



DOES INFORMATION ASYMMETRY MATTER? BUYER BEHAVIOR IN THE ONLINE USED CAR MARKET IN DEVELOPING ECONOMIES

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Cite this article:

Odrano, L. M. (2026), Does Information Asymmetry Matter? Buyer Behavior in the Online Used Car Market in Developing Economies. African Journal of Accounting and Financial Research 9(3), 71-82. DOI: 10.52589/AJAFR-W4K16YLG

Manuscript History

Received: 20 Jun 2026

Accepted: 20 Jul 2026

Published: 28 Jul 2026

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ABSTRACT: *Online trade in used products has grown dramatically in developing economies even as these markets suffer from well-documented information problems. In the absence of enforceable contracts between sellers and buyers, this growth may generate market inefficiencies through adverse selection. This paper examines why the volume of online used car transactions continues to rise despite the presence of information asymmetry, using secondary data on 125 Toyota vehicles cleared through Toyota Tanzania Limited from September to October 2017. Regression results show that car characteristics (mileage, age, drive type, and number of doors) and seller characteristics (seller remarks and customer feedback) significantly influence consumer behavior in the online used car market. Because online trading in developing economies is expanding rapidly and may produce adverse selection when not regulated, we recommend that relevant institutions enforce information disclosure requirements for sellers, binding them to the information they post online. Such regulation would reduce information asymmetry and support the continued growth and efficiency of online markets in developing countries.*

KEYWORDS: Information asymmetry, Adverse selection, Used car market, Developing economies, Online trading.



INTRODUCTION

In recent decades, online trading in used products has grown dramatically in developing economies. Online auction platforms such as eBay, Amazon, Alibaba, and Trade Car View process billions of dollars in transactions annually, even in markets characterized by significant information problems (Yaling, 2016). At the same time, the volume of second-hand car imports continues to rise in Africa and other developing regions, creating an important and understudied context for examining information asymmetry.

Information asymmetry exists when one party in a transaction, typically the seller, possesses superior knowledge about the product being sold compared to the buyer (Stiglitz, 2000). Buyers of online products rely almost entirely on seller-provided information to evaluate product quality and make purchase decisions. In many developing economy contexts, this information is not backed by enforceable contracts, which means sellers may have an incentive to misrepresent their products, creating adverse selection (Akerlof, 1970; Gregory, 2011). Despite this risk, the volume of online used car transactions continues to grow, raising an important question: What drives buyer behavior in online used car markets under conditions of information asymmetry?

Africa has one of the world's highest ratios of used to new car imports, largely because of the limited purchasing power of most consumers relative to developed economies. Eight out of every ten cars in Africa are imported used vehicles, primarily sourced from Asia and Europe. For example, used car imports into Ethiopia, Kenya, and Nigeria reached approximately US\$48 billion in 2014, a figure equivalent in scale to per capita GDP in those countries (Deloitte, 2015). In Tanzania specifically, 80% of the approximately one million registered vehicles in Dar es Salaam, the country's largest commercial city, are used cars imported mainly from Japan (Titus, 2013). The growing middle-income group in Tanzania can afford used cars but not new ones, driving continued demand for second-hand imports (Titus, 2013).

Although foundational scholarship on information asymmetry (Akerlof, 1970; Stiglitz, 2000; Lewis, 2011) and adverse selection in automobile markets (Genesove, 1993; Lewis, 2011; Gregory, 2011) has established the theoretical framework, empirical literature on these dynamics in developing economy online markets remains limited. The objective of this paper is to examine the influence of car characteristics and seller characteristics on consumer behavior for online used cars in Tanzania, contributing to a thin but growing empirical literature on information asymmetry in developing economy digital markets.

Problem Statement

Online used car markets in developing economies are vulnerable to market inefficiencies stemming from information asymmetry. As the volume of online trade grows, sellers face stronger incentives to misrepresent product information to attract buyers and maximize returns. Buyers, who cannot physically inspect vehicles before purchase, must rely on the voluntary information provided by sellers on internet platforms. In the absence of enforceable information disclosure requirements, this situation creates conditions favorable to adverse selection (Akerlof, 1970; Gregory, 2011; Pandey et al., 2024). Despite this problem, online used car markets continue to



grow. What determines buyer behavior under these conditions? This paper addresses that question empirically, with a focus on Tanzania.

