PSL
UNIVERSITÉ PARIS

THÈSE DE DOCTORAT
DE L'UNIVERSITÉ PSL

Préparée à MINES ParisTech

Trajectoire Industrielle et Réglementation de l'Audiovisuel en France

Industrial Trajectory and Regulation of the French TV-market

Soutenue par

Victor Lavialle

Le 17 décembre 2019

École doctorale n°396

Économie, Organisation, Société

Spécialité

Économie et Finance

Composition du jury :

Françoise Benhamou Professeure d'Économie, Université Paris 13	*Présidente*
Marc BOURREAU Professeur d'Économie, Télécom ParisTech	*Rapporteur*
Paul BELLEFLAMME Professeur, UC Louvain	*Rapporteur*
Thomas PARIS Professeur, HEC Paris	*Examinateur*
Élisabeth FLÜRY-HERARD Vice-présidente de l'Autorité de la Concurrence	*Examinatrice*
Olivier BOMSEL Professeur d'Économie, Mines ParisTech	*Directeur de thèse*

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Acknowledgements

First and foremost, I would like to express my gratitude to Olivier Bomsel, for trusting me with this challenging research topic, and for providing me with a dedicated and pedagogical supervision.
My sincere thanks to Françoise Benhamou, Paul Belleflamme, Marc Bourreau, Élisabeth Flüry-Hérard and Thomas Paris, who have accepted to serve as my referees.

I want to thank the CNC, CANAL+, Médiamétrie and France Télévisions for letting me access and work with their data at different times during my PhD.

I thank my colleagues from CERNA in for the stimulating discussions and for all the fun we have had in the last three years: Guillaume, Connie, Anne-Sophie, Simon, Damien, Laurie, Dandan, Paul-Hervé, Maddalena, Sabrine, Btissam, Julie, Jiekai. I would like to give special thanks to Maxime, Matthieu, Ivo, and Thibault for their tremendous help and collaboration during this work. I am profoundly grateful to Sesaria, whose conversation never failed to make my day better, and Barbara for helping me with administrative work.

I am thankful to my closest friends, for their support during these years.

Last but not the least, I would like to thank Jeanne and my family for their love and encouragement throughout writing this thesis.

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Introduction

Broadcast television began in the mid-1930s, as an evolution of radio-diffusion technologies. It then developed as a mass media in the second half of the twentieth century. Economic and institutional aspects were central to this development process, and explain the existence of radically different trajectories of evolution.

Indeed, Starr 2005 shows that as the market for media and other cultural goods expanded, early institutional differences led to path divergences in the communication and media industries in Europe and United States. He explains that the path of telecommunications in America originates from the country's foundation as a liberal republic and its response to the challenges of building a nation on a wide, continental scale.
For instance, the geography of American cities very quickly favoured broadcasting via the cable over the terrestrial spectrum, as mountains and buildings would block TV signals[1]. Regulation very early on required operators to relay TV broadcasts via cable networks, especially to access remote areas. Cable began to develop separately from free television in the 1970s with the deregulation of the industry.

The essence of the divergence of national trajectories is linked to the difference in the assessment of positive and negative externalities related to communication, and to the media, which depend on the specific institutional history of each country. Starr describes this phenomenon without using the notion of externalities, for instance by pointing out that the development of telecommunications in the Soviet Union is structured by the State interests, and the priority given to broadcasting and *vertical* communications rather than horizontal technologies such as the telephone. The French trajectory is also extremely interesting in that regard: the French audiovisual industry is strongly structured by the State, through arbitrary decisions about resource allocation (see chapter 1). In a sense, it can be compared to a limited access

[1] *History of Cable Television*, National Cable & Telecommunications Association, 2010

order (D. C. North, Wallis, and Weingast 2009), as the State controls access to property and organizations. The trajectory of evolution of the regulation in France produced a relatively *closed* industrial ecosystem, dominated by terrestrial broadcasting, as cable and satellite have not been able to establish as major technologies. This ecosystem is particularly impacted by the opening of accesses and entry of *over-the-top* players, which operates a form of *destructive creation*, or of what Starr describes as a *de facto* opening of a restrictive system, eroding the legacies of State control.

