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PRICE DISCRIMINATION IN DIGITAL MARKETPLACE: AN ANALYSIS OF PURCHASING POWER PARITY (PPP) AND DIGITAL ARBITRAGE

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ABSTRACT

Today's digital borders are being redrawn by companies through geo-blocking and regional pricing strategies. The concept of digital arbitrage has entered our lives as a result of consumers in different countries accessing products/services at different prices, in line with companies' price differentiation strategies. This study aims to examine regional pricing in digital markets within the framework of purchasing power parity, and to explain the concepts of digital arbitrage and geo-blocking as methods of preventing digital arbitrage. Furthermore, this study aims to empirically test pricing behaviours on Steam, the world's largest digital game distribution platform, by correlating them with countries' purchasing power parity. The price of a basket consisting of 10 games was examined in 63 countries from different income groups and analysed using both linear and log-linear regression models. The findings suggest a statistically significant positive relationship between income levels and digital game prices, although the explanatory power of the linear model remains limited. The log-linear specification provides a better fit, indicating that the relationship may be proportional rather than strictly linear. In addition, deviations from predicted prices reveal substantial cross-country differences and point to the potential existence of digital arbitrage opportunities. The study contributes to the literature by revealing, through concrete data, how price differentiation policies trigger digital migration.

Key words: price discrimination, geo-blocking, digital arbitrage, purchasing power parity.
JEL: L11, L81.

1. Introduction

With the technological developments experienced in the last 20 years, trade, like most areas of our lives, has begun to digitize. As digitalization gained momentum, the production, distribution, marketing, and pricing processes of goods

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and services have also undergone a radical change. In particular, the ability to deliver digital products and services directly to consumers in different geographies without being hindered by physical borders and without transportation costs enables companies to act more flexibly in pricing. One of the factors affecting companies' regional pricing strategies is the purchasing power of the country where the product or service will be offered. Considering the difference in purchasing power, companies may follow a strategy of selling digital products at low prices in low-income countries and at high prices in high-income countries. This practice creates a risk of the arbitrage phenomenon emerging in digital markets.

Individual consumers or professional arbitrageurs can take advantage of price differences applied in different countries to purchase digital products or services from low-priced markets and use or sell them in different geographies. VPN services assist in this digital arbitrage process. Consequently, companies may restrict access to products or services from other countries.

This study aims to examine regional pricing in digital markets within the framework of purchasing power parity, and to address digital arbitrage and geoblocking as a means of preventing digital arbitrage. Furthermore, a case study was conducted to support the research. In this case study, cross-country price differences of a basket created by the researcher and available on the digital game distribution platform Steam were examined within the framework of the purchasing power concept across high, middle, and low-income countries.

2. Price discrimination

The main goal of firms is to maximize their profits. For a firm aiming to achieve maximum profit, the ability to apply different prices to different customers is an advantage, because price is the most fundamental element affecting the purchasing decision. Since firms' customers consist of people with different tastes, preferences, and income groups, it is in the firm's interest to be able to apply different prices to alter the purchasing decisions of these different groups. Therefore, firms may follow various pricing strategies. Price discrimination is the most widely used of these strategies today.

Although there are various examples explaining price discrimination in the microeconomics books, the most common one is Louis Phlips's Disneyland example: a case where the same commodity is sold, such as an entrance ticket to Disneyland on a particular day, senior citizens receive a discount, as do children and military personnel. While a specific definition of price discrimination is not made in the literature, its most widely known definition is as follows: it occurs when the same good is sold to different customers at different prices. Also, if one can discriminate, it is profitable to do so. Given a number of separated markets with different identifiable demands, a discriminating price policy is at least as profitable as a non-discriminating one.

In the literature, price discrimination is examined in three categories: first-degree price discrimination occurs when a producer knows exactly how much consumers are willing to pay and is able to capture the whole surplus, charging a tailored price equal to the reservation price. Second-degree price discrimination happens when a firm sets a price per unit that varies with the number of units the customer buys. Assuming that producers cannot distinguish consumers' tastes, they will offer personalized packages or bundles, letting customers choose among them. Third-degree price discrimination takes place when a firm charges different prices to different groups of customers depending on their elasticity of demand. (Zarra, 2016)

Pricing strategies observed in digital markets are mostly evaluated within the scope of third-degree price discrimination. In particular, geo-based pricing is a method frequently resorted to by digital platforms. Since digital products and services do not incur transportation costs, different pricing can be applied according to regions. In this context, software, subscriptions, and games are among the areas where price differentiation is most clearly observed.