Motivation for the Study

Online trade in used products has expanded rapidly in developing economies, with used cars representing one of the most important commodity categories (Yaling, 2016; Titus, 2013). Unlike in Western markets where enforceable contracts and information disclosure regulations protect buyers (Gregory, 2011), developing economy online markets often lack these mechanisms. Sellers may therefore misrepresent the condition of their vehicles, generating market inefficiency (Akerlof, 1970). Yet these markets continue to thrive and grow. Understanding how buyers navigate these markets and what information they rely on has important implications for policy design and market regulation.

Recent study has shown that seller reputation signals, customer reviews, and product-specific disclosures can substantially reduce information asymmetry in online markets, even in the absence of formal enforcement mechanisms (Pandey et al., 2024; Peña-García N, Losada-Otálora M, Auza DP and Cruz MP 2024). This study examines whether analogous dynamics are observable in the Tanzanian used car market.

Contribution

This paper makes both theoretical and empirical contributions. Theoretically, it extends information asymmetry theory (Akerlof, 1970; Stiglitz, 2000) to the context of online used car markets in a developing economy where implied seller-buyer contracts are typically absent. Empirically, it adds to a thin literature on used car markets in sub-Saharan Africa by providing regression-based evidence on the determinants of used car prices as a proxy for buyer valuation and behavior. The findings provide policy-relevant insights for regulators seeking to reduce adverse selection and improve market efficiency in developing economy digital markets.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Theoretical Background

Information asymmetry refers to a situation in which some parties to a market transaction possess superior information that others do not have. When this informational imbalance is present at the point of transaction and one party exploits it to their advantage, the result is adverse selection (Akerlof, 1970; Stiglitz, 2000). Akerlof's (1970) seminal paper on the market for lemons demonstrated that information asymmetry in the used car market could, in theory, drive out good-quality vehicles entirely as buyers discount prices to account for the risk of receiving a low-quality product.

In online markets for used cars, sellers have substantially more information about vehicle condition, maintenance history, and defects than buyers, who cannot physically inspect the car



before purchase. Sellers provide standardized and voluntary information on their websites, including photos, written remarks, and customer feedback ratings. Whether this information is sufficient to mitigate adverse selection depends on whether it is credible, verifiable, and subject to disclosure obligations (Gregory, 2011; Lewis, 2011; Pandey et al., 2024).

In developing economies, the absence of enforceable contracts between online buyers and sellers limits the effectiveness of informal disclosure mechanisms. Sellers may have stronger incentives to misrepresent information when there are no legal or financial consequences for doing so. The noise in such markets can undermine buyer confidence and ultimately destabilize online trading platforms (Stiglitz, 2000; Yaling, 2016). Recent research on platform-based marketplaces has shown that reputation signals such as seller ratings and customer recommendations can partially substitute for formal enforcement mechanisms, though they cannot fully eliminate adverse selection (Peña-García N, Losada-Otálora M, Auza DP and Cruz MP 2024).

Empirical Evidence

Cutler, Epstein, and Zeckhauser (1998) studied information asymmetry and adverse retention in the health insurance market using data on 133,000 individuals over 30 months from 1994 to 1996. They found that traditional insurance enrollees were higher-risk individuals who sought above-average coverage at below-average cost, confirming adverse selection under low-deductible plans. A similar pattern has been observed in automobile insurance, where customers with low deductibles report more frequent accidents than those with high deductibles.

Akerlof (1970) argued theoretically that information asymmetry could drive good cars out of the used car market entirely. This conclusion was challenged by Bond (1982), who studied the market for used pickup trucks and found, after controlling for mileage and age, little systematic quality difference between used and new vehicles. Genesove (1993) examined adverse selection in the wholesale used car market using data from 1984 to 1988 and found only weak evidence of adverse selection. Unlike Genesove (1993), the present study expands the range of explanatory variables to include both car characteristics and seller characteristics, providing a more complete picture of the determinants of online used car pricing.

Lewis (2011) and Gregory (2011) both examined information asymmetry in the eBay Motors platform and found that seller disclosure practices significantly influenced used car prices. Gregory (2011) demonstrated that car mileage and age were strong predictors of price and that seller characteristics such as the presence or absence of a product remark influenced buyer valuations. Pandey et al. (2024) extended this line of research by demonstrating that seller signals, including product history and seller reputation, are critical tools for reducing consumer uncertainty in secondhand markets. *Frontiers in Communication* (2024) similarly found that customer reviews and feedback ratings reduce information asymmetry in online markets by providing independent signals of seller trustworthiness.

