

The Economic Consequences of DVD Regional Restrictions

by

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1 Introduction

The international distribution of films on DVD has been segmented into geographically distinct markets by both technology-based restrictions and national parallel importation laws. The regional coding system requires that all DVD players must be manufactured for distribution and use in one of six geographic regions around the world. A number of competition authorities have begun investigations into the DVD regional coding system. In December 2000, the Australian Competition and Consumer Commission announced that it had begun investigations into the system; in June 2001, the European Commission began similar investigations.¹

This paper examines the economic consequences of the DVD regional coding system. In particular, our focus is upon whether the technical requirements that restrict DVD usage across regions can be justified as a means of generating potentially socially desirable price discrimination for content providers or are simply a means of restricting competition that may arise when DVD supply was globally unconstrained. We conclude that the conditions that may theoretically allow such restrictions to be efficient are unlikely to hold in the case of DVDs and that social welfare is likely to be significantly enhanced by eliminating such technical restrictions.

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¹ See Stephen Spencer, 'ACCC threatens to attack DVD zoning,' *The Age*, December 22 2000, Andrew Osborne, 'EC investigates allegation of DVD price fixing by Hollywood studios,' *The Guardian*, United Kingdom, June 12 2001.

The paper proceeds as follows. In the next section, we describe the nature of technical restrictions on DVD usage across regions and the history of how those restrictions emerged. Section 3 then turns to legal restrictions that reinforce those technical restrictions. Section 4 then evaluates four potential consequences of such restrictions on regional flows of DVDs, including price discrimination; facilitating collusion; preventing free-riding and preventing consumer confusion and argue that the latter two, potentially socially desirable consequences, are unlikely to be important in this case. We then turn to consider the impact of restrictions on the DVD hardware market before presenting potential policy options. A final section concludes.

2 Technical Restrictions on DVD Usage Across Regions

The coding system for DVDs is based on six international regions. These are USA, Canada and US Territories (Region 1); Japan, Europe South Africa, and Middle East (Region 2); South-East Asia, including Indonesia, South Korea, Hong Kong and Macau (Region 3); Australia, NZ, PNG, Pacific Islands, Central and South America (Region 4); Africa, Russia, Former Russian States, North Korea, East Asia (Region 5) and; China and Tibet (Region 6). The system requires that individual DVDs are coded for use in only one region and limits the ability of players to play DVDs that come from 'another' region.

The Regional Coding System forms part of the DVD Content Scrambling System (CSS). The CSS is a patented piece of software that must be included in a DVD player to meet the requirements of the patented DVD Format and Logo.² The primary purpose of the CSS software is to protect against piracy of DVDs by ensuring that pirated DVDs will not play on DVD players. When the software is licensed to a manufacturer, the manufacturer must agree that all DVD players that are manufactured will be designated for one region (recorded on an internal memory register) and contain regional code playback controls.³ The playback controls require that DVD players play data on a DVD only if the data is coded for playback in the

² The CSS software was developed by Matsushita and Toshiba and is licensed to the DVD Copy Control Association, a not for profit organisation responsible for administering the licensing of the software.

³ See CSS Licensing Agreement Version 1.1 Section 4.2 and CSS Specifications Version 1.1 Section 6.2.1.4.

same region as the region for which the DVD player is itself designated.⁴ For example, a DVD player that is designated as region 1 cannot play a DVD that is designated for any specific region other than region 1. The DVD software format does not require that they be set for a specific regional code. DVDs without any regional codes will play on all DVD players. However, the DVDs released by the major film distributors contain region codes so that DVDs manufactured for use in one region will not play on a DVD player manufactured for another region.

The DVD Regional Coding System developed out of the negotiations prior to the release of the DVD Format that took place during 1995 and 1996. Prior to 1995 there had been major disagreement over the DVD format, with two major proposals coming from Toshiba/Time Warner and Sony/Phillips. A deal was brokered between the two groups by IBM in 1995 and in late 1995 the DVD Consortium (later the DVD Forum) was formed to negotiate the specifications for the format of all DVD related products. The founding members of the DVD consortium were predominantly the hardware and software manufacturers, but participants in the negotiations included a range of parties from the movie, consumer electronics and computer industries.⁵ The key issues under debate were DVD piracy protection, DVD format specifications and licensing of DVD patents.⁶ The negotiations were protracted and the launch of DVD in the US and Japan was postponed several times over the course of 1996.⁷ Eventually, participants from the movie industry proposed the Regional Coding System in January 1996.⁸ The Vice-President of MCA Video Louis Feola announced that it would not release DVD software unless the Regional Coding System was put into place and Disney and Paramount also made similar announcements.⁹ In November 1996, Matsushita announced that it would be manufacturing DVD hardware containing regional codes.¹⁰

