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IS AUSTRALIA REALLY THE LUCKY COUNTRY? PRICE DISCRIMINATION IN DIGITAL DISTRIBUTION

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Abstract

Digital content services have become a major source of information and entertainment for people, and the Internet has provided a means by which businesses and consumers can easily and efficiently distribute it. A large amount of this content is copyrighted or tied to a service, and sold commercially through multiple electronic and physical distribution channels. The modern day 'gamer' is expected to have a broadband connection and be able to access various digital distribution platforms to acquire such content. Due to price information dispersion and web resources dedicated to consumer awareness, differential pricing of PC game digital content delivery has recently become a controversial topic. This study collected and analysed price data across six geographical regions for over 1000 software titles in order to determine whether there was regional price discrimination. The results showed strong support for the price discrimination proposition. Future studies will focus on the causes and effects of such pricing and how pricing strategies can better manage the relationship between consumer and publisher.

Keywords: digital distribution, e-commerce, region pricing, price discrimination, grey markets.

1 INTRODUCTION

Digital information is an ever present part of modern life, with over 90% of information produced in a digital format (Varian 2005). Digital distribution services for personal computer games (e.g. Steam and Impulse) have become an attractive delivery option for the modern consumer with access to a broadband Internet connection. Multiple platforms from competing content providers have provided access to a global market and a need to choose suitable pricing strategies for a much more diversified customer base.

The largest of these digital distribution platforms for PC games¹ is believed to have about 70% of that market (Stardock 2009), with over 25 million active accounts spread over 237 countries in 21 languages and had a growth of 25% in 2009. The number of online users is regularly around 2.5 million concurrently, with an average of over 13 billion player minutes and 20 petabytes of data delivered per month. Unit sales in 2009 increased by more than 205%, the fifth year in a row that sales growth has exceeded 100%. The closest competitor believes they only have 10% of the PC games digital distribution market (remaining 20% consisting of multiple smaller platforms) and that the digital distribution accounts for about 25% of revenues "for a typical PC game publisher on a new title" (Stardock 2009). Considering the number of fixed broadband subscribers globally by the end of 2009 was believed to be almost 500 million (ITU 2010), there is significant potential for further rapid market growth.

Historically publishers and distributors have used economic models for pricing to set recommended retail prices within physical distribution channels and those prices will differ for reasons such as currency fluctuations and buying-power of each market segment. With the shift to digital distribution, those pricing decisions are causing friction with some consumers who enjoy the benefits of increased worldwide information and price transparency (Sinha 2000), coupled with a sense of entitlement to pay the same price (*ceteris paribus*) for the digital content delivery of their 'bits and bytes' regardless of location (Huang et al. 2005). This concern is highlighted by a complaint-oriented message thread in the discussion forum of the distribution platform's online store which contains in excess of 7,400 posts submitted over (approx.) the last two years. The same issue with regional pricing but from a distributor and publisher perspective is identified in the Stardock (2009) report to customers.

The purpose of this study is to determine whether there is price disparity across regions for a major digital content delivery service and if so, what direction are the pricing differences. Price data will be collected and analysed for four different regions (Europe, United Kingdom, United States of America and Australia). These four regions represent a large percentage of the broadband equipped 'western' PC game market (ITU 2010). The research question is as follows:

Does price discrimination exist in digital distribution of computer games?

This study forms the basis for future research into consumer behaviour when faced with opportunity for fraudulent purchases (pretending to live in another country), how publishers or content delivery services manage inter-regional sales and what role DRM (digital rights management) will play.

The paper proceeds by reviewing relevant literature and explanation of the methodology, followed by discussion of results, limitations and future research.

2 RELATED LITERATURE

The economics of price discrimination in physical distribution channels is well understood (Phlips 1983; Varian 1989; Stole 2005). However with the advent of high-speed digital networks, the

¹ Care has been taken to not explicitly identify the digital distribution platform and online store investigated in this paper at this stage. If you wish to know further details, please contact the author.

opportunity for convenient digital distribution has negated some of the physical barriers preventing consumers from purchasing outside of their immediate market. This has flow-on effects on how consumers adapt to the new distribution environment how publishers and consumers influence each other.

