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# DATA-TYPE ADJUSTMENT FOR RESIDENTIAL PROPERTY VALUATION IN JAKARTA: AN EXPLORATORY STUDY

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## Abstract

Valuers model market behaviour to estimate market value in property valuation. This requires a sufficient number of arm's length transaction price as comparables. In the Indonesian context, this proves to be difficult given the lack of market transparency. Thus, valuers often rely on asking price in their analysis. This may affect the accuracy of their value estimate as asking price does not represent property market. Asking price needs to be adjusted to arm's-length transaction better. This research seeks to study the magnitude of such adjustment. For this purpose, asking price and their corresponding transaction price of 331 properties in Jakarta were analysed. A questionnaire was also administered to capture the adjustment commonly used by valuation practitioners. The data shows that on average, asking price is 6% higher than its transaction price with no significant differences across areas in Jakarta. This is far below the 14% average adjustment used by valuers in their practice.

***Keywords:*** asking price, valuation, adjustment, residential property

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## BACKGROUND

Valuation is a product of human judgment (Gallimore, 1996). Value is an economic construct that refers to the price that is what is most likely agreed by buyers and sellers. Value, thus, is what a buyer should pay in a transaction. Value becomes transaction price when both buyer and seller are in agreement. Therefore, value is not a fact, but rather an opinion that is likely to be paid at a particular time under certain definition of value (Harjanto & Hidayati, 2014). There are several approaches often employed by valuers to arrive at an opinion of a fair market value. One approach widely used by practitioners in Indonesia is the market data comparison approach (Isakson, 2002). This approach attempts to estimate property market value by investigating comparable property transactions in a particular market.

It is, however, often difficult to accurately apply this approach in Indonesia. This is because obtaining reliable property transaction price is difficult. There is no single institution in Indonesia that is responsible for property data collection and then make it available for public. As such, valuers often rely on asking price in their practice. Although this simplistic approach is theoretically sound under limited circumstances (Appraisal Institute, 2020) and is also allowed under current regulation in Indonesia (MAPPI, 2018), one should recognise that asking price does not reflect market condition. It, by definition, only represents sellers' view. A counteroffer, which certainly is absent if asking price rather than transaction price is used in the analysis, is required to allow a negotiation process to take place that may, or may not, lead to a price that reflect a fair market condition. Asking price is bound to differ from transaction price. As a result, it should not be used by valuers in their market value analysis as it will generally lead to incorrect value estimate (Riyanto, 2020).

It is, however, generally difficult to have a reliable transaction data, a problem shared by most developing countries (Abidoye & Chan, 2018). On the other hand, using asking price instead of transaction price in market data approach is also problematic due to the said reason. There is however evidence found in Lagos, Nigeria in a study conducted by Olaleye (2019) where there is a significant link between a property's asking price and its transaction price. The study also reveals that on average, a property transaction price is approximately 87% of its asking price. As such, a -13% of adjustment is required for an asking price to arrive at an estimate of its transaction price. This is what is referred to in this article as a data-type adjustment. Thus, the use of asking price in property valuation is justified as long as it is property adjusted. Nevertheless, research that study the relationship between asking price and transaction price in the extant literature, to the best of our knowledge, is limited. This study aims to quantify data-type adjustment in the Indonesian context, particularly in Jakarta residential property market where transactions are more likely to be available. For this purpose, it attempts to answer the following questions:

1. What is the percentage of data-type adjustment that is required to arrive at a transaction price estimate?
2. Is there a significant association between data-type adjustment and the use of intermediaries in residential property transactions?
3. Is there a significant association between data-type adjustment and the duration of the property in the market?

## METHOD AND DATA DESCRIPTION

The problem of limited data transaction in property valuation is found in both developing as well as developed nations such as the United States (Baum & Hartzell, 2020, p. 118) and Italy (Curto et al., 2015, p. 97). This leads to the use of asking price as it can be taken as a proxy of transaction price (Curto et al., 2015, p. 97) so long as it is properly adjusted. A number of factors however need to be considered for this purpose. This for instance includes the use of intermediaries (Rutherford et al., 2005; Levitt and Syverson, 2008; and Zhang et al., 2019) and the length of a particular property offered in the market (Allen et al., 1987; Asabere et al., 1993; Asabere & Huffman, 1993). Based on this literature, this study uses a conceptual framework shown Figure 1 in its attempt to answer the questions raised in the preceding section.