3. Geo-blocking and digital arbitrage

There are differences in the implementation and sustainability of the price discrimination strategy in digital markets and physical markets. In physical markets, transportation costs, customs barriers, and legal restrictions limit arbitrage opportunities. In digital markets, however, since there are no transportation costs or customs barriers, the sustainability of the price discrimination strategy largely depends on preventing arbitrage. Therefore, companies resort to the geo-blocking mechanism to protect regional prices. However, the European Commission put an end to geo-blocking rules on the grounds that they undermined online shopping and cross-border sales in the EU. The Commission defines geo-blocking as follows: traders operating in one Member State blocking or limiting access to their online interfaces, such as websites and applications, for customers from other Member States who wish to carry out cross-border transactions.

The three specific situations of unjustified geo-blocking defined by the geo-blocking regulation are shown in Table 1.

Table 1. Types of geo-blocking

Type of geo-blocking	Example
1	*2*
The sale of *goods without* physical delivery	A Belgian customer *wishes to buy* a refrigerator and finds the best deal on a German website. The customer will be entitled to order the product and collect it at the trader's premises or organize delivery himself to his home

(cont.)

1	*2*
The sale of *electronically* supplied services	A Bulgarian consumer *wishes to buy* hosting services for her website from a Spanish company. She will now have access to the service, can register and buy this service without having to pay additional fees compared to a Spanish consumer
The sale of services provided in a specific physical location	An Italian family visits a French theme park and wishes to take advantage of a family discount on the price of the entry tickets. The discounted price will be available for the Italian family

Source: European Commission (2024).

Zarra (2016) mentions three types of geo-blocking: blocking measures, rerouting measures, and restrictive measures. In blocking measures, companies prevent users from entering websites by blocking access to cross-border content. In rerouting measures, users are automatically redirected to national websites. In restrictive measures, while access to the platform is allowed, the purchasing process is restricted.

4. Purchasing Power Parity (PPP)

In order to conduct an analysis in the field of economics, it is sometimes necessary to make comparisons. In cases where two countries need to be compared, Gross Domestic Product (GDP) comes into play. GDP refers to the total market value of all goods and services produced and sold in the relevant countries. When this value is divided by the population, per capita income is obtained, and this value is used when comparing the welfare of countries. Other alternative methods are also used in the literature when comparing the welfare of countries. One of these methods is the Purchasing Power Parity (PPP) approach. This approach was introduced to the literature by Gustav Cassel in 1918. Cassel defines PPP as follows.

"According to the theory of international exchanges which I have tried to develop during the course of the war, the rate of exchange between two countries is primarily determined by the quotient between the internal purchasing power against goods of the money of each country. The general inflation which has taken place during the war has lowered this purchasing power in all countries, though in a very different degree, and the rates of exchanges should accordingly be expected to deviate from their old parity in proportion to the inflation of each country. At every moment the real parity between two countries is represented by this quotient between the purchasing power of the money in the one country and the other. I propose to call this parity the purchasing power parity."

In cases where firms follow a regional pricing strategy, the purchasing power parity approach is of great importance in order to compare the accessibility of the

same product/service for consumers in different countries. Since this study involves comparing game prices on the digital game distribution channel Steam across countries in different income groups, the purchasing power parity approach is crucial for this study.

5. Literature review

There are a wide variety of studies on geo-blocking and price differentiation in the literature. In this section of the study, some important studies on the subject and their findings are included.

Within the framework of price discrimination in digital environments, geo-blocking practices are considered to allow firms to segment markets geographically and sustain third-degree price discrimination, thereby helping to limit arbitrage (Zarra, 2016). In this context, geo-blocking is used as a strategic tool. Similar findings are supported by other studies. It is argued that firms can strategically use geo-blocking practices to soften competition and maintain profit margins, and therefore price differentiation may be related not only to demand but also to market competition (Bourreau and Manenti, 2022).

More recent studies add a different dimension to the literature. With the increasing prevalence of data-driven pricing mechanisms, firms are able to analyse user behaviour in greater detail, which is believed to enhance their capacity for price differentiation (Grochowski et al., 2022).