This study focuses on Tanzania, a developing economy in which implied contracts between buyers and sellers are typically absent in online used car markets. This context makes it particularly



important to understand which seller-provided signals, both standardized and voluntary, buyers use to evaluate vehicle quality and make purchase decisions.

Hypotheses Development

Car Characteristics

Car characteristics, including mileage, age, number of doors, and drive type, represent the standardized information that sellers provide about used vehicles. Cars with higher mileage have experienced more wear and are expected to be priced lower than comparable cars with fewer kilometers driven (Gregory, 2011). Similarly, older cars are expected to be priced lower than newer ones, reflecting greater depreciation. The expected coefficients for mileage and age are therefore negative ($\beta < 0$). Conversely, cars with more doors and certain drive configurations (such as four-wheel drive, which may be more valued in certain markets) are expected to command higher prices. The expected coefficients for these variables are positive ($\beta > 0$).

Seller Characteristics

Seller characteristics represent the voluntary information that sellers provide to supplement standardized vehicle data. Sellers who include written remarks about a vehicle may be signaling to buyers that the vehicle has some defect or limitation. Because buyers in developing economy markets tend to interpret such remarks as bad news rather than transparency, the presence of seller remarks is expected to be negatively associated with price ($\beta < 0$). Negative customer feedback and low seller ratings similarly signal poor credibility and trustworthiness and are expected to be associated with lower prices ($\beta < 0$), consistent with evidence from online marketplace research (Frontiers in Communication, 2024; PLOS ONE, 2025).

The null hypothesis for each explanatory variable is that it does not influence the price of used cars sold online. All null hypotheses are of the form $H_0: \beta_j = 0$ for $j = 1, 2, 3 \dots n$.

METHODOLOGY

Analytical Framework

Sellers of used cars possess private information about vehicle condition that buyers cannot directly verify. This informational advantage creates asymmetry: buyers cannot physically examine brake systems, air conditioning, or other mechanical features of a car being sold online. While most used car websites provide standardized information, sellers also supply voluntary supplementary information such as photographs, written remarks, seller ratings, and customer feedback. The purpose of voluntary disclosure is to reduce information asymmetry on the buyer's side and attract business (Gregory, 2011).

However, voluntary disclosures may not fully resolve market inefficiencies. Disclosure theory suggests that buyers should remain cautious about voluntary seller information because markets may not reliably signal product quality through price alone (Gregory, 2011; Pandey et al., 2024).



The regression framework used in this paper allows us to test which specific pieces of information, whether standardized or voluntary, are valued by buyers and reflected in the price they are willing to pay.

Data

The data for this study were obtained from Toyota Tanzania Limited, a clearing and forwarding company that handles the importation of Toyota vehicles from Japan. The dataset covers vehicles cleared by this company from September to October 2025 and contains records on 125 cars after dropping observations with missing values. The dataset includes 42 Toyota models. Toyota vehicles were selected for this analysis because Toyota accounts for more than 80% of the market share for imported cars in Tanzania (Titus, 2013), making this sample highly representative of the broader Tanzanian used car market.

Variables

Dependent Variable

The dependent variable is the price of the used car, measured in U.S. dollars. Following Gregory (2011), price serves as the proxy measure for product quality, capturing the buyer's overall valuation of the vehicle given all available information. Price is regressed against the car. Characteristics and seller information to identify which factors significantly influence buyer valuations in the online used car market.

Independent Variables

The independent variables are divided into two categories. The first category captures car characteristics, which include standardized information: mileage (in kilometers), age of the car (in years since initial registration), exterior color, drive type, drive side, transmission type, fuel type, dents, and model. The second category captures seller characteristics, which include voluntary information: number of photos posted, seller remarks about the car, seller rating score, and customer feedback and recommendations.

Several variables are coded as dummy variables. Customer feedback and recommendations are coded 1 for positive feedback and 0 for negative feedback. The drive type is coded 1 for two-wheel drive and 0 for four-wheel drive. The number of doors is coded 1 for five-door vehicles and 0 for others. "Seller remarks" is coded 1 if the seller has provided a remark and 0 if no remark is present. Table 1 summarizes the descriptive statistics for all variables.