⁴ See CSS Licensing Agreement Version 1.1 Section 4.2 and CSS Specifications Version 1.1 Section 6.2.2.2

⁵ Time Warner was also a founding member of the DVD Consortium

⁶ See Dana Parker, 'The delay of DVD,' *CD-Rom Professional*, 10 January 1996.

⁷ Mark Tran, 'Case of slipped discs,' *The Guardian*, 26 September 1996.

⁸ The idea had originally been raised during discussions in 1995 when the movie industry was preparing its "DVD Wishlist." At that stage studio lawyers were concerned about the anti-trust implications of the regional codes. Having received contrary legal advice the movie studios proceeded with their request in 1996. See 'DVD borders sought: grey market in new discs feared,' *Video Business*, 3 January 1996.

⁹ *Ibid.*

¹⁰ See 'Matsushita's Digital Video Disk Players to be Region Specific,' *Computergram International*, 6 November 1996.

The Regional Encoding System for DVDs serves to impede the flow of DVDs around the world. There are clearly other barriers that limit the worldwide flow of films, books, computer software and other information-based products. The most obvious barrier is language although national technological decisions may also raise barriers. With television broadcasts and consequently videotapes, the division of the world into NTSC and PAL systems is an example of a barrier created by a failure to coordinate on national technological standards.

In the case of DVDs, however, the restrictions were not driven by a requirement to establish a national standard. Rather, the stated purpose of the filmmakers in pressing for the Regional Encoding System was to protect the staggered release of movies around the world.¹¹ Filmmakers release films over a series of different formats in sequential order. A typical release sequence is cinema, home video/DVD, pay television and finally free-to-air television. Sequential release maximises the profits earned by a filmmaker from each film. Filmmakers also stagger the release of films around the world, primarily due to the high cost of film reels and to trial the marketing of the film.¹² Without restrictions on the movement of DVDs between countries, a film could be imported from a country where the film has already been released on DVD to another country prior to or during the cinema release of that film in that country, undermining the profits derived from each film.¹³ Despite the claim that regional codes are required to protect cinema release patent, regional codes have been attached to DVDs of old and new titles.

The Regional Encoding System has not completely prevented the flow of DVDs around the world. DVD players could be easily modified to play in all regions. The modification of DVD players is not illegal, although it voids the warranty on the DVD player. Many DVD retailers offer DVD modifications (installed either by the retailer or the customer) at the time of sale of the DVD player and there are websites devoted to retailing DVD modifications.¹⁴ Estimates suggest that 50-100% of DVDs

¹¹ See 'DVD borders sought: grey market in new discs feared,' *Video Business*, 3 January 1996.

¹² See further Dean McIntosh, 'A History and Possible Future of Cinema,' 2000, www.michaeldvd.com.au.

¹³ This does not arise with VHS because different TV standards prevent the importation of VHS tapes across regions. DVDs are, on the other hand, independent of TV standards.

¹⁴ Examples of online modification sites include Code Free DVD, Region Free DVD, dvdkits.com, DVD Upgrades, DVD In The World and Link Electronics.

(depending on the country) sold are modified to overcome regional coding.¹⁵ Moreover, figures suggest that over 30% of Region 1 DVDs are sold online to customers in other regions, despite pressures from Hollywood for the big e-commerce merchants to refrain from selling Region 1 DVDs outside the United States.¹⁶ In addition, it is estimated that between 15% and 50% of the United Kingdom market for DVDs is for Region 1 discs.¹⁷

As a result, there have been attempts to place new restrictions on DVDs to reinforce regional coding. The latest example of this is Regional Code Enhanced DVDs. Regional Code Enhanced (RCE) DVD software is programmed to check the region of the DVD player. An error message is displayed on the player's screen if the region of the player does not match the region of the DVD or if the player has been set to play DVDs from all regions. *The Patriot* was the first DVD using RCE. So far, enhanced DVDs have been released by Fox, Buena Vista/Touchstone/Miramax, MGM/Universal, Polygram, Columbia Tristar, Warner Home Video.¹⁸

The effectiveness of RCE to reinforce regional encoding depends on the method of modification of DVD players. There are three basic modification options for consumers:

- *All Region Setting*: The DVD player is modified to play for all DVD Regions.
- *Region Switching*: Programming of DVD is modified so that it changes its region depending on the region of the DVD that is inserted.
- *Manual Region Setting*: The user accesses a hidden menu, usually via series of key presses on the remote control, to change the region code setting. There is no limit on number of changes that can be performed.