2.1 Digital delivery as a distribution channel

Computer software for many years has followed a publishing model which paralleled that of printed books. This was a process where developers wrote the software and a publisher would acquire rights to the work for marketing and provision to distributors. These distributors would ship to retail outlets to be typically sold to consumers at or near the recommended retail price. Some early exemptions were smaller independent developers that handled many aspects of the process themselves and their ability to make perfect yet relatively inexpensive digital copies of their work enabled this.

Software distribution models such as *shareware* further encouraged end-user distribution (sharing) of software. It has been found that sharing of information goods like software can increase profits (Varian 2000). Shareware provided a means for those new users to register or activate each copy via some complementary means in order to access full functionality or extend the usage period. The early days of shareware often relied upon physical distribution of media. With the increase in data communication speeds and Bulletin Board System popularity, digital delivery of some software became a reality for users who possessed dial-up modems. Over time as Internet access became affordable and prevalent, this distribution concept migrated to the world-wide web (WWW) where small-scale software developers could advertise and offer their digital goods via a web presence.

With the pervasiveness of broadband communication at affordable prices in many countries (ITU 2010), publishers are increasingly moving towards digital distribution as a means of delivering content (Stardock 2009). Through content mirroring services hosted by ISPs and peering partners, consumers can access 'local' copies of content at higher speeds and reduced prices. With the initial digital distribution of content followed by digital access to subscription services, this also allows publishers to adopt a more profitable business model of selling to high-value and renting to low-value customers (Varian 2000).

2.2 Market power and imperfect competition

Market power is the ability for a market participant to influence the market price of a good or service. When a market is perfectly competitive, no participants in the market have *market power*. Therefore the software publisher is a *price taker* who by definition is not influential enough to affect the product's pricing, but can still successfully sell at the current price to other market participants (i.e. the consumer). If the market competition is imperfect and the software publisher attains market power, they become a *price maker* and are able to manipulate the price and supply of the software product they sell. In such a situation, the consumer then assumes the role of the *price taker* and may become subject to the firm increasing sales by reducing prices (Krugman & Obstfeld 1999).

Ancarani (2002) proposed firms need to use smart and dynamic pricing to leverage the different value perceptions of customers. There is also automatic pricing, which is another method by which to maximise profits for sellers (Abe & Kamba 2000). Automatic pricing systems distinguish themselves from supply-and-demand dynamic pricing models by setting prices based on historical information. Abe and Kamba (2000) highlighted that consumers are increasingly influencing prices, not just the suppliers or manufacturers, due to consumer-to-consumer and 'reverse bid' auction sites.

When considering print versus digital information resource pricing, Venkatesh and Chatterjee (2006) found the digital versions could enhance profits through price discrimination, and that there is a need to understand how to make the digital version more attractive with extra content and features. Koukova et al. (2008) found that using differential prices and informing customers of suitable usage were effective strategies. Implementations of this strategy can be seen through the recent adoption of

DLC (Downloadable Content) and digital editions that add extra features or content in popular game titles.

2.3 Price Discrimination

Price discrimination is well studied and a common practice across markets where there is a difference in economic demographics, with the “wealthy” regions being able to afford to pay a higher price for a product or service than “poorer” regions (Phlips 1983; Varian 1989; Stole 2005). It is seen as desirable as it can increase the efficiency of the economy, but causes strong opposition from informed buyers (Odlyzko 2003). By increasing regional segmentation of the market, manufacturers can sell at the optimal price and maximise profits while reducing consumer surplus (Ancarani 2002). Segmentation of markets however can (and often does) lead to the development of a “grey market” where consumers and resellers buy from a cheaper market by importing. In many markets, the government plays an important role in maintaining or controlling price discrimination by imposing tariffs or import restrictions on certain items (Odlyzko 2003). Changes to copyright law which limit consumer rights have also been argued to increase the level of price discrimination. In particular, where the right to resell is removed (Meurer 1997).

Duranceau (2003) discussed how digital content is often priced at perceived market value and not the cost of provision. This can also be seen in contexts where higher prices can be charged by a supplier because of some tangible non-digital attribute of the product is valued by the consumer (Lal & Sarvary 1999) or the service quality (Venkatesan et al. 2006). For physically distributed software, the Internet provides a means for the quick and easy dissemination and searching of price information. For digitally distributed software, the same applies and also the opportunity to offer immediate use (or as immediate as bandwidth allows). If the non-digital attributes no longer exist due to a purely digital process of searching, purchasing and acquiring, then traditional retailers are likely to become uncompetitive which may cause an increase in prices where a monopoly on digital sales exists. The pricing is important as Al-Rafee and Cronan (2006) identified that if a consumer has the cognitive belief that the price is unfairly high, they are more likely to have a higher attitude towards piracy.

