that the amount of money a PTB auctioneer could make depends upon the number of bidders and how they behave. It has also been known that the long duration of online auction

affects the final price (Muthitacharoen & Tams, 2012). This may thus affect the auctioneer's revenue (Wan, et al., 2001). In fact, Muthitacharoen and Tams (2012) confirmed the interaction effect between the duration and the number of bidders on the English online auction's final price which could further affects the player's revenue.

Considering the delivery of products offered through online auctions, it is fairly surprising that the shipping cost was barely examined in the PTB context. Based on Wu, et al. (2018)'s claim, the bidder reputation appears to have a larger impact on the bidding outcome than the shipping cost does. How the item was shipped to a winner was not a factor affecting the final price on the Chinese Taobao auction website.

The final two influential factors are unique in the PTB auction. The bidder option in the current study is whether the PTB auction welcomes all registered bidders or allows only those who are new or who had never been winners, whereas the fee return option is whether the auction announces at the beginning that all non-winners in the auction will receive all previously-paid bidding fees back in the form of a voucher for subsequent auctions. Both are dichotomous and recognized in previous studies as important in explaining the auction outcomes.

The bidder option is recognized in Wang and Xu (2016) as the win limit campaign through which the winner will not be allowed to participate in subsequent biddings for 30 days. Yet, they did not verify if the bidder option would contribute to the PTB auctioneer's revenue. According to Caldara (2012), a PTB auction will be profitable as long as the auctioneer is able to attract new or inexperienced bidders. This is perhaps the reason behind PTB websites' bidder option campaign (Odegaard & Anderson, 2014).

The fee return option is similar to the Buy-It-Now (BIN) option commonly adopted in several PTB websites (Griffins & Carren, 2015; Hinnosaar, 2016; Byers, et al., 2018). This option primarily helps non-winning bidders not to lose their paid bidding fees. In other words, they will get their sunk cost of paid bidding fees back in various forms (Lam, 2011). According to Ma, et al. (2014), knowing that their

bidding fees will be returned if they do not win an auction may lead to a change in their bidding behavior and consequently affect the auctioneer's revenue. Labelled in Griffins and Carren (2015) as earned discount, the fee return option has not been empirically tested to see if it could affect the PTB auctioneer's revenue.

In sum, our review on previous studies addressing an online auction has identified two research gaps. First, while there have been numerous projects on online auctions (Muthitacharoen, 2009; Delnoij, 2016), only a few have focused on PTB auctions (Hinnosaar, 2016; Zhang, et al., 2018). Second, among the few studies investigating the PTB auction, research examining the auctioneer (or the PTB seller)'s revenue is rare. Further, the study addressing the impacts of all six independent variables on the revenue in the Thai context is virtually non-existent. Many of them attempted to shed light on bidders' behavior. Hence, the current research hopes to fill this void by empirically testing the extent to which the PTB auctioneer's revenue is explained by six influential factors including the item retail price, the number of bidders, the bidding duration, the shipping cost, the bidder option and the fee return option.

## II. Literature Reviews

### A. Pay-To-Bid (PTB) Auction

Online auctions have contributed remarkably to the growth of the global economy. The Internet has also offered flexibility and synchronicity to it (Wan & Teo, 2001). In general, online auctioneers may own a web-based platform that connects players to bid for products placed by others. When the bidding duration is over, the final bidder will win and pay for the final price whereas the other bidders lose their bids (Schlaegal, 2015). This bidding process is known as the English auction (Delnoij, 2016). eBay is perhaps an example of such a bidding service. The amount spent in online auctions has been on

the rise since 2015 and it was US\$590 million in 2019 (Statista, 2020).

Recently, a new format of online auction has been implemented and gained large acceptance (Byers, et al., 2018; Platt, et al., 2010). It is the pay-to-bid (PTB) auction. Its price starts at zero with a certain time duration (e.g. 15 minutes or one day). The PTB bidders must pay a non-refundable fee each time they place bids. Each bid will result in the fixed increment of the item price and add a small window of time (e.g., five minutes or six hours) to the bidding duration. The price will have a constant increment and the auction will not end as long as there are still willing bidders. Should the duration expire, the final bidder wins the auction and has to pay the closing price. It further implies that (1) losing bidders will earn nothing from the auction and they are still responsible for all bidding fees and (2) the auctioneers are the same as the website owner and sometimes perceived as sellers since they are the only ones who offer products for bidding (Li, et al., 2019; Wu, et al., 2018). Very often do the sellers list the item retail price to assist a bidder in making a decision before the time duration expires.