Manual Region Setting is a more recent method for modification. As it requires no physical modification to the DVD player it has no impact upon the DVD player's warranty and RCE DVDs will continue to play. RCE DVDs will not play on DVD player that have been set for all regions. Whether or not RCE DVDs will play on a DVD player programmed for region switching will depend on the precise programming of the region switching.

¹⁵ Paul Zach, 'Singapore's a No-Code Zone,' *The Strait Times*, 21 July 1998; Sue Lowe, 'The Backstreet Market in DVD Grows,' *Sydney Morning Herald*, 30 August 1999; and Nigel Power, 'Don't Panic,' *Sunday Times*, United Kingdom, 25 June 2000.

¹⁶ Don Groves, 'Up to 30% of all DVD sales outside North America are being conducted online,' *Variety*, Volume 377, Issue 12, February 7 2000.

¹⁷ Sam Andrews, 'About 45 mil Region One DVDs imported from US and about half go to Europe; about 15-50% of UK's DVD market is for Region One discs,' *Billboard*, Volume 112, Issue 47, p.99.

¹⁸See Jim Taylor, 'DVD Frequently Asked Questions,' www.dvddmystified.com/dvdfaq.html.

3 Legal restrictions on DVD usage across regions

The parallel importing of DVDs into Australia remains illegal, despite the lifting of laws prohibiting the parallel importing of sound recordings.¹⁹ Under the *Copyright Act* it is an infringement of copyright to import an article into Australia for commercial purposes without the copyright owner's consent. The laws, however, do not prohibit purchases of DVDs from overseas by Australian citizens (either while travelling or over the Internet) for personal use. In New Zealand, the laws prohibiting the parallel importing of DVDs were repealed in 1998.²⁰ However, parallel imported DVDs can only be sold in New Zealand, the copyright owner or licensee retains the exclusive right to rent out DVDs and videos.²¹ In September 2000, the Intellectual Property and Competition Review Committee recommended the removal of parallel importing restrictions on videos and DVDs in Australia.

Some parallel importing restrictions also exist in Europe, preventing the sale of goods intended for sale outside Europe.²² There are, however, no restrictions on the movement of goods between European countries. Until December last year, region one DVDs were sold legally over the counter in France. However, in December the French government passed a bill, effective 1 January 2001, preventing over the counter sales of imported DVDs and importation for personal use. Under the new legislation, personal importation is only permitted six months after a film's cinema release.²³

4 The Economics of Regional Restrictions

Legal and technical restrictions are both means for achieving exclusive territories for the distribution of copyright goods. Gallini and Hollis identify four predominant reasons why manufacturers may seek to establish exclusive territories. These are price discrimination; facilitating collusion; preventing free-riding and

¹⁹ ss 102, 44D and 112D *Copyright Act 1968 (Commonwealth)*

²⁰ See ss 12(5A) (a) and (b) *Copyright (Removal of Parallel Importing) Amendment Act 1998 (NZ)*.

²¹ See New Zealand Ministry of Economic Development, 'Parallel Importing and the Creative Industries,' *Discussion Paper*, Competition and Enterprise Branch, December 2000, www.med.govt.nz/buslt/int_prop/creatdisc/

²² See further Denis Kelleher, 'Commission seeks fair pricing policy in Europe,' *Irish Times*, June 15 2001.

²³ See <http://www.dvdtimes.co.uk/getstory.cgi?story=1165>

preventing consumer confusion.²⁴ Where the restrictions are motivated by the latter two reasons, it is likely that restrictions will enhance social welfare. Where the restrictions are motivated by the former two reasons, the restrictions will likely reduce social welfare. In this section, we consider which of these reasons are likely to be motivating the exclusive territories for DVD software.