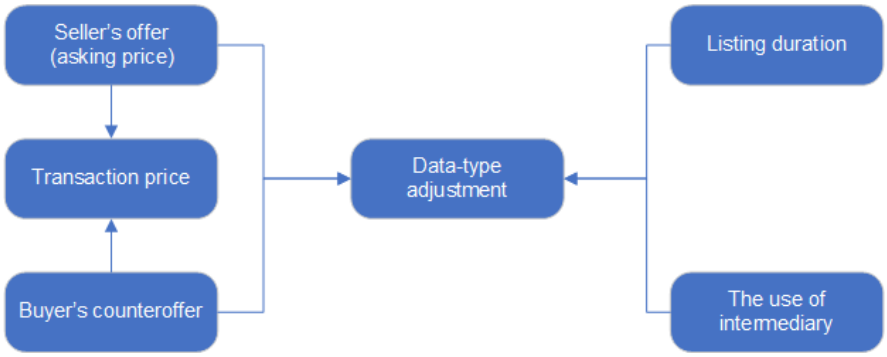


**Figure 1:** Research Framework

This study analyses a total of 1,400 property data collected by from the Directorate General of State Assets containing property asking price. This reflects the highest price that a seller wants (Chinloy, 1980). A potential buyer will bid asking price down to reflect their preference. Consequently, a transaction price is less than its corresponding asking price. Song (1995, p. 607) refers to the difference between asking price and transaction price as a bargaining outcome (Equation (1)). This is the same as the data-type adjustment referred to earlier. OP in Equation (1) is asking price whereas TP is its corresponding transaction price.

$$Data\ type\ adjustment = \left(\frac{OP - TP}{OP}\right) \times 100\% \quad (1)$$

Outliers were identified using quartiles suggested by Tukey (1977) (Equation (2)) and afterwards, the Mahalanobis distance. Q3 in Equation (2) refers to quartile 3 and IQR is the inter-quartile range of the said 1,400 data. This part of data analysis is crucial as asking price only represents a seller's view of a property transaction. Because seller generally has an incentive to make their property sells at a higher price, then asking price data is normally skewed.

$$Upper\ fence = Q_3 + (1{,}5 \times IQR) \quad (2)$$

The identification and removal of outliers resulted in 613 records. Out of these, 120 were excluded as they were from outside Jakarta. A telephone survey was conducted on these data to obtain their transaction price. It was then known that further data removal of 117 records as they were higher than asking price (6 records) or transaction price was unavailable (111 records) leaving 331 data records for further analysis (Table 1).

**Table 1: Distribution of Transaction Data**

| No | City / Region | Frequency |
|---|---|---|
| 1 | Central Jakarta | 14 |
| 2 | Wes Jakarta | 87 |
| 3 | South Jakarta | 91 |
| 4 | East Jakarta | 92 |
| 5 | North Jakarta | 47 |
| | **Total** | **331** |

Table 2 lists property key attributes for data analysis. As can be seen, this dataset also includes geographic coordinates that are useful to plot the property transactions in a geographic information system (GIS) software.

**Table 2: Data Variables**

| No. | Property Characteristics | Variables |
|---|---|---|
| 1 | Transaction Intermediaries | PERANTARA |
| 2 | Period for which the property is offered. | DURASI_PENAWARAN |
| 3 | Asking price | PENAWARAN |
| 4 | Transaction price | TRANSAKSI |

| No. | Property Characteristics | Variables |
|---|---|---|
| 5 | Data type adjustment | PENYESUAIAN |
| 6 | District of property location | KEC |
| 7 | City of property location | KOTA |
| 8 | Data adjustment class | GOL_PENYESUAIAN |
| 9 | Transaction data coordinates (longitude) | BUJUR |
| 10 | Transaction data coordinates (latitude) | LINTANG |

This study also uses data-type valuation obtained from property valuation practitioners using online survey. In total, there were 163 respondents completed the survey.

## RESULTS AND DISCUSSION

This section describes the results of data analysis both from the questionnaire and field survey and thus provides answers to the research questions. Most data calculation was conducted using JMP 16 and Stata 14. In answering the first question, from the questionnaire data, it was found that those completing the online survey applied a median of 10.00% (IQR=7%; 15%) of data-type valuation in their property value estimates. Most of them were either confident (60.74%) or rather confident (24.54%) on the accuracy of the data-type adjustment that they usually use. It is however interesting to note that around 45% of the respondents admitted that they or the company that they work for never did a scientific study on data-type adjustment. Most generally relied either on their own judgment (44.79%) or course material (23.93%) as their source of adjustment. It is also interesting to note experienced practitioners (at least 6 years of practice) tend to apply lower data-type adjustment at 1.67% compared to less-experienced respondents (less than 1 year of practice) who on average applied 8.75% adjustment.