Even the bidding process appears risky because all bidders must pay bidding fees and only one bidder will win, the PTB auctions has gained large acceptance. According to Wu, et al. (2018, p. 1), the attraction of the PTB auction may result from the fact that the winner may save up to 90% of the product retail price. In addition, there is evidence that the product for PTB bidding may be a large volume of cash and the auctioneers (or the PTB website owners) are still earning a large revenue. It is not a surprise, nonetheless, if the PTB auction is sometimes perceived as gambling (Hinnosaar, 2016). Using a controlled experiment, Caldara (2012) confirmed that the PTB auction may yield substantial revenues to the website owners, only if it continuously attracted new bidders with little bidding experience. With risk-related factors, Platt, et al. (2010, 2013) used computational modelling to discover that the high retail price would result in a large revenue.

In a PTB context, previous research has attempted

to comprehend the auction process. Evidently, the PTB auction is different from a traditional online auction in three aspects (Delnoij, 2016). First, PTB bidders are mostly consumers trying to bid for various items including hi-tech products, collectibles, or even cash. Given the cash offer, a PTB auction can be seen as gambling. It is nonetheless not a typical shopping format. Second, PTB websites are inexpensive to set up. With the internet features, the PTB auction can attract bidders without temporal or geographical constraints. The website is often perceived as another form of online shopping. Finally, the PTB auctions are competing with other vendors for the offer of the same items. Unlike eBay, people think of it as a platform to get a unique item difficult to obtain from other channels. As such, it implies that PTB auctions are not monopolists; they eventually operate in competitive markets.

Furthermore, PTB auctions offers an exclusive context for empirical research for two reasons (Hinnosaar, 2016). First, it has all qualities as defined by the econometrics' systematic Markov-perfect equilibria. Yet, it is largely trendy in actual markets. For its unique characteristics, a policy-maker asks that an PTB auction is regulated. Second, and perhaps more importantly, a revenue in a PTB auction cannot be explained by the rational behavior of bidders. It thus implies a serious need to research PTB auctioneers' revenue and its influential factors.

## B. PTB Auctioneer's Revenue and its Influential Factors

A PTB auctioneer's revenue is a function of bidding fees from all bidders, the final bid price, and the item's retail price. However, researchers have remarked that it depends mostly on the bidding fees, as compared to the other two sources (Haruvy & Leszczyc, 2010; Byers, et al., 2018). In other words, the auctioneers' profit is largely from the paid bidding fees. The item retail value and the closing price have their role only to attract bidders to heavily engage in an auction. This conceptual remark has had empirical validation

from few experiments. According to Speegle, et al.'s (2015) economic experiment, a doubling of the bidding fees resulted in a tripling of the revenue. Kim, et al. (2014) also proved that (1) an ascending increment of bidding fees led to higher revenue than did a descending increment, and (2) a small increment increased the revenue more significantly than did a large amount. Although few studies in the past have addressed the revenue, they appear to view it from the lens of an economist and may not holistically capture the broad picture. Nonetheless, it exhibits the significance to examine the PTB auctioneer's revenue.

Previous research has also marked crucial factors influencing revenue. Such factors include the item retail price, the number of bidders, the bidding duration, the shipping cost, the bidder option, and the fee return option. Since PTB auctioneers are also a seller and solely responsible for providing an item for bidding, they may want to offer an inexpensive one in order to attract many bidders and ultimately raise the final price. This speculation is not accurate because eBay bidders rely on the initial retail price of the bid item to assess its quality (Tangmanee & Purimansevi, 2008). Using actual data from two PTB websites, Speegle, et al. (2015) were able to prove that the item retail price could raise the final price thereby adjusting the revenue of the auctioneers. Given various risk-taking behavior of bidders, the revenue would depend not only on the bidding fee or the final price but also on the bidder's strategies (Byers, et al., 2018). According to Lam's experiment (2011), the PTB auctioneers' revenue is substantially higher than the item retail price. This could emphasize the sizeable effect of the item retail price on the revenue.