In parallel with these developments, studies focusing on personalized and algorithmic pricing highlight that firms can differentiate prices at an individual level by using consumer data, which may significantly expand the scope of price discrimination in digital markets (Poort and Zuiderveen Borgesius, 2019). This suggests that price differentiation is no longer limited to country-level segmentation but may also operate at the user level.

Cardona (2016) analysed the results of a comprehensive "mystery shopping" survey conducted across the EU. The study revealed that 63% of cross-border shopping attempts were blocked by sellers. Cardona noted that these blockages were most prominent in the electronics and household appliances sectors and that this situation prevented the full realization of e-commerce potential in Europe. In response to this issue, policy regulations have been developed. Hutchinson (2018) conducted a legal analysis of the Geo-blocking Regulation adopted by the EU in 2018, stating that its main objective is to prevent discrimination based on nationality or place of residence and to introduce the principle of "shop like a local." However, it is also argued that although geo-blocking regulations have achieved progress in certain areas, significant shortcomings remain in implementation, awareness, and enforcement processes, and therefore full market integration has not yet been achieved (European Court of Auditors, 2025).

Besiekierska (2021) examined the legal dimensions of geo-blocking regulations, emphasizing that this legal framework is a necessary step for the functioning of the digital single market, but that differences in implementation across member states need to be eliminated. Fortes, Martins, and Oliveira (2021) approached the issue from an ethical and legal perspective through the concept of "digital geodiscrimination," arguing that algorithms profile consumers based on their geographical location and use this data to offer different prices or service conditions.

From a broader industry perspective, the gaming market has also been analysed within the framework of competition law and platform regulation. In particular, digital distribution platforms are considered to hold a critical intermediary position, which may enable practices such as geo-blocking, price differentiation, and market segmentation (Gómez Trujillo, 2023). This highlights the relevance of platform power in shaping pricing strategies.

Beyond the theoretical and legal framework, empirical analyses have also been conducted in the literature. Studies focusing on measuring price differences suggest that while some convergence may exist between digital and physical prices, income levels remain an important determinant in cross-country comparisons (Cavallo, 2017). Cavallo (2017) compared online and offline prices using data from 10 countries and found that retailers applied the same price in both channels in 72% of cases. This finding is significant as it shows that prices in digital markets may not be as dynamic and differentiated as often assumed, and that firms prioritize channel consistency.

Similar findings are observed in other studies. It is stated that per capita income is an important variable in understanding price differences and that cross-country heterogeneity is shaped within this framework (Gyódi et al., 2017). Gyódi, Sobolewski, and Ziembiński (2017) examined price dispersion in e-commerce using data from 26 EU member states and found that, in addition to logistics costs, per capita income levels were among the main determinants of price differences. This provides strong evidence that firms implement cross-country price differentiation strategies based on macroeconomic indicators, particularly purchasing power. On the other hand, although the removal of trade barriers may increase consumer welfare, it is also argued that digital trade can increase price differences and expand arbitrage opportunities (Duch-Brown et al., 2020).

In this context, the concept of purchasing power parity (PPP) provides an important theoretical background for understanding cross-country price differences. Empirical studies testing the PPP hypothesis suggest that price levels and exchange rate dynamics may converge in the long run, although short-run deviations are common (Žďárek, 2012). This supports the idea that observed price differences may persist due to structural and market-specific factors.

Duch-Brown, Grzybowski, Romahn, and Verboven (2020) empirically tested the effects of the geo-blocking ban in the portable computer market. One of the most striking findings of the study is that the welfare gains from the ban stem primarily from increased product variety rather than price convergence.

When the literature is examined, it can be seen that most existing studies focus either on regulatory frameworks or general e-commerce markets, while studies directly testing the relationship between pricing and purchasing power in platform-based digital product markets remain limited. In particular, the digital game market has not been sufficiently explored. Although global platforms such as Steam provide a unique context in which pricing behaviour, income differences, and digital arbitrage opportunities can be observed simultaneously, empirical studies in this area are still scarce. This study addresses this gap. By employing both linear and logarithmic models, it aims to test the extent to which digital game prices are related to purchasing power and to reveal the potential for digital arbitrage through deviations from expected price levels.

6. Methodology

In this study, a quantitative research method has been adopted to analyse price differentiation strategies in the digital game market and the relationship between these strategies and the purchasing power of countries. It is considered that using linear and logarithmic regression models together may provide a more comprehensive analysis in order to examine this relationship. The analysis is multi-layered. In this context, different types of models have been preferred in order to evaluate whether the findings obtained are specific to a particular model. In addition, residual and deviation analyses have also been included to examine the model results in greater detail.