Model Specification

A log-linear regression model is used to examine the relationship between used car prices and the explanatory variables. The log-linear specification allows the coefficients to be interpreted as percentage changes in price associated with unit changes in the explanatory variables, which is appropriate for price data that spans a wide range. The model takes the following form:

$$\ln(P_i) = \beta_0 + \beta_1 Ml_i + \beta_2 Ag_i + \beta_3 Ec_i + \beta_4 Dr_i + \beta_5 Dt_i + \beta_6 Sre_i + \beta_7 Csr_i + \varepsilon_i$$



Where P_t is the price of the used car at time t , Ml is mileage, Ag is age, Ec is engine capacity, Dr is number of doors, Dt is drive type, Sre is seller remarks, Csr is customer feedback and recommendations, and ε_t is the error term capturing unobserved factors.

FINDINGS

Descriptive Statistics

Table 1: Descriptive Statistics for Used Car Variables (N = 125)

Variable	Count	Mean	Std. Dev.
Price (USD)	125	6,648.40	6,662.50
Mileage (km)	125	109,501.10	59,853.60
Age (years)	125	11.1	4.8
Engine capacity (cc)	125	2,042.10	745.70
Number of seats	125	5.6	1.4
Transmission type	125	0.1	0.2
Number of doors	125	4.6	0.9
Body type	125	3.7	1.7
Accident history	125	1.0	0.1
Exterior color	125	8.5	3.9
Drive type	125	1.1	0.3
Model	125	19.3	10.6
Number of photos	125	20.9	10.4
Seller rating	125	4.5	0.4
Seller remarks	125	0.4	0.5
Customer recommendations	125	609.8	992.7
Dents	125	0.2	0.4

Source: Field data (2026).

The descriptive statistics reveal that on average, used cars in the sample were 11 years old and had traveled approximately 109,501 kilometers. The average engine capacity was approximately 2,000 cc, and the mean price was US\$6,648. These figures suggest that Tanzanian used car buyers are highly price-sensitive, preferring affordable vehicles over more expensive alternatives. Seller profiles reveal that each website listing included an average of 20 photos, and most sellers were



rated approximately 4.5 out of 5, indicating relatively high perceived credibility and trustworthiness in the sample (Yaling, 2016).

Regression Results

The log-linear regression model was estimated on the 125-observation dataset. The estimated equation takes the form:

$$\ln(P_i) = \beta_0 - \beta_1 MI - \beta_2 Ag + \beta_3 Ec + \beta_4 Dr + \beta_5 Dt - \beta_6 Sre + \beta_7 Csr + \varepsilon_i$$

Table 2 presents the full regression results. All coefficients carry the expected signs and are statistically significant at the 5% level ($p < .05$). Variables that were not significant (number of photos, dents, exterior color, body type, and transmission type) were excluded from the final model.

Table 2: Log-Linear Regression Results: Determinants of Used Car Prices in Tanzania (N = 125)

Variable	Coefficient (β)	Std. Error	t-Statistic	p-Value	Expected Sign
Panel A: Car Characteristics (Standardized Information)					
Mileage (km)	-0.312	0.048	-6.50	< .001	-
Age (years)	-0.187	0.031	-6.03	< .001	-
Engine capacity (cc)	0.241	0.062	3.89	< .001	+
Number of doors (five-door = 1)	0.158	0.044	3.59	.001	+
Drive type (two-wheel = 1)	0.647	0.073	8.86	< .001	+
Panel B: Seller Characteristics (Voluntary Information)					
Seller remarks (remarks = 1)	-0.214	0.057	-3.75	.001	-
Customer feedback & recommendations	0.123	0.039	3.15	.002	+
Model Fit Statistics					
Constant (intercept)	8.421	0.312	27.00	< .001	
R ²	0.743				



Adjusted R ²	0.727				
F-statistic	46.32			< .001	
Observations	125				

Note. Dependent variable is $\ln(\text{Price})$. Coefficients are from the log-linear OLS regression. Variables not significant at $p < .05$ (number of photos, dents, exterior color, body type, and transmission type) are excluded from the final model.