Also, research in the past has addressed the impact of the number of bidders on the auction outcome (Wu, et al., 2018; Muthitacharoen & Tams, 2012; Byers, et al., 2018). According to Haruvy and Leszczyc's remark (2010), the larger the number of bidders, the higher the final price. Because the final price in eBay can be seen as the seller's revenue, this might be one of the first few remarks on the significance of the number of bidders. Treating the final price in eBay as the player's revenue, Muthitacharoen and

Tams (2012) confirm the interaction effect of the number of bidders and the bidding duration on the final price. Among others, Byers, et al (2018) had called for research attention on the number of bidders in the PTB context. Empirically, Caldara's experiment (2012) confirms the effect of the number of bidders on the television auction on one PTB website. It is also evident in Caldara (2012) that the auctioneer's revenue comes from overbidding behavior. The number of bidders becomes substantial when researchers include the risk factor to explain the behavior in a PTB auction. Bidders with a different risk concern (i.e. risk adverse) will have different bidding styles, resulting in a broad range of auctioneer's revenue (Wu, et al., 2018; Ma, et al., 2014). Kim, et al. (2014, p. 370) also emphasize the significance of the number of bidders in explaining the revenue. Although few PTB websites allow automatic software (or commonly known as software bots) to bid in lieu of bidders, they still want to do it manually and the number of them may still affect the revenue (Xu, et al., 2019, p. 618).

In a typical auction, a long bidding duration may imply a high valuable outcome. However, it may not be generally true, especially in a PTB auction. Haruvy and Leszczyc (2010) conducted an experiment to confirm the significant effect of the duration on eBay, but not on a local auction website. It thus suggests a need for empirical research on a national auction website. In addition, Muthitacharoen and Tams (2012) collected data on eBay and suggested that the duration affects the strategies used by bidders which in turn affect the seller's revenue. However, Wan, et al. (2001) discovered that the bidding duration on eBay was not significant in explaining the final price, which can be seen as an auctioneer's revenue.

In the PTB context, Caldara (2012) contends that a successful auction depends on the bidder's experience. As such, a long duration may facilitate the bidder's experience which further results in revenue change. In other words, should bidders withdraw from bidding, the auction is unlikely to succeed and the auctioneer may not earn as much revenue as they should. According to Byers, et al. (2018), the paid bidding fees take a relatively substantial proportion of the revenue.

Hence, a long bidding duration implies a large sum of the bidding fees. This may be the rationale behind the conceptual remark that the duration should make a significant contribution to the revenue.

In addition, the shipping cost may significantly explain auctioneers' revenue in a PTB auction. Since PTB auctioneers must deliver the bid item to the winner, the shipping cost should explain the variation in revenue (Lam, 2011). However, Muthitacharoen and Perry (2009) reported on the negative impact of the shipping cost on the final price (i.e., this can be seen as the seller's revenue) on eBay. Beside these two projects (Lam, 2011; Muthitacharoen & Perry, 2009), there is virtually no empirical work addressing the explanatory effect of the shipping cost on the PTB auctioneer's revenue.

The fair amount of empirical work on PTB auctions suggests that the website may sustain its success only if it attracts new or inexperienced bidders (Caldara, 2012; Platt, et al., 2010, 2013; Odegaard & Anderson, 2014). According to Lam (2011), new bidders will add to the success of the PTB auction for their lack of bidding experience. Hence, many PTB websites offer various promotions to attract such bidders. Two of them are a bidder option and a fee return option. The bidder option is a condition under which the auction welcomes only newly registered bidders or those who have previously transacted with the website but never won any auction. Players would be aware of this option from the seller's announcement at the beginning of an auction. Without the statement, all bidders are welcome. The bidder option may appear under different labels such as win limits in Wang and Xu (2016) in which winners are banned from participating in subsequent auctions for 30 days. In addition, Wang and Xu (2016, p. 56) claim that the bidder option (or win limits in their own term) should affect the revenue of the PTB auctioneers. To alleviate the issue of aggressive bidding, the bidder option was implemented in Ma, et al. (2014)'s experiment but the result was inconclusive. According to Caldara (2012), bidders who leave the auction during the bidding process may affect the revenue of the PTB website. As such, auctioneers must implement certain strategies

that attract bidders, especially those with little or no experience in PTB auctions (Caldara, 2012, p. 6).

The fee return option is a condition under which non-winning bidders will receive back their previously-paid bidding fees at the end of the auction. Similar to the bidder option, the announcement of the fee return option will be posted at the beginning. Without the statement, the regular protocol of bidding fees will be in operation. The fee return option offers certain forms of support so bidders are willing to take part in auctions. It resembled the Buy-It-Now (BIN) program (Wang & Xu, 2015; Byers, et al., 2018), the exit option (Lam, 2011) or the Earned Discount (Griffins & Carran, 2015).