Television is linked to historically dated technical systems, and has known a *mediatic* use that structured the development of its economic activity. For a long time, television broadcast was the only system allowing the distribution of moving images, or audiovisual content to individual households, or consumers. It was built as a flow of programs, structured around a specific schedule, creating specific *rendez-vous* for the spectator. As a media offering a bundle of different *programs*, it maintains cross-externalities effects with other media, for instance music (variety shows), news, sports, but more importantly with cinema. Cinema has long been used as a source of content for television, as broadcasting movies was a way of ensuring high audiences. Television also contributes largely to the financing of cinema: in France, the relationships between television broadcasters and movie producers were regulated in the early 1980s with the concession of terrestrial frequencies. Pay-TV then became the main source of funding for French movies. As a result, it is essential to study the cinema economy in France to discuss the audiovisual ecosystem.

The audiovisual industry can be considered as an industry of development and production of *narratives*, or stories, which can be for instance fictional (movies, TV series...), event-driven (news), or linked to the broadcasting of sports events. The common feature of these stories is that they are intended to be made public. Television is their primary medium of distribution, and sells *bundles* of narratives to the spectator. In that sense, we speak of the audiovisual industry for the production of such content, as it is linked to a technical broadcasting system.
Most of these *audiovisual goods* require high fixed costs, up to several tens of millions of euros for the production and distribution of a movie. On the other hand, their marginal cost is extremely low. In that sense, programs have a *prototype* dimension: the first copy is infinitely more expensive to produce than the following ones. However, TV installed recurrences, series of programs creating economies of scale in production that are superior to those of cinema. Overall, the capital-intensity of programs varies greatly.

Maybe one of the more specific characteristics of audiovisual stories, which they share with most *mediatic* goods is the fact that their value lies in their *semantic* content, in the message, information or narrative they convey, and how these combine with technical systems.

The audiovisual industry can be included in the broader category of *cultural industries*, which generally includes printing, publishing, multimedia, as well as crafts and design. Cultural goods are considered as a type *experience goods*. Before consumption, consumers are unable to estimate the utility these goods will give them. This notion is defined by Nelson 1970, by opposition to *search goods*, whose qualities can be determined before purchase.
The consumer will then rely on prior experience or on other derived information to evaluate their utility *ex ante*. This ignorance is symmetrical, and implies a significant risk of commercial failure. Caves 2000 shows that one of the key characteristics of such industries is that it is extremely difficult to predict consumer reaction to a new cultural work ("Nobody Knows"). This explains the importance of consumer information and market signaling with regards to such goods (*mediatization*), the media notoriety can then be seen as a quality signal, as well as this of the artist, or producer.

Experience goods are also generally linked to some kind of *learning* or *habitual* effects, in the sense that the more of the specific good is consumed, the greater the utility. Consumers' preferences are thus endogenous. A particularly strong version of this assumption is developed by Stigler and G. S. Becker 1977. They allege that individuals start with identical preferences, and that all differences in individual choices can be explained by prior experience, or constraints faced by these individuals, which differs from the traditional view in economics that preferences are given as exogenous.

> *Widespread and/or persistent human behavior can be explained by a generalized calculus of utility-maximizing behavior, without introducing the qualification "tastes remaining the same."*
> Stigler and G. S. Becker 1977

Blaug 2001 shows that this theory has been heavily discussed in the field of cultural economics. Numerous empirical studies point to this endogenous formation of taste for the arts and other cultural goods: Baumol and Bowen 1966 show that audience for the arts strongly depend on the level of education and age above other personal characteristics. O'Hagan 1996 shows how early exposure to arts accounts for later participation. This idea that

cultural goods are a type of experience goods sometimes leads to *rational addiction* types of analysis (see chapter 3).

This inability to predict demand for such goods has led the media to be described as a "nobody knows industry" (Goldman 1989). The literature on predicting the success of films screened in movie theaters leads to the conclusion of the radical uncertainty of the sector. De Vany 2004, Ginsburgh and Throsby 2006 show that this uncertainty with regards to demand structures the industrial organization of cinema. The high risk associated with investing in production also leads to consolidation strategies on the part of producers (Maskell and Lorenzen 2004), and explains the relative concentration of the production ecosystem (see chapters 2 and 4).