Moving on the results obtained from the field survey data, it can be seen from Figure 2 that the data-type adjustment from 331 records do not seem to follow the normal distribution. The Anderson-Darling (AD=12.08; $p<0.01$) and Shapiro-Wilk (SW=0.87; $p<0.01$) test results provide support for this as well. As such, further analysis will be carried out using nonparametric procedures. Equivalent parametric tests occasionally will also be carried out for comparison purposes.

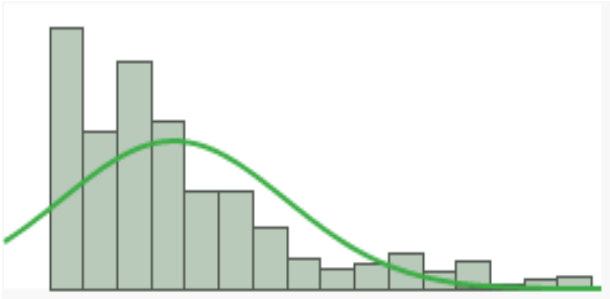

**Figure 2:** Distribution of data type adjustments

It can further Table 3 in be seen that the median of data-type transaction is 5.71% (IQR=2.67%; 10.00%). This is significantly lower than the median adjustment of 10% used by valuation practitioners (z=-13,981.50; p<0.01). The largest data-type adjustment median is found in central Jakarta where properties are sold at approximately 93% (median adjustment of 7.07% (IQR: 3.85%; 12.50%)) of their asking price. By contrast, properties in West Jakarta generally are sold at a higher level compared to other regions. Here, properties generally are sold at around 95% of their asking price (median adjustment of 5.08% (IQR: 1.79%; 8.06%)). Some transactions apparently have an adjustment of 0% which means that their transaction and asking price are the same. On the other hand, there are certain properties in East and South Jakarta that are sold only at 70% of their asking price. All in all, the data shows that it seems that properties in Jakarta are sold at approximately 94% of their asking price without significant differences across regions ($c^2(4, 331) = 4.21$; p=0.38). The ANOVA test supports this (F (4, 326) =1.54; p=0.19).

**Table 3**: Data-Type Adjustment Across Regions

| CITY | DATA TYPE ADJUSTMENT | | | | | |
|---|---|---|---|---|---|---|
| | **Median** | **Min** | **Max** | **$Q_1$** | **$Q_3$** | **IQR** |
| Central Jakarta | 7.07% | 1.92% | 26.00% | 3.85% | 12.50% | 9.35% |
| West Jakarta | 5.08% | 0.00% | 25.00% | 1.79% | 08.06% | 6.28% |
| South Jakarta | 6.22% | 0.00% | 30.00% | 3.03% | 10.34% | 7.31% |
| East Jakarta | 5.78% | 0.00% | 31.58% | 2.24% | 10.00% | 7.77% |
| North Jakarta | 5.76% | 0.00% | 25.00% | 3.85% | 12.50% | 8.65% |

Figure 3 provides a geographical presentation of data-type medians across regions in Jakarta.