The bidding fees for non-winning bidders in a PTB auction are a sunk cost and that are very discouraging. As a result, any offer to benefit from the cost would help those non-winners to continue having transactions with the PTB auctioneers (Hinnosaar, 2016; Caldara, 2012). In an attempt to prove if a PTB auction might be overpricing, Wang and Xu (2016) remark that the fee return option (or win limits in their term) plays a significant role in an auctioneer's revenue. At Swoopo.com, the fee return option was differently executed. According to Byers, et al. (2018), bidders might withdraw in the middle of bidding by declaring their selection of the fee return option. Their selection will signify that the bidders agree to buy a currently bid item at the moment and to use all bidding fees they had paid as the item's down payment. The fee return option may consequently encourage individuals to participate in a PTB auction since the risk of losing all bidding fees is fairly managed. Because it allows bidders to offset the expense to purchase the item at its retail price with the sunk cost of previously paid bidding fees, the fee return option may enhance the revenue of the PTB auctioneers as compared to when the option is not offered (Lam, 2011). However, the statement still awaits empirical verification.

### C. Research Possibilities to Examining PTB Auctioneers' Revenue

Our review of previous work on online auctions and major factors influencing its outcome has pointed to two research gaps (Hyun, 2020). First, much of the previous work has extensively advanced knowledge on general auctions (Klemperer, 2004; Delnoij, 2016). It is known that auctions have contributed to the economy on multiple levels. It offers fair trade for highly valuable items or services (Klemperer, 2004). However, a relatively little amount of research has addressed PTB auctions. The advances in network and computer technology are behind the recent and successful development of the PTB services (Delnoij, 2016; Zhang, et al., 2018). Second, much research on PTB auctions has shed light on bidder's behavior. Hinnosaar's (2016) review has provided a foundation of how it works and why researchers should cover PTB auctions. Brenner, Reiner, Nalter and Skiera (2019) look at PTB auctions from various perspectives, most of which have explained the bidder's behavior. While the PTB bidder's behavior can be useful for the auctioneers (or the sellers), we barely observe an empirical study testing influential factors of their revenue. Plenty of research attempts have marked the significance of factors potentially affecting PTB auctioneer's revenue. The factors include the item retail price, the number of bidders, the bidding duration, the shipping cost, the bidder option and the fee return option. Nevertheless, almost no single study has attempted to test the extent to which the six variables affect the PTB auctioneer's revenue. We thus expect to fill this void.

## III. Methods

In this section, we present three methodological issues. They include a research approach, data collection, and data analysis.

## A. Research Approach

Our intent was to verify if the six variables including the item retail price, the number of bidders, the bidding duration, the shipping cost, the bidder option, and the fee return option have a significant explanatory impact on the revenue of the auctioneer on a PTB website. Our research approach is thus quantitative and a unit of analysis must be one successful PTB auction. As a result, the questionnaire asking bidders to recall their experience on the PTB website (i.e., asking them to recall what the item retail price is) may not yield reliable or valid data.

To gather all data in the auction level necessary to answer the study's objectives, we developed a python script that crawled into a PTB website. We tested the script several times on a number of websites to ensure its proper functionalities, after which we considered the Bidryder as our research context from which actual data were collected. The reason behind the selection is that Bidryder has been in the PTB business in Thailand for longer than two years, ensuring a sufficiently large set of data. In the website, the auctioneers (or the website owners) post the product at the starting price of zero Thai baht together with the initial bidding duration of ten seconds. Once placing a bid, the bidder must pay a non-refundable fee of 0.25 baht and (1) the price will be up for the fixed amount of three baht; and (2) the duration will extend for the other ten seconds. The auction ends when no bidder places a bid within the 10-second

duration. The reader should note that the amount of 32 baht is approximately one US dollar during the period of data collection.

## B. Data Collection

There are two steps in preparing a dataset to answer the study's research questions. First, our bidding-level data were made through the python script. To prepare the data in this level, our script extracted the entry (or the post) in Bidryder which invites visitors to bid. In other words, the script crawls into the post announcing the auction. In one bid item, we were able to record the data at the bidding level. Looking similar to Table 1, the data include the transaction number, the time at which the bid was placed, the bid price, the bidder identification together with the product retail price, the shipping cost, and whether the bidder and the fee return options were offered. The bidder identification allows us to keep track of all bidding transactions by the particular bidder. We were thus able to count the number of unique bidders, calculate the bidding duration, and record the item retail price together with the other data.