4.1 Price Discrimination

A manufacturer may be able to increase its profits by charging different prices in different countries. It seems likely that facilitating international price discrimination was a primary motivation for the DVD regional code system. In particular, the DVD regional code system restricts the resale across markets thereby allowing sellers to exploit regional difference in demand patterns.

Price discrimination through market segmentation has been extensively studied in economics. It involves selling essentially the same product for different prices to distinguishable, different groups of customers. The seller gains from this strategy by being able to tailor prices to the individual demand characteristics of consumer groups. The seller sets a higher price to those groups who have a higher willingness-to-pay for the product and whose demand for the product is less sensitive to rises in the price. A lower price is set for customers with a lower willingness to pay and whose consumption is more sensitive to a rise in price. The seller makes higher profit through such group-specific prices than if it had to set a single price across all buyers.

²⁴ Nancy T. Gallini and Aiden Hollis, 'A Contractual Approach to the Grey Market,' *International Review of Law and Economics*, 1999, Vol.19, 1-21 at pp.3-5. There is an additional set of arguments raised in terms of protection of the local industry. Legal and technical restrictions on parallel importing of DVDs potentially affect the local industry for film production. This argument was put forcibly by players in the Australian music industry prior to the removal of the restriction on parallel importing of compact discs. The argument is that restrictions on parallel imports raise the price of DVDs in the Australian market. As a result the profits that can be earned on film production is increased and the production of Australian films becomes more attractive. To the extent that local industry earns profits from the distribution of overseas films, these profits can be used to subsidise local film production. However, while there is a gain in social welfare in Australia to the extent that the community benefits from the production of Australian content, there is clearly a loss in social welfare due to the higher prices. The Intellectual Property and Competition Review Committee rejected the local industry argument on the basis that the increase in production of Australian films would likely be small, and any benefit would be outweighed by the loss caused by higher DVD prices. Arguably, the profitability of Australian films turns on the profit that can be earned outside Australia, rather than an incremental increase in the profits earned in Australia. Intellectual Property and Competition Review Committee, *Review of intellectual property legislation under the Competition Principles Agreement*, September 2000.

This type of price discrimination may benefit the seller but it will often lead to a social loss. This occurs because market segmentation prevents goods moving to those people who most value them. A person who faces a high price might refuse to buy a product even though they would be more than willing to buy that same product if they faced the same lower price as some other customers. Thus, people who only have a low value for a product may receive the product while others who value the product higher go without.

A simple example helps illustrate this source of inefficiency. It is likely that demand in Region 1, the United States, is much higher and less price sensitive than demand in China (Region 6). A firm that can set different prices in the different regions will maximise its profit by setting a high price in Region 1 and a low price in Region 6. In this way, it can reap maximum profit from each individual area rather than simply setting a single uniform price. However, this means that there will be high value consumers in the US who are willing to pay, say \$20 for a DVD, but do not buy a DVD because the US price exceeds \$20, while there might be a buyer in China who only values a DVD at \$10 and buys the product as this value exceeds the Chinese price. But from an economic perspective this is inefficient. The DVD is consumed by someone who only values it at \$10 while a person who values it at \$20 goes without. Further, if it were possible for the Chinese buyer to sell their DVD to the person in the US, say for \$16, then both people would be better off. The Chinese consumer would sell the DVD for more than their personal value, while the US buyer would be able to purchase a DVD that they value at \$20 for only \$16. In economic terms, there is \$10 worth of gains from trade between China and the US and this gain is lost due to the regional restriction.

If regional restrictions on DVDs were motivated by a desire to segment the world market and price discriminate then it would be expected that the regions would be determined according to the demand characteristics of the buyers. This appears to be the case. The geographic regions devised by the DVD Consortium do appear to have segmented the world according to different demand elasticities. The price elasticity of demand will likely correlate with income levels in the country, with demand more elastic in lower income countries. Income levels do vary within DVD regions; however, the DVD Regions separate the world's largest markets according to per-capita incomes in that country. An interesting exception is the inclusion of Hong

Kong and Singapore, both countries with high per capita incomes, with the other lower income countries in South East Asia.²⁵

Figure 1: Per-Capita Incomes in DVD Regions

Region	Primary Market	GDP per Capita PPP (USD)
Region 1	United States	\$29000
Region 2	Japan, Europe	\$20000-24000
Region 3	Malaysia, Thailand	\$6700-8100
Region 4	Argentina	\$10300
Region 5	India	\$1700
Region 6	China	\$3100