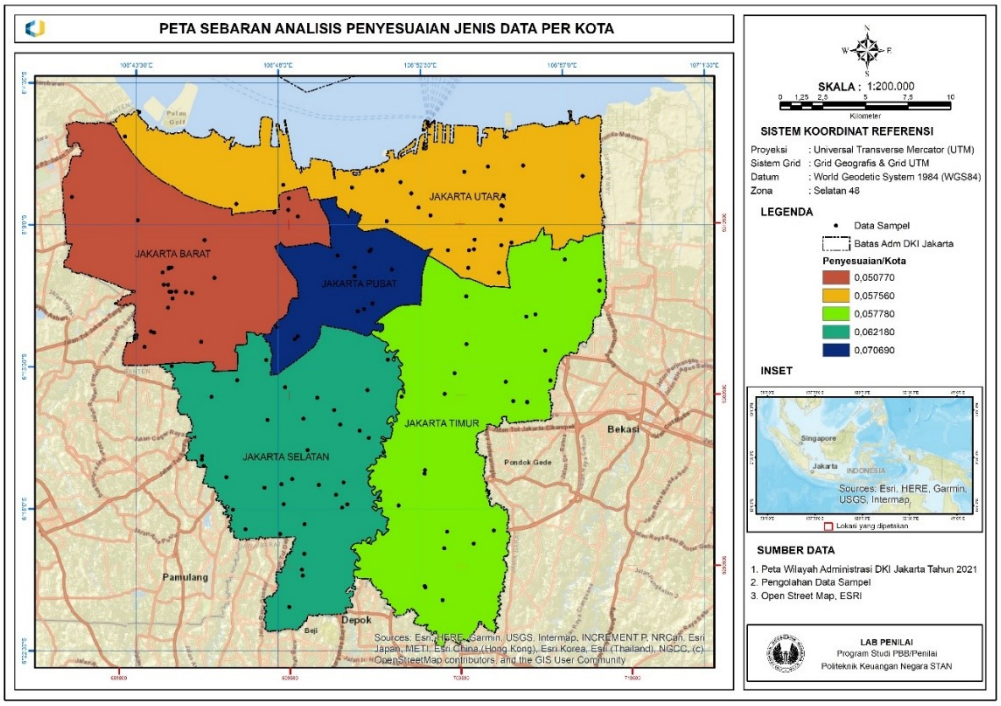


**Figure 3**: Map of Data-Types Adjustment

At the district level – as shown in Table 4 – the lowest median of data-type adjustment is in Kalideres at around 1.96% (IQR: 0.99%; 5.79%) while Tebet, on the other hand, has a much higher median adjustment of 10.71% (IQR: 5.88%; 14.06%). Hence, consistent with the regional level, properties in Kalideres in West Jakarta are generally sold at a higher level of their asking price than those in Tebet in South Jakarta.

**Table 4**: Data Type Adjustment Across District

| DISTRICT | ADJUSTMENT | | | | | |
|---|---|---|---|---|---|---|
| | **Median** | **Min** | **Max** | **$Q_1$** | **$Q_3$** | **IQR** |
| Cakung | 4.23% | 0.00% | 21.43% | 1.71% | 10.81% | 9.48% |
| Cempaka Putih | 9.17% | 1.92% | 20.00% | 4.65% | 13.73% | 10.10% |

| DISTRICT | ADJUSTMENT | | | | | |
|---|---|---|---|---|---|---|
| | **Median** | **Min** | **Max** | **$Q_1$** | **$Q_3$** | **IQR** |
| Cengkareng | 5.71% | 0.00% | 25.00% | 2.86% | 7.41% | 11.01% |
| Cilandak | 4.98% | 1.78% | 25.60% | 4.14% | 10.00% | 6.58% |
| Cilincing | 9.09% | 3.03% | 24.44% | 5.30% | 22.50% | 17.20% |
| Cipayung | 5.56% | 0.00% | 14.74% | 0.37% | 10.00% | 9.63% |
| Ciracas | 3.83% | 0.00% | 31.43% | 2.17% | 25.00% | 22.83% |
| Duren Sawit | 6.28% | 0.00% | 31.58% | 1.75% | 10.00% | 8.42% |
| Grogol Petamburan | 4.26% | 0.00% | 18.75% | 1.85% | 6.06% | 4.21% |
| Jagakarsa | 7.55% | 0.00% | 30.00% | 2.86% | 10.34% | 7.95% |
| Kalideres | 1.96% | 0.42% | 23.53% | 0.99% | 5.79% | 4.80% |
| Kebayoran Lama | 5.36% | 0.00% | 21.43% | 2.17% | 9.76% | 12.87% |
| Kebon Jeruk | 5.26% | 0.47% | 18.75% | 1.62% | 7.69% | 6.07% |
| Kelapa Gading | 7.87% | 0.00% | 23.91% | 4.44% | 12.50% | 8.06% |
| Kemayoran | 6.56% | 1.96% | 26.00% | 3.51% | 8.00% | 9.38% |
| Kembangan | 5.60% | 0.00% | 22.41% | 1.87% | 9.09% | 7.22% |
| Kramat Jati | 5.50% | 0.00% | 10.53% | 1.41% | 6.25% | 6.26% |
| Mampang Prapatan | 8.35% | 6.04% | 10.71% | 6.06% | 10.71% | 4.66% |
| Matraman | 7.28% | 2.44% | 20.00% | 4.63% | 10.61% | 6.60% |
| Pasar Minggu | 7.73% | 0.27% | 20.00% | 3.43% | 8.93% | 5.95% |
| Penjaringan | 3.11% | 0.35% | 7.74% | 1.14% | 4.88% | 3.82% |
| Pesanggrahan | 4.67% | 0.00% | 28.57% | 0.92% | 6.01% | 5.35% |
| Pulo Gadung | 5.77% | 2.27% | 24.00% | 4.28% | 8.33% | 7.15% |
| Tambora | 5.43% | 0.38% | 8.33% | 0.78% | 5.98% | 5.89% |
| Tanjung Priok | 8.00% | 0.00% | 25.00% | 5.28% | 14.81% | 11.59% |
| Tebet | 10.71% | 2.33% | 16.00% | 5.88% | 14.06% | 9.09% |