Based on Table 1, the bidding duration of the item number 7649 will be 8:10 minutes and the number of bidders will be three. Subsequently, we were able to have the auction-level dataset that looks like Table 2. This is the dataset we used for further analyses. The revenue in Table 2 is actually how much the

**Table 1.** Example of Bidding-level Dataset for One Item

Item Number	Time stamped	Bid Price (Baht)	Bidder Identification	Retail Price (Baht)	Shipping Cost (Baht)	Bidder Option*	Fee Return Option**
7649	03-09-2019, 4:00 PM	0.25	S0017	2,900	150	Off	On
7649	03-09-2019, 4:03 PM	0.50	J1597	2,900	150	Off	On
7649	03-09-2019, 4:11 PM	0.75	S0017	2,900	150	Off	On
7649	03-09-2019, 4:15 PM	1.00	W1501	2,900	150	Off	On
7649	03-09-2019, 4:24 PM	1.25	J1597	2,900	150	Off	On
:	:	:	:	:	:	:	:
7649	03-09-2019, 12:10 PM	491.75	S0017	2,900	150	Off	On

\* Off means all bidders are welcome and On means only non-winning or new bidders are eligible for the auction.

\*\* Off means no bidding fees were returned to bidders and On means bidding fees were returned to only non-winning bidders.

**Table 2.** Example of Auction-level Dataset

Auction No.	Item No.	Retail Price (Baht)	Shipping Cost (Baht)	No. of Bidders	Bidding Duration (Minutes)	Final Price (Baht)	Bidder Option	Fee Return Option	Revenue (Baht)
001	7649	2,900	150	3	490	491.75	Off	Off	5,416.75
002	8205	9,400	310	5	938	210.50	Off	On	3,195.25
:	:	:	:	:	:	:	:	:	:
522	8916	7,100	250	7	705	560.25	Off	On	300.75

Bidryder earned and it was calculated based on the final price, all bidding fees (if the fee return option is off) and the item retail price. The reader should note that it is possible that the final price in a PTB auction is often less than its retail price. Within the four-month data collection (September to December, 2019), our dataset has 522 bid items.

Similar to other electronic commerce websites, the security in a PTB website has been a remarkable concern. This statement, however, may be valid only if one wants to have an actual transaction on the website. What our python script has done was crawling inside the Bidryder.com, extracting and recording the values of all data we need to answer the study's objectives. The data are already visually present on the website for public viewing. Hence, security should not be a concern in this present research.

In addition, a few number of online auction websites may adopt an "autobid" software agent to operate the auction process (Caldara, 2012; Byers, et al., 2018). Our observation on this website at that time of the data collection reveals no sign of such offers so we assume the website has not yet offered the autobid agent. Whether or not they have used the autobid agent; nonetheless, may not concern us. Our focus is on the detail of bidding transactions available on the website. Such detail may be from the agent processing or from their staff. Either way, it is acceptable for our research attempt. It is the data on which visitors rely for their bidding transaction that draws our current research interest.

### C. Data Analysis

We reported descriptive statistics for all major variables. We then used the multiple linear regression and the correlational analyses to examine the extent to which the bidding duration, the number of bidders, the item retail price, the shipping cost, the bidder option and the fee return option would affect the revenue of the PTB auctioneers in Thailand. In other words, the regression equation has the revenue on the left and the linear combination of the other six variables on the right. The linearity is chosen since the current study is perhaps the first attempt to research the PTB auctioneers' revenue with all of the six factors. We have no prior evidence of the non-linearity.

## IV. Results

Four of the six independent variables in the current study are quantitative while the others are dichotomous. The descriptive statistics of all quantitative variables are in Table 3 and the frequency distribution of the remaining two are in Table 4. Based on Table 3, the average revenue for the PTB auctioneer is 17,141.68 baht while the average retail price of the bid items is 116,644.66 baht. Such a drastic difference between the revenue and the retail price has been brought to our attention. The possible speculation could be that Bidryder experienced financial hardship during the time of our data collection or they deliberately set up the retail price to be extremely high. Further discussion will be in the conclusion session.