2.4 Electronic grey markets

A “grey market” is an unofficial channel by which resellers or consumers can acquire goods without utilizing the official distributor(s) servicing that region. Physical goods acquired through unofficial channels may differ in packaging and level of end-user customer support (e.g. original region of sale determined from serial number and warranty limited to within that region). Regional governments (normally at the country level) will set import tariffs on items sourced from overseas and provided the cost of importation is not too high, grey market importers can sell the imported item at a discount within the region. Consumers who import directly from a different region do not have the bulk buying power of resellers. However, if the value of the imported goods is not above an import tax threshold, the only import costs incurred is the price of postage and currency conversion. The opportunity to acquire equivalent goods at a substantially reduced price is attractive to buyers.

Digital delivery of software makes the establishment of a grey market relatively simple as the distribution method is normally consistent regardless of region (e.g. download installation client files from a website). The actual purchase consists of a license code or ‘CD-key’ that authorises the installation of the downloaded files and enables use of the software. This mechanism for activating use by a string of text makes it relatively simple for a buyer to be sent the activation key via email once payment has been provided. A reseller in a cheaper region can purchase the keys locally and resell them to customers in more expensive regions to activate their installations. The reseller makes a profit off the difference between purchase price and resale price, with close to zero overheads due to the entire process being electronic with little human labour involved. Such practice has been prevalent for many years, but recently it has gained media attention with a game publisher requesting a digital distribution platform ban keys for customers who owned grey market imports of a recent sales record breaking AAA title (Burnes 2009).

3 RESEARCH METHOD

The public-domain content of an online store for a large digital delivery service provider (see footnote on 1st page) was ‘scraped’ for price information across the four main country regions that the provider services (EU, UK, US and AU). This catalogue exceeds 1000 game titles, with almost all being English language titles and many supporting multiple European languages. Some publishers choose to set different prices for countries within the EU and do not publicly announce which countries belong to which region. Therefore this study treats the EU region as being segregated into three tiers based upon store prices for Sweden, Norway and Lithuania for EU Tier 1, 2 and 3 respectively. These 3 countries were identified as being representative based upon tier information derived from price data and store forum discussion, but are not classified by country-level economic indicators. Combined this gives a total of six price regions. The majority of prices are consistent across all three tiers, so Tier 1 can be treated as the EU price.

Webpage mirroring software was used to capture the product price pages quickly and minimise the likelihood of price fluctuations due to promotional events, publisher initiated pricing adjustments and other potential factors that may cause a title’s price in a particular region to change. This took approximately 15 minutes to download and then several hours to parse into comma delimited files. The data was then cleaned in preparation for statistical analysis. Any products that did not have data for all regions were manually checked to record whether this was a result of regional sale restrictions, invalid hyperlinks or unexplained redirections. The data collection process for 1038 software products resulted in price data for 1035, 1035, 1025, 1029, 1034 and 1002 products for the EU Tier 1, 2, 3, US, UK and AU regions respectively. From this population of 1038, a sample of 987 products that had prices across all six regions was used for the inferential analysis.

The study is exploratory in nature, with descriptive and comparison of means being used to answer the research question, as well as identify topics of interest and potential issues for future study. Although the sample size is large and a normal distribution could be expected for prices, the data indicated a categorization effect with products being set at discrete price levels. This resulted in equivalent non-parametric Friedman, and Wilcoxon Signed Ranks tests for related samples being deemed to be more suitable techniques for data analysis.

4 RESULTS

Table 1 shows descriptive statistics for each of the 6 regions being investigated in this study. The EU, US and UK regions had price data for about 99% of the software catalogue, with the AU region lagging behind on 97%. This larger discrepancy in the AU catalogue is due to 12 titles being unlisted in the AU store and a further 24 titles locked out due to regional restrictions. The AU store uses USD.

Table 2 presents the same information but limited to only titles that were common to all regions, with all prices converted to Australian dollars at the prevailing interest rate on the day the data was collected (\$1 AUD = ~€0.6375 EUR, ~£0.5527 GBP and ~\$0.8838 USD).