Moving on to the second research question, this study looks at the association between data-type adjustment and the use of intermediary in residential property transactions. Most of properties – around 84% – in this study are sold using an intermediary. On the other side of the coin, only just over 16% are sold by their owners.

Using a simple cross tab, it can be seen that there indeed a significant association between the use of intermediary and the level of a transaction price of a property from its asking price ($\chi^2(2, 331) = 7.85$; $p=0.02$). a biserial point correlation between the use of intermediaries (with or without intermediaries) and the amount of data type adjustment was then computed and showed a significant – albeit weak – correlation between the two attributes ($r(329)=-0.12$; $p =0.03$). Note that properties sold without intermediary are coded with 0. The negative correlation hence shows that those sold with an intermediary tend to have a transaction price that approaches their asking price. This study however fails to find evidence that properties sold using intermediaries shortens the duration of a property in the market ($r(329)=0.04$; $p=0.51$), which is consistent with what is described by Rutherford et al. (2005).

Literature in this context supports that properties sold through an agent are sold at a higher price than those that are not (Levitt & Syverson, 2008). This is perhaps because agents generally have more knowledge about property market condition in the neighbourhood (Zhang et al., 2019). This means they are able to estimate the optimum time to put a certain property on their listing.

Lastly, for the third research question, this study seeks to examine the association between the length a property offered in the market and its data-type adjustment. The difficulty faced during data collection is that it was often for property owners or sellers to be unable to provide a complete information with regards to the date their property was sold. They instead, only provided an approximate month of when the transaction was entered into. To deal with this issue, this study categorises the duration a property offered in the market – in term of months – into five groups (Table 5).

**Table 5**: Property Listing Duration Category

| No | Category (month) | Frequency |
|---|---|---|
| 1 | 0-6 | 224 |
| 2 | 7-12 | 41 |
| 3 | 13-18 | 14 |
| 4 | 19-24 | 7 |
| 5 | >25 | 45 |
| | **Total** | **331** |

The data-type adjustment was then classified into three categories (Table 6). This made analysis using cross tabulation possible. A polychoric correlation was able to be computed as well.

**Table 6**: Data type adjustment group

| No | Category | Adjustment Range | Frequency |
|---|---|---|---|
| 1 | Low | 0%-3% | 93 |
| 2 | Moderate | 3%-10% | 160 |
| 3 | High | >10% | 78 |
| | **Total** | | **331** |

The results show that the property transaction data used in this analysis fails to provide support for a significant association between the length a property is offered in the market and its data-type adjustment ($\chi^2$ (8, 331) =5.13; p=0.74). The correlation between the two attributes is also found to be statistically insignificant (r=0.08; Pearson G2=4.36; p=0.74). This means that – contradicts to what is reported by Asabere and Huffman (1993) but is consistent with Allen et al. (1987) – there is no evidence to suggest that properties that are longer in the market are sold at a higher level of their asking price.

## CONCLUSION

In a nutshell, this study concludes that firstly, asking price of residential properties in Jakarta require a -6% adjustment to arrive at an estimate of their transaction price with no significant differences across regions. This proves to be far lower than similar adjustment used by practitioners in their market value analysis of -10%.

Secondly, this study provides evidence that the use of intermediary in a residential property transaction may lead to a higher level of transaction price. It is however important to note that such intermediary may not be able to shorten the length of a property offered in the market.

Lastly, it can be seen here that there is no evidence in this study to support the claim that the longer a property is put in the market, the more expensive it will be. This contradicts the findings identified in the literature that suggest a positive correlation between the two.

## LIMITATION

This study has some limitations. First, the research focuses on property transaction data of DKI Jakarta. As a consequence, the findings reported in this study may not be applicable in other areas. Second, the data were collected in 2017 with a further validation conducted in 2021. This may affect the accuracy of the estimated transaction price and the length of time the property is offered.

Some property owners, for example, do not remember exactly how long their properties are offered in the market.

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