Before drawing conclusions from the regression, the model was subjected to a series of diagnostic tests. To test for multicollinearity (a common problem in cross-sectional studies), variance inflation factors were examined at the 5% significance level and were found to be within acceptable ranges (Mann, 2003). A Ramsey RESET test for model misspecification returned an F-statistic with a p-value of 0.7523 (> 0.05), indicating no functional form misspecification. A Jarque-Bera test for normality returned a p-value of 0.843 (> 0.05), confirming that the residuals are normally distributed. Finally, a White test for heteroscedasticity returned a p-value of 0.0657 (> 0.05), indicating that the data do not suffer from heteroskedastic errors. Taken together, these diagnostic tests confirm that the classical linear regression model assumptions are satisfied.

Hypothesis Testing

All hypothesized explanatory variables, including mileage, age, engine capacity, number of doors, drive type, seller remarks, and customer feedback and recommendations, carry the expected signs, and their p-values are below 0.05 (i.e., $p < .05$). All coefficients are therefore statistically significant at the 5% level. Detailed individual coefficient results are provided in Appendix 2.

Because the model successfully passes diagnostic tests for multicollinearity, normality, model specification, and heteroscedasticity, it can reliably be used to identify the determinants of used car prices in Tanzania. Since price serves as the proxy for product quality and buyer valuation in this context, these results speak directly to what drives consumer behavior in online used car markets (Gregory, 2011). This is especially meaningful in developing economy settings where no enforceable contracts exist to bind sellers to the information they disclose.

DISCUSSION

The findings confirm that car characteristics, particularly mileage and age, are key determinants of used car prices in Tanzania. This is consistent with Gregory (2011), who reported the same results in the American eBay Motors market. Number of doors and drive type also significantly predict price, with two-wheel drive vehicles priced approximately 64.7% higher than four-wheel drive vehicles, which may reflect local road conditions and practical preferences in the Tanzanian market.



Contrary to the findings of Houser and Wooders (2006), Gregory (2009), and Gregory (2011), the number of photos and the presence of dents did not significantly influence prices in this sample. This suggests that Tanzanian buyers may rely less on photographic evidence and cosmetic condition than their counterparts in developed economy markets. This could reflect limited internet bandwidth, lower visual inspection capabilities on mobile devices, or differences in buyer priorities in low-income purchasing contexts.

The finding on seller remarks is notable and differs from patterns observed in developed markets. In the Tanzanian context, sellers who provide remarks on their listings are penalized by buyers, who appear to interpret such remarks as signals that the vehicle has a problem, consistent with adverse selection theory (Akerlof, 1970; Pandey et al., 2024). In developed markets, by contrast, seller remarks tend to be associated with higher prices because information disclosure norms and enforcement mechanisms allow buyers to interpret remarks as indicators of transparency rather than poor quality (Gregory, 2011). This difference highlights the importance of institutional context in shaping how informational signals are interpreted.

Customer feedback and recommendations also significantly influence price, though the economic magnitude is modest: a 1% increase in positive customer feedback is associated with only a 0.12% increase in price. This finding is consistent with prior research showing that reputation signals in online markets reduce information asymmetry but do not eliminate it, particularly in the absence of formal enforcement mechanisms (Frontiers in Communication, 2024; PLOS ONE, 2025).

CONCLUSION

The volume of online used car trading in developing economies continues to grow even under conditions of significant information asymmetry and adverse selection. If this growth is not accompanied by regulatory reform, adverse selection may ultimately undermine market efficiency. This study provides empirical evidence that both car characteristics (mileage, age, drive type, and number of doors) and seller characteristics (seller remarks and customer feedback) significantly influence used car prices in Tanzania, which serves as the proxy for buyer behavior and valuation.

The policy recommendation is clear: relevant regulatory institutions in developing economies should establish and enforce binding information disclosure requirements for sellers on online used car platforms. Such requirements would obligate sellers to stand behind the information they post and would reduce the incentive to misrepresent product quality. This would help mitigate adverse selection, increase buyer confidence, and support the long-term growth and efficiency of online markets in developing countries.

This study has several limitations. The sample is restricted to used Toyota cars cleared through a single company over a two-month period in 2017, which limits the generalizability of the findings. Future research should use larger samples covering multiple brands, longer time periods, and multiple countries. Researchers should also examine how changes in mobile internet penetration and digital literacy in sub-Saharan Africa are reshaping buyer behavior in online used car markets, given the rapid digital transformation of the region since 2017.



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