	EU (Tier 1) (€ EUR)	EU (Tier 2) (€ EUR)	EU (Tier 3) (€ EUR)	US (\$ USD)	UK (£ GBP)	AU (\$ USD)
N	1035	1035	1025	1029	1034	1002
Sum	18474.63	18210.43	17985.66	19104.46	13171.92	18818.73
Mean	17.8499	17.5946	17.5470	18.5660	12.7388	18.7812
Std. Deviation	13.74985	13.50593	13.55269	13.75588	9.18574	14.32318
Minimum	.65	.65	.65	.99	.59	.99
Maximum	99.99	99.99	99.99	99.99	69.99	99.99

Table 1. Entire software catalogue descriptive statistics (in local store currency)

	EU (Tier 1) (\$ AUD)	EU (Tier 2) (\$ AUD)	EU (Tier 3) (\$ AUD)	US (\$ AUD)	UK (\$ AUD)	AU (\$ AUD)	
N	987	987	987	987	987	987	
Sum	26844.85	26461.79	26548.06	20152.69	22273.68	20655.09	
Mean	27.1984	26.8102	26.8976	20.4167	22.5678	20.9257	
Std. Deviation	20.72483	20.44407	20.56948	14.71134	16.16416	15.87230	
Std. Error	.65968	.65074	.65473	.46827	.51451	.50522	
95% Confidence Interval for Mean	Lower Bound	25.9038	25.5332	25.6128	19.4978	21.5582	19.9343
	Upper Bound	28.4929	28.0872	28.1824	21.3356	23.5775	21.9172
Minimum	1.02	1.02	1.02	1.12	1.07	1.12	
Maximum	156.85	156.85	156.85	113.14	126.64	113.14	

Table 2. Common software catalogue descriptive statistics (converted to \$ AUD)

The total cost for the entire catalogue of 1038 titles is \$20861.94 AUD; with 601 of the titles being cheapest in the AU store (many of the AU titles have identical prices in the US store). The UK store also showed to have a strong influence on pricing, with 32.66% (339 titles worth \$6221.65 AUD) being cheapest to purchase from that region. For the 987 titles in common across all regions, the total cost is \$19215.53 AUD.

The results of the Friedman Test for detecting differences in prices across regions found a statistically significant difference between regions (at the $p < 0.001$ significance level). The US had the lowest mean rank (cheapest) at 2.14 and EU (Tier 1) had the highest (most expensive) at 4.70. The ranks for EU (Tier 2), EU (Tier 3), UK and AU were 4.56, 4.57, 2.84 and 2.20 respectively. A Wilcoxon Signed Ranks Test was used to further explore the between region differences. All regions except “EU (Tier 3) - EU (Tier 2)” were statistically different from each other (at the $p < 0.001$ significance level). The results of this analysis are shown in Table 3.

Region	N			Mean Rank		Sum of Ranks		Statistics	
	Negative Ranks	Positive Ranks	Ties	Negative Ranks	Positive Ranks	Negative Ranks	Positive Ranks	Z	Asymp. Sig. (2-tailed)
EU (Tier 2) - EU (Tier 1)	59	3	925	30.26	55.83	1785.50	167.50	-5.694a	.000
EU (Tier 3) - EU (Tier 1)	61	8	918	32.27	55.81	1968.50	446.50	-4.563a	.000
US - EU (Tier 1)	903	84	0	514.88	269.58	464933.00	22645.00	-24.722a	.000
UK - EU (Tier 1)	814	173	0	542.38	266.36	441498.00	46080.00	-22.077a	.000
AU - EU (Tier 1)	892	95	0	514.92	297.59	459307.00	28271.00	-24.093a	.000
EU (Tier 3) - EU (Tier 2)	2	5	980	3.00	4.40	6.00	22.00	-1.357b	.175
US - EU (Tier 2)	885	102	0	520.06	267.86	460256.00	27322.00	-24.195a	.000
UK - EU (Tier 2)	796	191	0	537.54	312.55	427880.00	59698.00	-20.555a	.000
AU - EU (Tier 2)	874	113	0	519.89	293.72	454388.00	33190.00	-23.538a	.000
US - EU (Tier 3)	887	100	0	519.55	267.38	460840.00	26738.00	-24.260a	.000
UK - EU (Tier 3)	796	191	0	537.64	312.14	427960.00	59618.00	-20.564a	.000
AU - EU (Tier 3)	877	110	0	520.55	282.33	456522.00	31056.00	-23.777a	.000
UK - US	355	632	0	323.55	589.74	114862.00	372716.00	-14.398b	.000
AU - US	10	30	947	15.30	22.23	153.00	667.00	-3.462b	.001
AU - UK	625	362	0	582.38	341.42	363985.00	123593.00	-13.423a	.000

a. Based on positive ranks.

b. Based on negative ranks.

