The effects of broadband on the consumption film at theaters in Brazil

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Abstract

We use a large emerging economy's broadband adoption as a quasi-natural experiment to study the effects of Internet access the consumption of films at theaters. Based on individual-level large samples, available for 2002/3 and 2008/9, we find a negative effect, and we are not able to rule out the hypothesis of film piracy since neither DVD nor cable TV, the more important legal substitute goods, have their consumption increased due to broadband.

Key words: broadband, Internet, films at theaters, piracy

JEL code: L820, L860, L80

1. Introduction

Taking advantage of broadband adoption in Brazil, officially in 2006, we study the effects of Internet access on film consumption at theaters employing a very rich survey data of 300,000 individuals from around the country available for the years 2002/3 and 2008/9. Exploring a difference-in-differences framework applied to a pseudo-panel, and using cohorts by age, gendern, and place of birth, we perform an intervention analysis for the film market. Brazil is an important case in point, since it is a very unequal country, with a huge digital and cultural goods divide, and only around 10% of film consumption is domestic production, being representative of many developing countries.

The use of Internet broadband increased substantially in Brazil after 2002, what can be illustrated by the number of accesses[1]. Between 2002 and 2008, the annual average growth rate was 49% in fixed access. Prior to 2011, however, the minimum speed of broadband in the country

[1] http://www.caminhosdabandalarga.org.br/2012/10/capitulo-1

was not officially established[2], while in other countries the standard at that time was speeds greater than 256Kbps. The entry of broadband (Internet access with speeds between 512Kbps and 2Mbps) in the country took place between our two years of observations. According to ANATEL (Brazilian telephony regulatory agency), in 2002 the average of broadband monthly accesses was 776,718, while for 2009 the same average was 12,199,824 (Figure 1).

Internet broadband brought a huge innovation for information transmission vehicles, which made it possible to reduce transmission costs (Oberholze-Gee and Strumpf, 2007), since it increases speed, processing, and volume of data transportation.

The technological shift from a film to a digital film standard also implied a very significant reduction in the cost of production, reproduction, and distribution to the film industry, where technological changes have allowed the simultaneous worldwide release of films, access to content at home, multiple digital versions with alternate endings, director cuts, and multiple subtitles in different languages (Husak 2004).

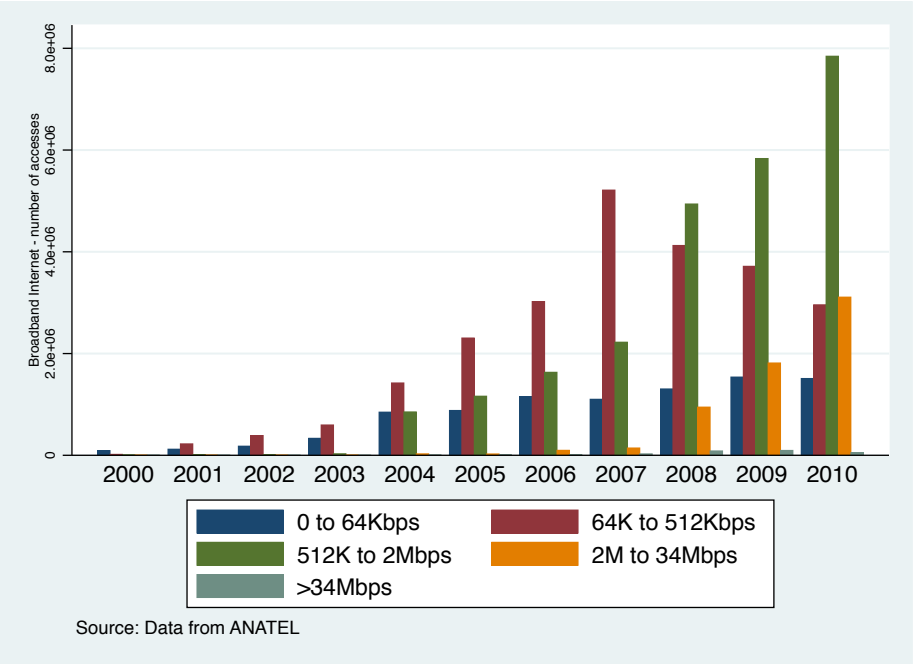
Because film is an information good, it has had its costs of transmission/reproduction reduced by Internet broadband and has experienced an increase in non-paid files-sharing (Husak 2004).