Market segmentation and price discrimination need not always lead to a loss in social welfare and may in some circumstances raise social welfare. This can be shown by another simple example. Suppose that there are two groups of potential consumers for a product. The first group has 100 customers who are each willing to pay up to \$50 for one unit of the product. The second group has only 30 customers each of whom is willing to pay up to only \$20 for the same product. For simplicity suppose that the marginal cost of a unit of the product is zero. Then a profit maximising monopoly manufacturer that cannot discriminate between the two groups of customers will set the price of the product at \$50 and sell only to the high-value customers. This results in profit of \$5000. In contrast, if the manufacturer lowered the price to \$20 so that all customers purchased the product then its profit would only be \$2600. From the manufacturer's perspective, it is not worth lowering the price to the high-valued customers to gain sales to the low valued customers. The low valued customers do not buy the product even though their willingness-to-pay (\$20) exceeds the marginal cost of the product (\$0).

If, however, the manufacturer could set a different price to each group of customers, then it would wish to set a price of \$50 to the 100 high-valued customers and \$20 to the 30 low-valued customers. This will lead to greater profit to \$5600 and a rise in economic welfare as all customers who value the product at more than marginal cost are now being served.

²⁵ Australia is in region 4 but is only a relatively small part of that region on the basis of population.

As a rule-of-thumb, market segmentation and regional price discrimination can raise social welfare if it results in groups of customers being served who would not otherwise be served so that it leads to a substantial rise in total sales of the relevant product.²⁶

While regional price discrimination creates a welfare loss, the removal of this discrimination will create ‘winners’ and ‘losers.’ Returning to the example of the US and China, if price discrimination leads to a lower price in China than the US, then the removal of this discrimination will tend to lead to a lower price in the US but a higher price in China. In other words, in the absence of discrimination, the price will tend to move to an average level. US consumers will gain from the removal of the price discrimination but the consumers who previously paid the cheaper price will lose. Overall the gains will tend to outweigh the loss.

While it is likely that price discrimination was an important factor in the establishment of the regional restrictions, to date there is little evidence that the regional coding system is facilitating price discrimination between regions to take advantage of income differentials. A report commissioned by the British and Swedish governments found that CDs and DVDs were in fact cheaper in the United States than in Britain and Sweden, and cheaper again in Germany.²⁷

4.2 Facilitating Collusion

Rey and Stiglitz have shown that by creating exclusive territories for independent distributors, a manufacturer of a differentiated product is able to increase its market power and dampen competition with its rivals.²⁸ When distributors are not subject to competition, not all of a price rise by the manufacturer will be passed on to the consumer. This makes the demand curve faced by a manufacturer less elastic and increases its market power.

Film industry participants are likely to have a high degree of market power due to the protection afforded by copyright law. Notwithstanding, it seems unlikely that the protection of exclusive film distribution arrangements was the motivation of

²⁶ For a more general version of this proposition, see H. Varian (1985) “Price discrimination and social welfare,” *American Economic Review*, 75, 870-875. For a general discussion on price discrimination see H. Varian (1989) “Price discrimination,” in R. Schmalensee and R. Willig, (eds) *Handbook of Industrial Organization, Volume 1*, North Holland, Amsterdam, 597-654.

²⁷ See Kelleher (2001), *op. cit.*

²⁸ P. Rey and J. Stiglitz, “The Role of Exclusive Territories in Producer’s Competition,” *Rand Journal*

the film industry in pushing for the regional coding system. Not all filmmakers distribute their content through independent distributors. In Australia, Columbia Tristar and Twentieth Century Fox distribute their own films through local subsidiaries. Warner Bros, Disney, Paramount, Universal and MGM distribute their films through independent distributors Roadshow and United International Pictures. Moreover, the regional coding system devised by the DVD Consortium is unlikely to be effective in protecting exclusive distributor arrangements. The six regions do not parallel with the regions served by independent distributors, which tend to be national distributorships only. Thus, the regional coding system provides independent distributors with some, but not complete, protection from import competition.

4.3 Preventing Free-Riding

Gallini and Hollis argue that manufacturers often impose territorial restrictions to encourage an exclusive distributor to make specific investments in marketing and customer service. Without territorial restrictions on distribution, retailers can import the product from overseas rather than from the licensed distributor. This enables importers either to free ride on investments in marketing and customer service to undercut the licensed distributor or to undermine or dilute the investments by providing inferior products or service. An absence of exclusive arrangements for distribution may in fact weaken competition between the different manufacturers. In contrast to the preceding argument, the protection of exclusive distribution arrangements in these circumstances would be pro-competitive.