Table 3. Wilcoxon Signed Ranks Test statistics

5 DISCUSSION

In response to the research question “*Does price discrimination exist in digital distribution of computer games?*”, the answer has been found to be yes. Table 3 shows that where the currency is identical across regions, the prices for the majority of titles are consistently the same, but still have significant differences. The results of the statistical analysis support the proposition that price discrimination exists between all but two of the regions. The lack of significant pricing difference between Tier 2 and Tier 3 of the EU region can be partly explained by the merging of Tier 3 into Tier 2 for most, but not all software titles.

By providing false location information or having a ‘friend’ purchase a title in another region and gifting it, an Australian-based customer of this digital distribution service can save \$1439.56 AUD (a discount of almost 7%). With these savings come the risk that a publisher enforces region control and disables access to game. Both the US and AU store use the US dollar for the currency of payment, with 947 (96%) of the titles having the same price. This is beneficial to Australian customers as the online store prices are typically cheaper than the local Australian dollar RRP and comparable to the grey import versions of those physical titles. EU customers are less fortunate due to a tendency for titles to adopt a EU↔US pricing model of €1 EUR = \$1 USD (581 titles exactly and 780 titles within +/- 10%). At the time of this study, €1 was equivalent to about \$0.72c, a difference of about 39%. This causes a large discrepancy in prices, to the detriment of EU customers.

The concerns of existing subscribers and future customers about differential pricing and a lack of transparency about why are justified. Forum discussion posts from one publisher said the digital distribution service recommended prices such as the \$1USD=€1EUR, while the digital distribution service said the publishers decide price points for each region. Who the responsibility lies with is not important provided customers are not turned away or unfairly punished for purchasing or acquiring content from outside their region. Regional pricing is rational from an economics perspective, but so is consumer behaviour that seeks to minimize the cost of digitally identical and legally acquired goods.

6 LIMITATIONS AND FUTURE RESEARCH

This study used price data from the largest digital distribution platform for computer games and is likely indicative of the entire market, however this needs to be tested further. Due to publishers using multiple distributors, there are other much smaller minor providers of similar services who sell some of the same popular game titles. Future studies with an economics focus that control for factors like currency fluctuations and piracy propensity could reveal whether there is individual, flat or tiered pricing across distributors regardless of market share. Such studies could also discover whether publishers favour their own in-house content delivery platforms through lower pricing or other means.

Some publishers on a per-title basis have shown intent to adopt DRM which requires persistent Internet connectivity for the software to authorise the installation and permit any functionality, even if such connectivity would not otherwise be a required feature (e.g. single player mode). Invasive DRM has met with high levels of resistance in the past and when the digital delivery content includes such mandatory DRM, customer dissatisfaction is likely to rise. How a content distribution platform can manage DRM without negatively impacting on sales and customer experiences is worthy of study.

Neither Norway, Sweden or Lithuania use the € as their currency and therefore the inhabitants of those countries (and others where applicable) are likely to incur currency exchange fees for purchases, which further adds to the purchase cost. Norway has not accessioned to the EU but is a member of the European Economic Area and therefore able to access the European Union’s market. There are multiple discussion forum posts expressing dissatisfaction about large price discrepancies between the lower local store prices and the higher online price, which is at odds with what the digital publishing service touts as a reduced cost method of distribution. Whether this affects digital sales and potentially influences piracy rates needs further investigation.

During the process of this investigation, it was noticed that there is relatively little per-title price adjustment over time. This indicates there is no automatic or dynamic pricing, but an actual longitudinal study is required to correctly determine this. There are however frequent sale periods (bi-weekly) and promotional pricing (e.g. new releases). Information about the sales figures are not released, but at least one game oriented social networking site (gamerDNA 2009) that tracks what their subscribers play has shown large increases that coincide with discount and free-play periods, with differences between gaming platforms (e.g. PC vs console). Further study of this purchasing behaviour and manipulation of market power is warranted to see if there is potential for automatic pricing models, as identified by Abe and Kamba (2000) in other distribution channels.

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