Rob and Waldfogel (2007) go beyond piracy to argue that the substitution between the Internet and movies depends on the types of activities the individuals involved have on the Internet. Waldfogel (2017) argues that the Internet fosters new products, promotes their global distribution - by means of Netflix, Amazon, Spotify, iTunes, and others - and possibly fosters convergence of consumption across regions. In addition, social networks, such as Facebook and Twitter for instance, are new entertainment products that compete with films and songs in time spent. Since most of these Internet services, however, were not available in Brazil during our

[2] In 2011, Internet broadband started to be regulated by the National Planning for Broadband under management of the minister of Communications, Mr. Hélio Costa.

analysis period, 2002-2009, stating only after 2010, we believe a negative effect maybe correlated with non-authorized film sharing.

Figure 1 – Broadband Internet access according to speed of transmission in Brazil



Several studies explore the effect of music piracy due to technological changes (Internet as the main channel) on the legal music market. Most of them find evidence of negative effects, Hui and Png (2003), Peitz and Waelbroek (2004), Bishop (2004), Rob and Waldfogel (2007), Bounie et al. (2006), Zentner (2006), Liebowtz (2008), Woldfogel (2010), Danaher et al. (2014). Exceptions are Oberholzer-Gee and Strumpf (2007) and Smith and Telang (2009) find a null effect.

Regarding films, Vany and Walls (2007) find a negative effect of Internet downloads on films at theaters. Rob and Waldfogel (2007) find a strong substitution effect between unpaid film and paid films, based on a sample of 500 undergraduate students using broadband and DVD

consumption as instrumental variables. Liebowitz and Zentner (2009) find that the Internet reduces the consumption of television viewing among the youngest generation that has grown up since the personal computer was developed, but small or no effect on the oldest. Their results, however, are connected to substitution for activities on the Internet, that include business, entertainment pursuits, and social connections for instance.

2. Data and Empirical Strategy

Broadband adoption was used in order to study the effects of the Internet on consumption at cinemas as a quasi-natural experiment because Brazil's broadband adoption depends on other countries' technology availability as well as of political decisions.

We employ survey data of individual-level consumption from 2002/3 and 2008/9, including all metropolitan areas from IBGE (the Brazilian Institute of Statistics and Geography) under the name POF (Research of Familiar Budget), which aims to ascertain the patterns of consumption. Performing a Difference-in-Differences (DD) model, our treated group comprises individuals who have access to the Internet, and our control group is people without Internet access. Yet, since we have a pseudo-panel for individual observations, we control for cohorts by year of birth, state of residence, and gender.

We pooled data to estimate DD models of consumption of films at theaters C_{it}, a binary variable, by an individual *i* in year *t*. We employ an LPM (linear probability model), and non-linear models Logit and Probit (Wooldridge, 2002).

$$C_{it} = \alpha_0 + \alpha_1 I_{it} + \alpha_2 Post + \alpha_3 I_{it} * Post + \alpha' X_{it} + u_{it} \quad (1)$$

where *I*=1 if the *i-th* individual has access to Internet in years t =2002/3 or 2008/9 and 0 if not. *Post* is a binary variable that takes the value 1 for year=2008/9 and 0 for year=2002/3, and α_3 is our interest coefficient. Matrix X_{it} includes the following variables that may also influence the decision to consume cinema; gender, age, skin color dummy, religion dummies, years of schooling, per capita income, number of bedrooms at home, private health insurance ownership,

credit card ownership as proxy for employment, student dummy, urban area dummy, state dummies, and cohort of birth year dummies. All monetary value variables are in 2002 prices.

3. Empirical Findings and Discussion

Estimates of DD models suggest a negative effect of broadband on film consumption at theaters that are robust to different model specifications (Table 2). In addition, estimates reveal film consumption as higher in the treated group before broadband. The marginal effects evaluated by mean values indicate broadband adption reduced film at theaters by around 12%.

Table 2 – Difference-in-Differences estimates for consumption of films at theaters

Variables	Films at theaters consumption		
	LPM	Logit	Probit
Internet coef.	0.0725***	0.3604***	0.2288***
	(0.008)	(0.060)	(0.033)
Marg. Effect	0.130	0.145	0.145
Post coef.	-0.0079***	-0.1133	-0.0485
	(0.002)	(0.097)	(0.043)
Marg. Effect	0.423	0.476	0.476
Internet*Post coef.	**-0.0564*** **	**-0.1716** **	**-0.1372*** **
	(0.008)	(0.079)	(0.040)
Marg. Effect	0.115	0.130	0.130
Observations	296,239	259,609	259,609