The research population consists of Steam, the global digital game distribution platform. This platform was preferred because its wide geographical coverage allows for the examination of countries with different income levels together. The sample consists of 63 countries. These countries represent different income groups. In the selection process, it can be said that attention was paid to achieving as heterogeneous a distribution as possible among the countries where the platform provides services.

In the price analysis, instead of relying on data from a single game, a basket consisting of 10 games was created to ensure diversity. To ensure diversity in the created segment, high-budget new productions (AAA), indie (independent) productions, and games that can now be considered classics were included. The content of the basket is as follows: Baldur's Gate 3, Elden Ring, Call of Duty Modern Warfare 3, Red Dead Redemption 2, Cyberpunk 2077, Euro Truck Simulator 2, Rust, Stardew Valley, Hades 2, Terraria. Price data for the games were retrieved instantaneously from the SteamDB database as of January 2026. Local currencies were converted to US dollars using instant exchange rate conversion to ensure comparability.

The variables used in the study are as follows: Dependent variable (Y): The US dollar price of the average price of the '10-game basket' calculated for 63 countries. Independent variable (X): Data on countries' gross domestic product per capita (GDP per capita PPP). This data was obtained in terms of purchasing power parity (PPP) to adjust for price level differences and living costs between countries. For macroeconomic data, the 2024 data, which is the most recent finalized set in the World Bank database, was used. The time difference (time-lag) between price data (2026) and GDP per capita PPP data (2024) was neglected in the analysis under the assumption (ceteris paribus) that the macroeconomic welfare rankings of the countries did not undergo a structural change in the short term and relative purchasing power remained constant.

Within the scope of the analysis, a linear regression model was first constructed. The simple linear regression model established within the scope of the analysis is as follows:

$$Price_i = \beta_0 + \beta_1 \left(GDP_{PPP_i}\right) + \epsilon_i \quad (1)$$

In this equation, $Price_i$ represents the average game basket price in country i; while GDP_{PPP_i} represents the per capita purchasing power of that country. In this model, it is assumed that there is a direct relationship between the variable representing the average game price at the country level and per capita income. However, it should not be overlooked that the model may be limited and that other factors may also be influential. For this reason, a second model has been established. In the newly constructed model, a log-linear model was preferred based on the assumption that the relationship between the variables may have a proportional structure rather than a purely linear one.

$$\ln\left(Price_i\right) = \beta_0 + \beta_1 \, ln\left(GDP_{PPP_i}\right) + \epsilon_i \quad (2)$$

This model is considered to provide advantages, particularly in reducing the problem of heteroscedasticity and in capturing the percentage-based relationship between variables more clearly. It is anticipated that the results may differ under this model.

Residual analysis was conducted to evaluate the performance of the model. Residual values represent the differences between the observed prices and the values predicted by the model, and it is suggested that they may reveal the countries in which the model systematically makes errors. In addition, a deviation analysis was performed. In order to more clearly observe price differences between countries, the proportional differences between the actual prices and the predicted values were calculated. The deviation values were computed as follows:

$$Deviation_i = \frac{Actual\ Price_i - Predicted\ Price_i}{Predicted\ Price_i} \quad (3)$$

The values obtained as a result of this calculation indicate the extent to which countries deviate from the expected price level. Negative values may point to relatively lower prices, while positive values may be associated with higher price levels. Within this framework, it is observed that some countries are cheaper than expected, while others are more expensive. This situation is considered to lead to the emergence of arbitrage opportunities in digital markets, allowing participants to benefit from price differences.

7. Findings

The findings obtained as a result of the regression analysis applied to the macroeconomic data collected for 63 countries and the constructed digital game basket prices within the scope of the study are as follows:

In the constructed econometric model, the strength and direction of the relationship between countries' purchasing power and digital game prices were tested. According to the analysis results, a positive relationship was detected between per capita income and digital game basket prices. However, this relationship alone is insufficient to fully explain all price differences. This finding appears to be consistent with empirical studies in the literature emphasizing that income level is an important but not solely sufficient determinant of price differentiation (Cavallo, 2017; Gyódi et al., 2017). The main outputs of the model are shown in Table 2 and Table 3:

Table 2. Summary statistics of the linear regression model

Statistics	Value
Observations	63
R-squared	0.25
Significance F	0.000026

Source: created by the author.