In the case of the film industry, investments in customer service for purchasers of videos and DVDs will be small. However, film distributors make considerable investments in the marketing of films, which they distribute across cinemas and television as well as on video and DVD. Competition in the distribution of DVDs may undermine the marketing investments of the licensed distributor made on the basis that these will be recouped across all distribution channels. Exclusive distributor arrangements may provide film producers with greater flexibility in distribution and enable more effective competition with film producers that distribute content themselves.

That said, the prevention of free riding on efforts by independent distributors does not seem a probable motivation for the DVD regional coding system. Again, not all filmmakers distribute films through independent distributors and the DVD regions are sufficiently broad to allow a significant amount of DVD importation to occur within regions. Prevention of free riding is a potential argument in favour of laws prohibiting parallel importation of DVDs. However, Gallini and Hollis argue that such restrictions should be protected via contract - whereby their merit can be assessed explicitly by competition authorities - rather than via laws protecting copyright.²⁹

4.4 Preventing Consumer Confusion

Where copyrighted products differ between countries, exclusive territories for distribution may be used to prevent confusion. This argument is potentially of relevance in the case of DVDs. Because broadcasting regulations around the world vary, different versions of films are released in different countries. Restrictions on the parallel importation of DVDs are one means for protecting the DVD version authorised by the broadcasting authority in each country. While this would be a logical motivation for DVD regional codes in theory, the regional coding system as devised cannot protect national broadcasting regulations. The DVD regions span across national borders and contain a range of nations unlikely to have similar broadcasting regulations. Region 2, for example, contains Japan, all of Europe, the Middle East and South Africa. Had protecting the different versions of films released been the concern of the DVD Consortium, a much larger number of regions (more closely resembling national borders) would have been necessary. This argument, however, would support the continuation of national laws prohibiting the parallel importation of DVDs.

Related to this concern is the argument for regional encoding based on a desire to protect global release patterns. Filmmakers have argued that legal and technical restrictions on the movement of goods between countries are necessary to ensure effective competition between film releases and filmmakers.³⁰ The free movement of

²⁹ The alternative argument is that the regulatory cost associated with parallel importing restrictions may be lower if prohibited granted explicitly by law rather than assessed on a case-by-case basis.

³⁰ See Motion Picture Association, *Submission to the Intellectual Property Review Committee*, November 1999, p. 10

DVDs between countries has the potential to compromise a film's release, which is co-ordinated across a range of distribution formats and countries in sequential order. When this occurs the profits earned by a filmmaker from a particular film are reduced, the filmmaker is less able to compete with other film releases and the incentive to invest in film production is reduced.

Whether or not the film industry's argument that staggered global film releases are pro-competitive holds true, the potential benefit to consumers of staggered global release dates is becoming academic due to the additional pressures on staggered releases. The rise of news and marketing over the Internet compromises the effective execution of staggered marketing campaigns for films across the globe. As a result, lags between cinema release dates in different countries have begun to decrease. For, example while the release of *Braveheart* was spread over seven months in 1995, the lag in the release of *The Patriot* in 2000 was one month, and Columbia Pictures ran near-simultaneous releases for its five biggest films in 2000.³¹

4.5 Summary

Of the motivators for regional distribution restrictions identified by Gallini and Hollis, the only one that appears broadly applicable to the DVD regional coding system is to facilitate international price discrimination. As we discussed, international price discrimination does not necessarily reduce social welfare. If a single uniform price led to many consumers being priced out of the market then discriminatory pricing may improve welfare and Malueg and Schwartz have shown that this can occur where demand patterns are sufficiently dispersed between countries.³² This said, international price discrimination unambiguously harms consumers in high price regions. It will also lead to a social loss when comparing regions, such as the US, Europe, Australia and parts of Asia, where price discrimination is more likely to lead to a misallocation of product rather than a significant increase in total sales.