All of these variables create the idiosyncrasy of the institutional and industrial trajectory of the French audiovisual ecosystem, which is the focus of this thesis. The central question of this work is to describe, in the case of France, the industrial organization, the institutions, and the industrial ecosystem associated with the development of television. The interest of this study lies in the fact that this is one of the sectors most impacted by recent industrial innovations (digitization, high speed internet access...), and is ideal-typical of the industrial and institutional transformations and adaptations resulting from technological change.
The development of information and communication technologies has led to gradual transformations in this industry. It is now experiencing a strong shake up, linked to the entry of a wave of new players, bypassing traditional broadcasting technologies. We try to explain how the French ecosystem is coping with this change, and provide conjectures on the future of the industry.

This thesis consists of four chapters, organized as follows:

- Chapter 1 aims at defining the notions used in this thesis, as well as to present the specific trajectory of evolution of the French audiovisual industry. Each country has a particular way of managing media activities, which generates a lot of externalities, both positive and negative. For instance, the US never had State television, while the UK developed on a hybrid public/private model. The importance of initial conditions and industrial path in the development of television leads us to consider the precise definitions associated with this media, its industrial organization and institutional framework before studying how it is affected by the entry of *over the top* players.

- The French regulation introduced with the concession of a terrestrial broadcasting licence to a private operator resulted in a unique copyright structure, and in automatic support mechanisms for the cinema, and later on for the audiovisual production through mandatory investments. It is therefore important to consider the effects of this system on the broadcasters' investment strategies. Chapter 2 presents an analysis of the regulated funding of the French audiovisual works and cinema by the broadcasters. We provide evidence that, by transferring most of the risk towards the investor, the current regulation may negatively affect the financing diversity of the industry by creating incentives for broadcasters to invest on the bigger producers to minimize the risk of a financial loss.

- Chapter 3 focuses more on the demand side, and discusses the effect of narrative writing on consumption patterns. We study the strategies for the broadcasting of *fiction* in France, and show the importance of the narrative structure of such works to keep the attention of the consumer. TV series expanded quite early in the United States, with satellite pay-TV, while this format was overshadowed by cinema in France. The recent growth in popularity for TV series, and more generally for *serialized* narratives raises some questions about their consumption and monetization. We provide evidence that the consumption of such programs is consistent with the *rational addiction* framework.

- The previous chapters describe an ecosystem strongly structured by the regulation resulting from the liberalization of State television in the early 1980s. The growth of the television market created a positive-sum game between broadcasters and producers. The entry of new players, bypassing traditional distribution channels, is disrupting the industrial organization of the sector and compromising the status quo.
  The purpose of chapter 4 is to study how this ecosystem, marked by a strong path-dependency, adapts to the new paradigm imposed by the platforms.

Chapter 1

Definitions and perimeter of the thesis

1.1 Media and network effects

Media refers to both a technical and symbolic dimension. First, the *media* refers to a technical means of communication allowing the transmission of a message[1], or to a support for the massive diffusion of information (press, radio, television, cinema). Media may also refer to the product of these techniques (newspapers, movies, broadcasts).

Every media is associated with a *publishing protocol* (Olivier Bomsel 2013), which identifies the sender of the message, contextualizes the story and gives it a public dimension.
Thus, from the point of view of communication, disregarding technical considerations, we can say that a media is a message intended for use by a wide audience. In this sense, we believe it is necessary to separate the category of media from that of *correspondence*, or exchange which only concerns private and identified agents. This separation is due to the fact that these two categories present different externalities profiles, and protocols. Correspondence, as a form of communication between two identified agents, is associated with positive externalities. Transactional risks (lies, asymmetry of information) are managed with the identification of communicating agents, and by reputation effects. Correspondence systems can be funded by the contributions of agents (postal stamp, telephone subscription).