Table 3. Linear Regression Results: GDP per Capita (PPP) and Game Basket Prices

Variables	Coefficient	Standard Error	P-Value
Intercept	34.94	1.87	<0.001
GDP per Capita (PPP)	0.00013	0.000029	<0.001

Source: created by the author.

The results of the linear regression model indicate that as purchasing power increases, the game basket price also tends to rise. The overall significance level of the model appears to be statistically strong, and the Significance F value suggests that this relationship is not merely the result of random variation. This limited explanatory power is consistent with theoretical approaches arguing that price

differentiation in digital markets is shaped not only by income but also by strategic and competitive factors (Bourreau and Manenti, 2022). The direction of the relationship is positive. However, the explanatory power of the linear model remains limited. An R-squared value of approximately 0.253 indicates that only about one-quarter of the variation in game prices across countries can be explained by per capita income, while the remaining portion is associated with other variables. The summary statistics of the linear model are visualized in Figure 1.

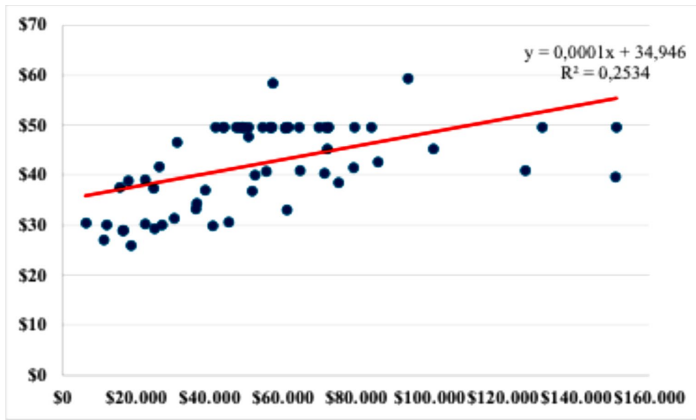

Figure 1. The linear relationship between GDP per capita (PPP) and digital game prices
Source: created by the author using data from The World Bank (GDP PPP, 2024) and SteamDB (2026).

According to Figure 1, the trend line is upward sloping. This indicates that as income levels increase, prices also rise. However, the distribution in the graph suggests that a single-variable linear structure may be insufficient. The distribution is not homogeneous. This heterogeneous pattern is consistent with studies in the literature indicating that digital platforms determine prices not only based on cost or income but also through regional strategies (Zarra, 2016). Clustering is particularly noticeable among countries in the low- and middle-income groups. In contrast, among high-income countries, the presence of significant price differences even between observations with similar income levels indicates that the platform takes regional pricing strategies into account.

When the coefficient of the linear model is examined, it is observed that each 1-dollar increase in per capita income leads to a very small but positive increase in the basket price. The direction of the relationship is as expected; however, the magnitude of the relationship shows that pricing does not operate solely through an income-based automatic mechanism, but also involves platform decisions and country-specific market conditions. This finding is consistent with recent studies suggesting that data-driven and algorithmic pricing mechanisms are becoming increasingly influential in price formation (Grochowski et al., 2022; OECD, 2023).

This result is also in line with studies suggesting that digital platforms may implement more granular and personalized pricing strategies, extending price differentiation beyond country-level segmentation (Poort and Zuiderveen Borgesius, 2019).

Following the linear model, the log-linear model produced stronger results. The main outputs of the model are shown in Table 4 and Table 5. The findings obtained as a result of the log-linear analysis applied to the macroeconomic data collected for 63 countries and the constructed digital game basket prices within the scope of the study are as follows:

Table 4. Summary statistics of the log-linear model

Statistics	Value
Observations	63
R-squared	0.43
Significance F	<0.001

Source: created by the author.

Table 5. Log-Linear Regression Results: ln(GDP per Capita (PPP)) and ln(Game Basket Prices)

Variables	Coefficient	Standard Error	P-Value
Intercept	1.38	0.34	<0.001
ln(GDP per Capita (PPP))	0.22	0.032	<0.001

Source: created by the author.

When the outputs of the log-linear model are examined, it is observed that when ln(Price) is used as the dependent variable and ln(GDP per Capita (PPP)) as the independent variable, the explanatory power of the model increases to approximately 0.436, indicating that the logarithmic structure fits the data better. This increase does not appear to be random. This finding is consistent with the empirical literature emphasizing that relationships in digital markets are often not linear but proportional and scale-dependent. The rise in the explanatory power from around 25% in the linear model to about 44% in the log model suggests that the relationship between price and income may have a proportional structure. In this respect, it can be said that the log model performs better.