Finally, it is useful to remark upon the implications of parallel import restrictions for DVD rentals. The market for video and DVDs differs from that for

³¹ Bruce Orwall and Evan Ramstead, "Web's Reach Forces Hollywood to Rethink America-First Policy," *The Wall Street Journal*, 6 December 2000

³² David A. Malueg and Marius Schwartz, "Parallel Imports, Demand Dispersion, and International Price Discrimination," *Journal of International Economics*, 37(3-4), November 1994, pp.167-95.

compact discs in that rentals account for a significant portion of the market. This reduces the impact that restrictions on parallel importing have on the DVD software market. The sale of parallel imported DVDs is permitted in New Zealand; however only DVDs licensed for distribution in New Zealand can be rented out. The relationship between film distributors and the video rental chains, which involve joint promotional efforts and agreements, makes it less likely that the chains would choose to rent parallel imported DVDs – even if it were not illegal. For these reasons, a film distributor will retain control of exclusive distribution of DVDs to the rental market. While the social welfare impact of the restrictions is reduced, the potential impact of the removal of with the legal or technical restrictions on the profitability of film distributors will also be minimal.

5 The DVD Hardware Market

Laws prohibiting parallel importing of DVDs impact only upon the efficiency of the DVD software market. In contrast, the regional coding system impacts on both the market for DVD software and the market for DVD hardware, increasing the effective cost of a DVD player and facilitating price discrimination in the market for DVD players.

The regional coding of DVD software has meant that fewer titles are available on DVD in the lower demand regions (predominantly Regions 3, 5 and 6 but initially also Regions 2 and 4). The reduced range of DVD titles has reduced take-up rates for DVD players in these countries. The attractiveness of portable DVD players is significantly reduced when portability is reduced because a portable player cannot play DVD titles purchased or rented in countries within different DVD regions.

The response to the regional coding system has been the rapid growth of the market for DVD player modifications. In the United Kingdom it is estimated that sixty percent of all DVD players are modified to play DVDs from all regions. Almost 500,000 DVD players have been purchased in Australia already and the ultimate penetration of DVD players is forecast to be over 6.5 million.³³ The cost of modifying DVD players ranges between \$100 and \$150.³⁴ With over half of DVD players

³³ Columbia TriStar media release, February 2001 John Hanrahan 'DVD, VoD go varoom in Australia,' 1 May 2000, www.findarticles.com.

³⁴ See Nick Tatham, 'Digital Watch,' *Sun Herald*, 16 July 2000 and Rod Easdown, 'The Price is Right,' *Sydney Morning Herald*, 11 June 2000

modified, this puts the potential cost to Australian consumers of the DVD regional coding system at over \$700 million in modification of first purchase DVD players alone.

The argument that the regional coding system facilitates price discrimination between the different DVD regions also applies to the market for DVD players. By segmenting the market for distribution of DVD hardware, manufacturers of DVD players can also charge different prices to consumers in different countries. As noted above, this has ambiguous welfare consequences on a worldwide basis. However, to the degree that regional coding has lowered the worldwide take-up rate of DVD players, the regional discrimination is unambiguously welfare reducing. Further, it will be unambiguously welfare reducing in those countries that face relatively higher prices.

In many ways though, the economic loss from regional restrictions on DVD players is more obvious than for the DVD software. The regional encoding system is likely to raise the costs of manufacturing DVD players. This is clearly undesirable as it is an extra cost that provides no benefit to consumers, and in fact reduces the value of the DVD player to consumers. In addition, a significant number of consumers are willing to spend extra to modify their DVD player so that it is capable of playing DVDs from all regions. This is a clear deadweight loss – a cost is imposed on the consumers to ‘undo’ a feature that, from the consumer’s perspective, is either unnecessary or harmful. At the end of the process, many consumers will have DVD players that play DVDs from all regions but the regional restriction has made such players more expensive than necessary.

The cost of manufacturer modification to satisfy the regional restrictions, and the consumer cost to reverse such modification, represents a waste of social resources and an economic cost. Even if it were argued that regional price discrimination of DVDs raised social welfare, consumers removing the regional restrictions from players would dilute any gains from these restrictions. Further, any gains would need to be offset against the resource cost of costly modification by both manufacturers and consumers.

6 Policy Implications

Both parallel importing laws and the DVD regional coding system are likely to produce overall social welfare losses in the market for DVD software by facilitating international price discrimination. The DVD regional coding system produces an additional loss in social welfare by facilitating international price discrimination in the market for DVD hardware. The policy also creates an additional cost on manufactures and on consumers who reverse the regional modification to their player. The welfare analysis implies that a change in policy is desirable. There are four possible responses open to a government: removal of either the parallel importing laws or the DVD regional coding system, removal of neither or of both.