Cluster-robust standard errors in parentheses - *** p<0.01, ** p<0.05, * p<0.1; X variables included

Estimates of spending on films at theaters show the same trend (Table 3). In addition, estimates for DVD player consumption indicate no changes due to broadband Internet adoption, while consumption of cable TV presents a negative effect. These results suggest that Brazilians were not substituting films at theaters by DVD or cable TV consumption. The trends between treated and control groups show the same pattern (Figure 2). It is worth noting that the substitution option, a film viewed a place than at a theater and not exactly at the release time, is for a lower-quality product. Despite the low quality, Hui and Png (2002) argue that usually the

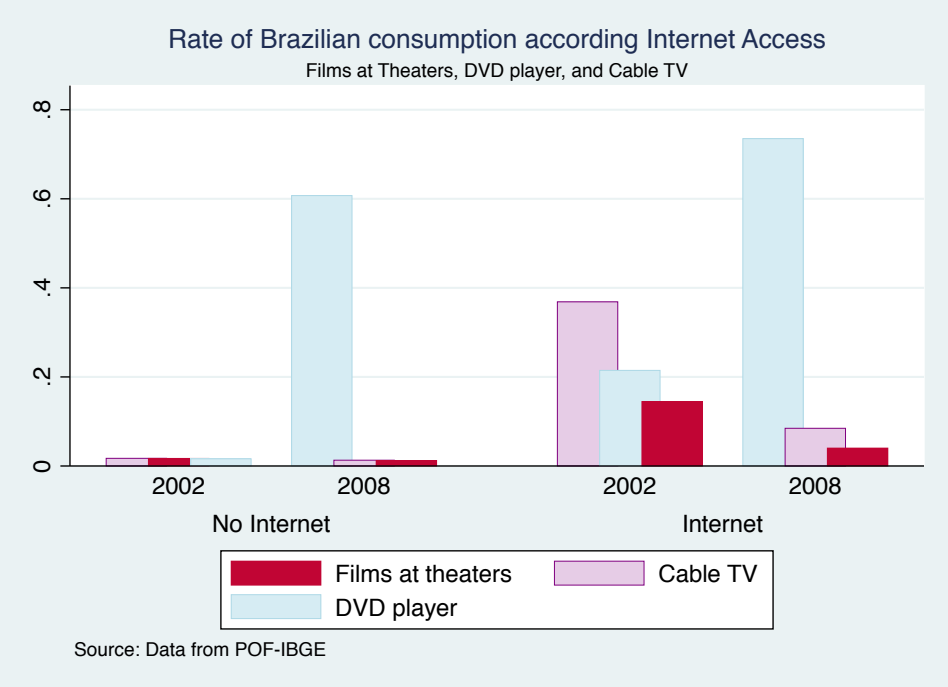
degree of substitution tends to be significant.

Table 3 – OLS-DD estimates for substitutes goods and for films at theaters spending

Variables	DVD	Cable TV	Film at theaters spending
Internet	-3.855	64.91***	376.0***
	(5.762)	(7.737)	(82.93)
Post	0.099***	-0.00140***	-0.0206***
	(0.002)	(0.0002)	(0.00559)
Internet*Post	**0.00196**	**-0.0323*** **	**-0.187*** **
	(0.003)	(0.004)	(0.0413)
Observations	296,248	296,248	296,226
R-squared	0.513	0.187	0.051

Cluster-robust standard errors in parentheses - *** p<0.01, ** p<0.05, * p<0.1; X variables included

Figure 2 - Trends between treated and non-treated groups before and after broadband



We argue that the reduction in consumption of films at theaters may be connected mainly to piracy, as Bai and Waldfogel (2012) and Danaher and Smith (2014) assert, since fewer legal options were available at the time of our analysis and because there is a lag for new technology to arrive in a country that is not a technology developer. In addition, according to IPEA (2012), it is believed that around 41% of Brazilian Internet users committed piracy in 2010 and 2011, downloading both music and films files.

4. Conclusion

We estimate the effect of Internet access on the consumption of films at theaters in Brazil during a period in which Internet services like Netflix, Amazon, Spotify, iTunes, and others were not available (2002-2009). These streaming services become available only after 2011. Our results indicate a reduction of consumption of films at theaters and related spending due to the Internet. In addition, neither DVD nor cable TV consumption, the main legal substitute goods, increases. These results suggest a substitution of legal consumption of films by illegal consumption in a place where only the richest and more educated consume films at theaters.

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