Moreover, the coefficient is more meaningful. The ln(GDP per Capita (PPP)) coefficient of approximately 0.218 indicates that a 1% increase in per capita income may be associated with about a 0.22% increase in the game basket price. In other words, prices increase along with income. However, this increase is not proportional; that is, the platform does not automatically reflect much higher prices in wealthier countries, but rather appears to limit price increases to some

extent. This suggests the presence of other factors influencing pricing strategies. The summary statistics of the analysis and the explanatory coefficient of the model are visualized in Figure 2.

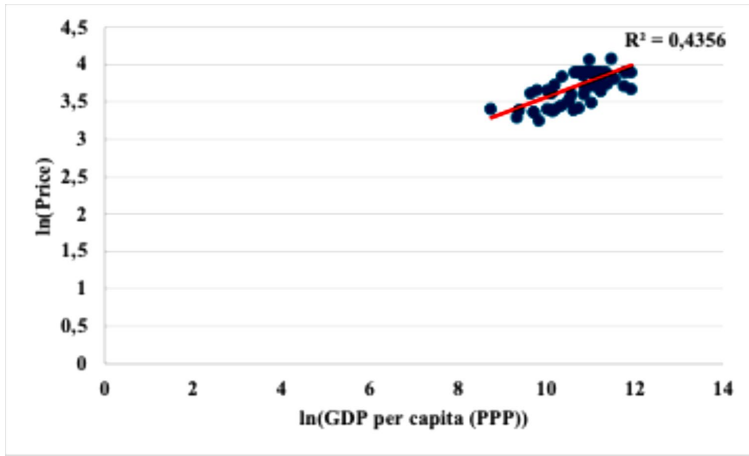

Figure 2. The log-linear relationship between GDP per capita (PPP) and digital game prices

Source: created by the author using data from The World Bank (GDP PPP, 2024) and SteamDB (2026).

At this point, cross-country comparisons become more informative. The observed price differences even among countries within similar income groups suggest that a pricing logic based solely on purchasing power may be insufficient and that national markets are positioned differently. This result aligns with recent policy reports arguing that price differences between countries persist in the digital economy and that market integration remains limited (UNCTAD, 2024). In short, the same income level does not correspond to the same price level. This deviation from a one-to-one relationship is also consistent with empirical studies on purchasing power parity, which suggest that price levels may diverge across countries despite similar income levels, especially in the short run (Žďárek, 2012). The effect of this can be clearly seen in the residual plot. Figure 3 shows the distribution of residual values.

According to Figure 3, the fact that the residuals are not distributed completely randomly around the zero line suggests that the model systematically overestimates or underestimates at certain income levels; therefore, the linear form may be insufficient. In particular, the concentration of positive residuals in the middle-income range is noteworthy. This clustering indicates that in some middle-income countries, actual prices remain higher than those predicted by the model, while in low- and very high-income groups, deviations in the opposite direction are more

frequently observed. For this reason, deviation analysis gains particular importance. Figure 4 presents information related to the deviation analysis.

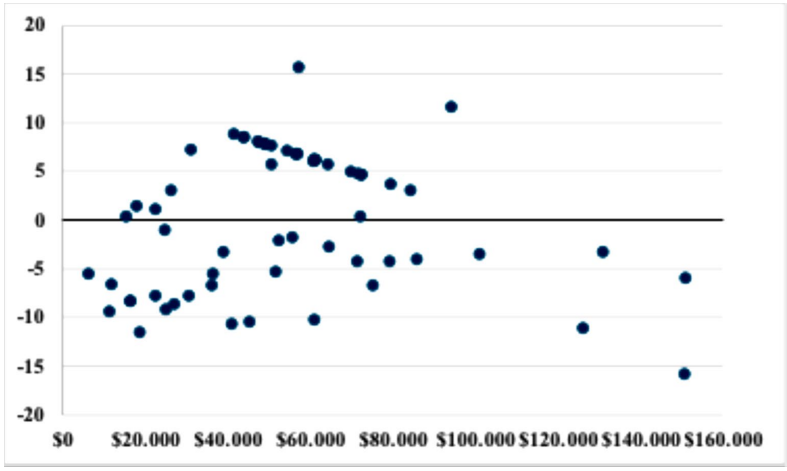

Figure 3. Residual distribution from the linear regression model

Source: Created by the author using data from The World Bank (GDP PPP, 2024) and SteamDB (2026).