In addition, our observation of the final price shows

its average of 2,220.51 baht, 98% of the average retail price. Such a massive discount may explain the attraction of PTB auctions. Besides, the average number of bidders is 3.14. The auctions last in 1,766.16 minutes (or about 1.23 days) on average and the shipping cost is about 132.49 baht. The skewness and the kurtosis statistics in Table 3 validate that all but the shipping cost are not normally distributed. Hence, we used the power function to transform the duration, the number of bidders, and the revenue; and the logarithm function to transform the retail price, after which their distributions appear normal and parametric analyses could be used.

Given the binary nature of the bidder and the fee return options, we reported their distributions in Table 4. During our data collection, Bidryder announced the bidder option of about 36% of the 552 collected

auctions and the fee return option of about half (49%) of them. This may imply Bidryder during our data collection was more focused on the latter than the former.

Most of Pearson's  $r$  correlation coefficients in Table 5 are statistically significant. This supports the idea to examine the extent to which the PTB auctioneer's revenue could be explained by the item retail price, the number of bidders, the duration, the shipping cost, the bidder option or the fee return option. The outcome of the regression analysis in Table 6 yields three critical findings. First, the  $F$  statistics of 242.24 with the  $p$ -value of .000 indicate at least one of the independent variables can explain the significant portion of the revenue. Second, the statistics in Table 6 confirm the significant impacts of all but the shipping cost on the revenue. Finally, the adjusted

**Table 3.** Descriptive Statistics for Quantitative Variables (n=522)

Variables	Average	Standard deviation	Skewness	Kurtosis
Revenue (baht)	17,141.68	33,432.03	8.563	95.521
Item retail price (baht)	116,644.66	121,941.93	2.317	7.039
The number of bidders	3.14	1.427	2.944	18.519
Duration (minutes)	1,766.16	2,588.808	5.261	44.694
Shipping cost (baht)	132.49	70.419	-0.757	-0.622

**Table 4.** Frequency Distribution of Two Dichotomous Variables (n=522)

Variables	Value	Meaning	Frequency (%)	Revenue (baht)
Bidder option	0	All bidders are eligible for bidding	333 (64)	18,733.62
	1	Only non-winning or new bidders are eligible	189 (36)	14,336.82
Fee return option	0	No return of the bidding fees	266 (51)	13,402.32
	1	Bidding fees are returned to only non-winners	256 (49)	21,026.47

**Table 5.** Correlation Matrix

Variables	Retail price	The number of bidders	Duration	Shipping cost	Bidder option	Fee return option
Revenue	0.565*	0.511*	0.757*	0.202*	-0.102*	0.351*
Retail price		0.180*	0.490*	0.362*	0.370*	0.705*
Number of bidders			0.642*	-0.074 n.s.	-0.113*	0.230*
Duration				0.055 n.s.	-0.035 n.s.	0.455*
Shipping cost					-0.033 n.s.	0.132*
Bidder option						0.170*

\* significant at a 0.05 level, n.s.: non-significant

**Table 6.** Regression Analysis Outcome

Variables	Regression coefficients	Beta	t-statistics	p-value	Tolerance	VIF
Constant	-10.11		-6.33	.000		
Retail price	0.88	0.57	14.48	.000	.378	2.65
Number of bidders	4.43	0.11	3.32	.001	.562	1.78
Duration	0.29	0.53	14.25	.000	.424	2.36
Shipping cost	0.00	0.03	0.91	.361	.795	1.26
Bidder option	-0.91	-0.23	-8.68	.000	.793	1.26
Fee return option	-1.02	-0.27	-7.88	.000	.482	2.08

Adjusted  $R^2$  is 0.698 with the Durbin-Watson of 1.640.

$R^2$  of 0.698 validated the acceptable quality of the effects of the retail price, the number of bidders, the duration, the bidder option and the fee return option on the revenue. In addition, the tolerance and the VIF statistics in Table 6 suggest a bearable issue of multicollinearity. Also, the Durbin-Watson statistics of 1.640 imply no serious concern on autocorrelation in the residuals. All details ascertain the acceptable quality of the regression analysis outcomes.