6.1 Maintaining the Status Quo

Under this scenario both the parallel importing restrictions and the regional coding system are allowed to continue. Given the preceding analysis of the social welfare losses in both the DVD software and hardware markets caused by the legal and technical restrictions, maintaining the status quo would seem to be undesirable.

6.2 Removal of Parallel Importing Laws Only

In this situation the parallel importing laws are removed but the regional coding system is allowed to continue. Removal of parallel importing laws would most likely produce some gains in social welfare in the market for DVD software. The ability of film makers to price discriminate will be reduced, as the market would be segmented only by DVD regions rather than along national borders. DVDs could be imported and sold in Australia from other Region 4 countries. However, the impact here is likely to be minimal given that the only potential import markets are Central and South America. The transport costs between Australia and these markets are likely to be high. If regional restrictions remain then the import of non-Region 4 DVDs would only be possible if consumers bear the cost of player modification.

6.3 Removal of Regional Coding System Only

Under this scenario the regional coding system is removed but the parallel importing laws remain. With the continuation of the laws prohibiting parallel importing, there is only a gain in social welfare to the extent that consumers are able to import DVDs directly. As consumers already modify players to purchase this option, this suggests that there are substantial welfare gains (especially in terms of increased variety) to removing the regional encoding system itself. In addition, the removal of the regional coding system would remove all social welfare losses arising in the market for DVD hardware.

6.4 Removal of Legal and Technical Restrictions

The removal of both the parallel importing laws and the regional coding system is likely to produce the greatest gain in social welfare - removing the social welfare losses produced in both the DVD software and hardware markets.

7 Conclusions

In this paper we have considered the welfare consequences of regional coding and parallel import restrictions on DVDs. The analysis suggests that a desirable change in government policy in relation to the movement of copyright goods in the case of DVDs would extend beyond the repeal of laws prohibiting parallel importing. The lifting of parallel importing laws without a response to the regional coding system will produce a decrease in the price of DVDs only to the extent that DVD players get modified to play DVDs from all regions. In this sense, the removal of parallel importing restrictions would not remove the main source of economic loss in the market for DVD software and players. While the parallel importing laws should, in our opinion, be removed, government policy cannot stop there.³⁵

This suggests that there may be considerable gains from the Australian government prohibiting technical restrictions being embedded on manufactured DVD players. This would reduce the costs faced by consumers in modifying DVD players

³⁵ The Intellectual Property and Competition Review Committee also recommended that parallel importing laws on DVDs should be repealed: Intellectual Property and Competition Review Committee Final Report (2000), p.73.

and open up the potential sources of DVDs for those consumers. However, the concern is that supply of DVD players may be inhibited by such a move as there would be legal complications associated with DVD licensing agreements. Such complications are beyond the scope of this paper to evaluate. Nonetheless, we do believe there is a prima facie case for some reform of existing DVD arrangements.

Finally, it is important to note that the Australian government may be unable to unilaterally remove the DVD regional coding system at a technical level. Suppose, for example, that the Australian government implemented a policy prohibiting the sale of regionally coded DVD players in Australia. Such unilateral action may be counterproductive if Regional Code Enhanced DVDs are distributed overseas. There are two reasons for this. First, RCE DVD software does not play on non-coded DVD players. If RCE DVDs are distributed overseas, even if they are not distributed in Australia, they would effectively prevent any importing of overseas DVDs into Australia. Secondly, if it were not possible to sell RCE DVDs in Australia due to the requirement that players not be regionally coded, then this may have severe implications for the range of titles that are released on DVD in Australia. If RCE software continued to be sold outside Australia, release of non-RCE software to the Australian market would require additional productions, potentially making service of the Australian market unprofitable. Given the size of the Australian market relative to other markets, this may make the optimal strategy for film-makers not to release films on DVD in Australia at all. Overall, the unilateral policy may lead to no increase in imports and a reduction in locally-released DVDs.

Therefore, for legal and technical reasons, any policy response to regionally coded system taken by Australian authorities would need to be co-ordinated with other overseas authorities. The Regional Coding System is a global initiative by players in the film and DVD industries aimed at preventing the free movement of licensed copies of copyright DVDs around the world. An effective response to the system requires a combined effort by competition authorities and governments globally, and in particular the involvement of authorities in key market such as the United States, Europe and Japan.