The deviation values calculated based on the proportional difference between actual prices and predicted prices make it possible to more clearly identify which countries are positioned as more expensive or cheaper than expected. Figure 4 indicates that Israel has the highest positive deviation, suggesting that its prices are significantly above the predicted level. Israel's positive deviation of approximately 36.7% suggests that prices in this country are significantly above the level predicted by the model, indicating a relatively more expensive market structure compared to its purchasing power. Following Israel, Switzerland exhibits the next highest positive deviation. The deviation of approximately 24.2% in Switzerland similarly suggests that, despite its high income level, prices remain above the predicted line, implying that consumers face a relatively expensive digital market.

Among the countries with positive deviations, Bulgaria, Latvia, and Greece also stand out. With deviations of approximately 21.8%, 20.8%, and 20.7%, respectively, these findings suggest that prices in these countries are higher than expected relative to their income levels, pointing to a possible pattern of relative expensiveness within Europe. Slovakia, Hungary, Romania, Croatia, and Estonia are close to this group. In these countries, positive deviations range between approximately 18.6% and 19.5%, indicating a consistent, though not extreme, tendency for prices to remain above predicted levels. The fact that some countries

in Eastern and Central Europe appear relatively expensive despite not having income levels comparable to Western Europe suggests that pricing cannot be explained solely by welfare levels and that regional price standardization may play a role.

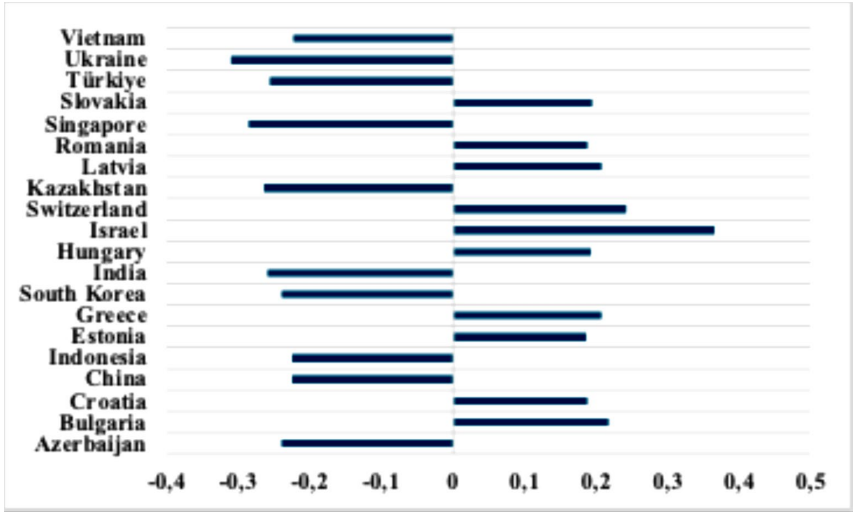

Figure 4. Price deviations from the estimated model

Source: created by the author using data from The World Bank (GDP PPP, 2024) and SteamDB (2026).

Looking at the group with negative deviations, Ukraine exhibits the lowest deviation at approximately – 30.9%, indicating that prices in this country are far below the level expected by the model and pointing to a strong relative affordability. Ukraine appears to be the cheapest market. In Singapore, a negative deviation of approximately – 28.6% suggests that even a high-income country can fall below the predicted price line, indicating that high welfare does not automatically result in high prices. This case appears to be an outlier. Kazakhstan and India also show significant negative deviations. With deviations of approximately – 26.4% and – 25.9%, respectively, these results suggest that prices in these countries are relatively low compared to purchasing power, making them potentially attractive regions for digital arbitrage. Türkiye is also included in this group. A deviation of approximately – 25.5% indicates that prices in Türkiye are significantly below model predictions, meaning that Steam pricing remains relatively low given the country's income level. In this respect, Türkiye stands out.

Vietnam, China, and Indonesia are also part of the negative deviation group. With deviations ranging between approximately – 22% and – 22.5%, these countries suggest that prices in some Asian markets are kept below expected levels,

possibly due to regional price differentiation strategies. Azerbaijan and South Korea also fall into the negative deviation group; however, although both exhibit deviations of around – 23.9%, their differing income levels, regional positions, and consumer market structures suggest that similar outcomes may arise from different underlying causes.