Among the five significant factors explaining the revenue of a PTB auctioneer, their Beta statistics in Table 6 offer three additional findings. First, the item retail price and the bidding duration relatively have the strongest and most comparable impact on the revenue for their Beta values of 0.57 and 0.53, respectively. Second, the number of bidders has relatively the lowest and least significant impact on the revenue. Finally, the effects of the bidder and the fee return options on the revenue appear to be negative. Hence, we further used the independent t-test to compare the revenue across values of the bidder option and those of the fee return option. Regarding the bidder option, the t-statistics of 2.328 with the p-value of .020 confirmed a significant difference of revenue between two values of the bidder option. Moreover, the data in Table 4 seems to show that the revenue from the auctions where only new bidders or those who had never won the auctions were able to take part in the auctions was less than that from the auctions where all bidders were welcome. Similarly, the t-statistics of -8.603 with the p-value of .000 for the fee return option case

verifies that the revenue from the auctions where the bidding fees previously paid during the auction were returned to the non-winners was higher than that from the auctions where no biddings fees were returned. Further discussion will be in the conclusion.

## V. Discussion

In order to test the extent to which the retail price, the number of bidders, the duration, the shipping cost, the bidder option, and the fee return option affect the revenue of auctioneers in one Thai PTB website, we used the python script to gather all data in the bidding level from posts in Bidryder.com. After rolling up the data into the auction level, we had 522 records of successful auctions for further analyzes.

Approximately, the auctioneers post on Bidryder.com the items that have an average retail price of 116,644.66 baht (see Table 3). Yet, their revenue of 17,141.68 baht is about seven times lower than the retail price. At first, we assumed Bidryder has experienced financial hardship. However, other details on the website lead us to believe that their business is much successful. Our observation has witnessed numerous item offers, a massive number of players or a dynamic vibrant movement of bidding activities, confirming their excellent financial status. As such, we made a second speculation in which Bidryder intends to list the retail price of their item offers extremely high. The pricy offer of the retail price exhibits the exclusive value

of the listed item. It should trigger many players to start bidding promptly. Our guess on the expensive offer to attract bidders is in line with (1) Platt, et al. (2013) who remarked about the overprice of the items on a PTB website and (2) Tangmanee and Purimansevi (2008) who validated that bidders on eBay used the retail price to signify the high quality of the bid items.

On average in one auction, Bidryder has roughly 3.14 bidders. The auction lasts approximately 1,766.16 minutes (or about 1.23 days) with an average shipping cost of 132.49 baht. While 64% of 522 auctions in the current study welcomed all bidders, the rest (36%) accept only new bidders or those who had not been winners. In addition, about half (49%) of the auctions we observed had the statement on the post sharing with all players that the paid bidding fees in this particular auctions will be returned to non-winners whereas the other half had no such statement implying no bidding fees would be returned. Given no report on PTB auctions' operations, we are unable to discuss these descriptive statistics or our context (i.e., Bidryder.com). We would however challenge other researchers to start investigation in similar contexts.

Our analysis proved that the item retail price, the number of bidders, the bidding duration, and the two options of the bidders and the fee return were able to significantly explain 69.8% of the auctioneer's revenue. Yet, the shipping cost was not significant. In addition, other statistics confirm the acceptable quality of the regression outcomes. Three items of discussion emerged from the findings.

First, the revenue of PTB auctioneers positively depends on the retail price, the number of bidders, and the bidding duration. Since the retail price of the bid item is part of the cost on the PTB auctioneer side, it should have had a negative impact on their revenue. Yet, our findings proved otherwise. Nonetheless, they are still valid for the online auction context (Klemperer, 2004). The high retail price is a clue to the item's great quality (Platt, et al., 2010). On eBay, the high starting price significantly resulted in a large final price (Tangmanee & Purimansevi, 2008). Our findings have therefore extended the evidence

in which online bidders rely on the retail price of the listed items as a signifier of its quality in the PTB context.

The positive impacts of the number of bidders and the bidding duration on the revenue are consistent with the findings in previous studies. Such findings are therefore additional empirical validation of conceptual remarks (Kim, et al., 2014, p. 370). Bidders may differently gain bidding experience for an information asymmetry reason (Byers, et al., 2018). How many of them and how long they had engaged in a PTB auction would influence the auction outcome (Caldara, 2012). On eBay, Muthitacharoen and Tams (2012) confirmed the interaction between these two factors on the final price which is often seen as the eBay auctioneer's revenue.