On the other hand publication refers to different protocols and externality profiles. A single emitter sends a message to a public of several agents, who

[1]Christophe Piar, *Médias - Vue d'ensemble*, Encyclopædia Universalis

may or may not be identified. Media follows publishing protocols in which the message is constructed before being made public, and whose publication itself produces additional value, or *meaning*. Marketing processes are examples of such protocols: for instance the marketing strategy for the first Macintosh computer, accompanied by a large advertising campaign, launched by the broadcast a spot at the first commercial break of the Super Bowl half time illustrates the additional value, or meaning created by the editorial protocol. Other examples include the construction of a narrative around football players' performance in a championship, which give additional value to both the players and the championship itself.

In that sense, *mediatization* means to add *meaning* to a message, or product through a publication operation. Media produces meaning through a publicizing operation that is dependent on a specific technical system. Mediatization contributes both to adding meaning, as a public image that can be considered a complementary good (see G. S. Becker and K. M. Murphy 1993), but also giving the product *coverage*. The originality of Steve Job's protocol when launching new *Apple* products is that the publication event caused by paid advertising leads to large news coverage (*ie.* free advertising). To publish amounts to creating and spreading a narrative which is complementary to the published product.

Media ecosystems consist, among other things, of technical systems, linked by standards and norms, which determine the publication, and access to the message (*eg.* the frequencies of the terrestrial spectrum for television). In addition, there are externalities between publishing systems, which combine effects of meaning and add value to those messages (Olivier Bomsel 2015).

More specifically, consumption of cultural and media content is associated with network externalities: the public circulation of information generates external effects, both positive (sharing of knowledge, coordination, synchronization, social norms...) and negative (disinformation, rumors, *fake news*, incitement to crime...). This explains the organization of media in *ecosystems*, as this form of industrial organization allows the internalization of these externalities (Olivier Bomsel 2013). A good or service is said to carry network externalities when the utility given by its consumption depends on that of other agents (Katz and Shapiro 1985). By extension, network industries are industries that produce goods or services that generate network effects, including telecommunications, video games and media. They share some key characteristics, such as the importance of technical standards, high switching costs, and *path-dependency* effects (Pierson 1997).

Media benefit from the network externalities of distribution systems, but also from the social benefits associated with sharing a meaningful experience (Frank and Cook 1995). For instance, the popularity of some cultural goods has been linked to a form of *superstar* effect (Rosen 1981, Adler 1985): an artist's success depends on their adoption by a critical mass of consumers, and positive network externalities generate an increasing dynamic of investment, regardless of the quality or talent of the artist. Similarly, in the sociological literature, Dutt 2009 has linked the value of consumption of cultural goods to positive network externalities. Di Maggio and Garip 2011 discuss the diffusion of cultural consumption practices within groups, and model it as a direct consequence of positive network externalities.
The transmission of messages from a distance, and their almost instantaneous reception by a massive audience is also a central issue for political authorities. Media are an instrument used by political and economic actors to try and impose on public opinion, and change their perception by voters, or potential customers. Motta and Polo 1997 show that the government is interested in the content of television programs as they influence the evaluation of its own actions. A rational government aiming at increasing its chances of re-election will try to affect the type and content of television broadcasts. If there is a public broadcasting company, the government could place more importance on obtaining favourable treatment than on ensuring the company's efficiency and independence. Hence, in each country, institutions encouraging the production of meaningful information have been completed with censorship.

1.2 Institutions and institutional change

The neo-institutionalist[2] approach in economics has been developing since the 1980s, based on the notion of transaction costs, and inspired by the work of Coase, (1937, 1960), of D. North 1981, on the institutional conditions of economic growth, and of Williamson (1975).

D. C. North 1990 defines the notion of institution as a set of formal and informal rules that specify the available strategies to each relevant player and the benefits associated with each of these strategies.
According to D. C. North, Wallis, and Weingast 2009, the top priority of

[2]Claude Ménard, *Économie (Histoire de la pensée économique) - Néo-institutionnalisme*, Encyclopædia Universalis

societies is to contain violence, a priority that goes beyond individual freedom or prosperity issues. To achieve this, societies establish a *social order*, an organization that delegates the practice of violence to a specific group. Institutions result from this social order, and are reflected and made public by the media. In *open access orders*, in which, the economy is decoupled from politics, the media organize competition in the economy and in political representation, to ensure the access stays open.