When countries with negative and positive deviations are compared, the fact that countries such as Israel and Switzerland lie above the predicted level, while countries such as Türkiye, Ukraine, and Kazakhstan fall below it, indicates that the platform does not apply a uniform global pricing strategy. This finding is consistent with the literature suggesting that geo-blocking and regional price differentiation are strategically employed by firms (Zarra, 2016). This observation also supports the view that digital platforms, particularly in the gaming industry, act as strategic intermediaries that actively shape regional pricing structures (Gómez Trujillo, 2023). Moreover, similar magnitudes of deviation may carry different meanings. For instance, Israel's positive deviation and Türkiye's negative deviation can be interpreted not only as opposite extremes but also as representing two distinct regional pricing regimes-one reflecting relative expensiveness and the other relative affordability.

In addition, factors outside the model play an important role. Elements such as tax structures, exchange rate policies, and regional competitive conditions, as well as the strategic choices of digital platforms and likely expectations regarding user behaviour, may also influence price formation. This multidimensional structure aligns with recent studies emphasizing the need to jointly consider algorithmic pricing and digital market dynamics (OECD, 2023). Therefore, the findings should be evaluated in two stages. In the first stage, purchasing power can be considered a significant variable in explaining prices; in the second stage, this explanation remains incomplete, and large cross-country deviations may point to alternative factors.

The findings also indicate the existence of digital arbitrage opportunities. The significant price deviations observed across countries suggest that the same digital product is offered at different price levels in different regions, which may increase consumers' incentives for cross-border purchasing. In particular, in countries with negative deviations, prices falling below expected levels indicate that these regions have become relatively cheaper markets and may offer potential arbitrage opportunities. Conversely, in countries with positive deviations, consumers are required to pay higher prices for the same product, suggesting that regional pricing strategies of platforms may have varying impacts on consumer welfare. In this context, the findings demonstrate that price differentiation in digital markets is

shaped not only by local economic conditions but also by firms' strategic decisions, and that this situation may foster digital arbitrage dynamics.

8. Conclusions

This study analysed the relationship between pricing mechanisms in the digital game market and the purchasing power of countries across 63 countries and 10 different games. The study has certain limitations. The single-variable model structure and the limitations of the dataset in terms of its time dimension require that the results be interpreted with caution.

The findings indicate that price differentiation strategies in the digital game market may be related to the purchasing power of countries; however, this relationship alone is not sufficient to explain prices. The results point to a positive relationship between per capita income and game prices. The relationship exists, but it is limited. Although the linear model appears to be statistically significant, its low explanatory power suggests that pricing is not determined solely by purchasing power and that other factors may also play a role. Therefore, the linear model is not sufficient on its own. The log-linear model, on the other hand, appears to be stronger. The higher explanatory power obtained from this model suggests that the relationship between price and income is not linear but proportional in nature.

When cross-country comparisons are made, it is observed that prices remain above expected levels in countries such as Israel and Switzerland, while they are lower in countries such as Türkiye, Ukraine, and Kazakhstan. This points to an important insight: prices are not determined solely based on income levels. It is likely that platforms implement country-specific strategies, resulting in different pricing patterns. This indicates the absence of a uniform pricing structure. The deviation analysis also supports this interpretation. It can be argued that prices remain relatively low in countries with negative deviations, while a more expensive structure emerges in countries with positive deviations. These differences may create arbitrage opportunities. Since digital products are less constrained by geographical boundaries, consumers may turn to lower-priced markets, which could affect market equilibrium.

Overall, the findings suggest that pricing in the digital game market is a multidimensional process. Although purchasing power plays an important role, prices are likely shaped by the combined effects of various economic and strategic factors. As long as this price advantage persists in certain countries, consumer motivation to overcome physical borders through digital means will continue. Such an

increase in consumer mobility may force firms to adopt stricter geo-blocking measures or reduce price differentials. Indeed, Steam's removal of local currency support in Türkiye and Argentina at the end of 2023 and its transition to U.S. dollar pricing can be seen as a concrete indicator of this defensive response. Homo economicus will always find ways to overcome the digital barriers constructed by firms. The solution to this issue lies not in further tightening digital borders, but in addressing the global income inequality reflected in digital markets.

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