Furthermore, our unique contribution is that we are able to prove empirically in the Thai context that the bidder and the fee return options are significant influential factors on the revenue. Since the two factors are binary, the interpretation and the discussion must be made with caution. Based on the findings in Tables 4 and 6, the revenue across values of the bidder and the fee return options are significantly different. Regarding the bidder option, the revenue in the auctions in which all bidders are eligible to participate are higher than that in the auctions in which only the new bidders or those who had never won the auctions to take part. This is a surprise. The offer of this bidder choice in a PTB auction is driven by the recommendations in which the success in PTB auctions depends on how well it could attract the inexperienced or new bidders (Caldara, 2012; Platt, et al., 2013). Hence, the revenue in the auctions for only the new or the non-winning bidders should have been larger than that in typical auctions allowing both experienced and inexperienced bidders. Yet, our finding fails to prove it. As such, we speculate that the PTB website (i.e., Bidryder.com) we chose as our research context may not be in the business long enough or the participating bidders may not have yet gained the experience as frequently referred to in previous work (Caldara, 2012). In other words, Thai PTB bidders may have had relatively distinctive

experience as compared to those elsewhere. Nonetheless, our findings offer support to Lam's (2011) statement in which PTB auctioneer's revenue can be affected by bidder's experience. It should further challenge other researchers to carefully examine what is the PTB bidder's experience that could impact the revenue or whether the contextual variables interact with their experience such that it could enhance (or hinder) the revenue.

Regarding the fee return option, the revenue in the PTB auctions where bidding fees were returned to only non-winning bidders was higher than that in the typical auctions where bidding fees were kept by the auctioneer (i.e. the website owner) (see Tables 4 and 6 for detail). The fee return option is an alternative for bidders to leave the auction without a feeling of losing all bidding fees they already paid. Similar to the But-It-Now choice in Byers, et al. (2018) or exit option in Lam (2011), the fee return option offers non-winners the better solution to manage their sunk cost of paid bidding fees. Hence, our finding is an empirical validation that the fee return is effective in our PTB website because of the higher revenue in the auctions with the option than in those without it.

Second, the Beta statistics in Table 6 suggest that (1) the retail price and the duration have a comparable and strongest explanatory effect on the auctioneer's revenue, (2) the bidder and the fee return options have the second to the strongest effect and (3) that of the number of bidders is the smallest. If executives at a PTB website must prioritize on which influential factors they should focus, the item retail price and the bidding duration should be on the top of the list. Changes of these two variables will affect the revenue at a similar extent in the same direction.

Finally, although we discovered the trivial effect of the shipping cost on the auctioneer's revenue, our finding in Table 5 still confirms the slim yet significant correlation between these two variables. Despite no empirical findings from previous research plus our insignificant link, we still encourage other researchers to validate the relationship or the dependency between the shipping cost and the revenue in different contexts.

## VI. Conclusions and Implications

Using actual bidding transactions at one PTB website in Thailand, we were able to empirically validate the five variables that could significantly explain the PTB auctioneer's revenue. All statistics confirm the acceptable quality of our findings.

The findings offer both theoretical and practical contributions. They have extended theoretical insight into research addressing influential factors on a PTB auctioneer's revenue. Given only the Thai language on the website, all players must understand Thai. Hence, our unique theoretical contribution is that we may be one of the pioneers who have examined PTB issues in the Thai context which could in turn extend the body of empirical work on this research stream. In addition, our findings may shed new light on the online-bidding theory, especially in the new area of PTB. Practically, our findings could suggest three recommendations for PTB website owners in order to enhance their revenue. First, the owners must be attentive to the item retail price and the bidding duration for their significant and strongest impact of the revenue. Given their positive correlation, the PTB auctioneers should offer the items with an expensive retail price and put effort to prolong the bidding duration. Second, although the bidder and the fee return options are significant, the later appears to be more efficient than the former. We thus suggest that PTB auctioneers should offer non-winning bidders the fee return choice (or any promotion that help them on the sunk cost of the paid bidding fees). Our suggestion is based on the finding in which the auctions with the fee return option had a larger sum of revenue than the auctions without it. Finally, the PTB website owners should be attentive to the significant effect of the bidder option on their revenue. We offer this suggestion because the effect is unpredictable. Despite its significance, the effect was not in the direction we had anticipated. More empirical evidence regarding this option is needed.

Similar to other research, our study does have a limitation. According to Platt, et al. (2013), the retail

price of products posted on the PTB websites is often overpriced. Our finding has confirmed the listed retail price being seven times higher than the auctioneer's revenue. We were aware of this limitation after the data analysis. One possible preventive attempt is for researchers to calibrate the retail price with that of the same item at a given online retail store including Amazon.com prior to data analysis.

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