Shepsle 1989 explains that the institutions have a goal of improving cooperation and facilitating the consolidation of agreements (*ie.* reduce transaction costs). Rational choice theoreticians[3] generally use institutions to explain stability of a political system. The stability of an institution would depend on its effectiveness in allocating resources, maximizing welfare...However, it appears that inefficiency is not a sufficient condition for institutional change. Shepsle 1989 distinguishes institutions whose inefficiency requires abandonment from those that can be modified according to their own rules, which he calls a robust institution. As an example, the French regulatory system for audiovisual broadcasting could be considered such a *robust* institution, as it was able to internalize the transformations linked to digitization in the early 2000s (see chapter 4).

After a long period of stability, it is possible that the institutional structure will stiffen, and lead to inefficiencies (Leonard-Barton 1992, Lieberman and Montgomery 1988 also speak of "incumbent inertia" to illustrate these inefficiencies). In fact, institutions can be robust, not because they correspond optimally to the tastes of players and to the environment, but because transaction costs set too high a price for alternative arrangements.

This raises the question of reforms, and institutional change. A reform can be seen as a specific investment aimed at altering the constituent rules of an institution (Lagroye and Offerlé 2011).
A reform therefore involves specific costs: building a reform project, finding coalitions of support, negotiating compromises...

According to North, reforms are responses by the institution and groups of actors within it to exogenous shocks, when maintaining existing rules is a sub-optimal strategy leading to a reduction in the function performed by the institution, its effectiveness, or its legitimacy (D. C. North 1990).
Wars, economic crises, pandemics, or technological mutations can make the

[3]see for instance Knight and Sened 1995

rules inappropriate or transform the preferences of actors. For instance, the development of new information technologies led to wide reforms in the administrations, especially in their interface with the users (Dunleavy et al. 2005). Another example of such exogenous shocks leading to institutional reforms is the impact of globalization and European integration, leading to plans to reduce public expenditure and reorganize administrative institutions (Boyer 2000).
These exogenous factors may also lead to the unblocking of an institutional *status quo*. Scharpf 2005 shows how the worsening economic crisis in Germany has reduced the political return on the blocking strategies employed by the opposition, and made it possible to consider a reform of the joint decision-making system characteristic of German federalism. We use a similar reasoning to show how the entry of international platform in the French ecosystem may unlock the blocked institutional situation.

The persistence of an institution, or the difficulty of carrying out a reform, even in the face of exogenous shocks can be explained by *path-dependency* effects: once established, the rules of the institutional game generate self-reinforcing dynamics (Pierson 1997, Rosenberg 1994). As a result, a more effective arrangement than the existing institution, or one that better mirrors the players preferences is not necessarily adopted. Pierson 1997 takes the example of the Welfare State institutions, and demonstrates the long lasting effects of the creation of these institutions. Once a path is taken, it extremely difficult to switch. He identifies four self-reinforcement mechanisms that characterize economic processes that generate economies of scale, which he links to path-dependency.

1. **Large fixed costs**: technological or institutional innovation implies significant fixed costs

2. **Learning effects**: Skills and knowledge acquired lead to increasing returns

3. **Coordination effects** (network externalities): facilitate the adoption of a single institutional or technical solution

4. **Adaptive expectations**: investing in unsuccessful technology can be costly (a direct consequence of network externalities) .

For North, path dependency is directly linked to institutional constraints. Institutional change means losing the increasing returns on initial investments, and no longer being coordinated with other institutions.

Wilsford 1994 takes the example of health care systems reforms to show that in path dependent models, institutions and structure channel actors along specific policy paths. He shows that in such systems, any non incremental change is unlikely.

Thus, it is clear that the reproduction of institutional arrangements is more easily ensured than their change (Lagroye and Offerlé 2011). In such situations, the beneficiaries of the rules in effect focus on defending institutional rents, and can permanently block developments that would be desirable for a large majority of players. In other words, as any reform project is interpreted by the players as likely to modify their utility or profit, it will generate mobilizations, coalitions or vetoes from different groups (Tsebelis 2002).

Knight and Sened 1995 show that the stability and the sustainability of an institution is explained by it's ability to provide distributional benefits to those who have the power or the authority to change it. Ultimately, reforming institutions may require such investments in information and negotiation that players will prefer the *status quo* (Shepsle 1989).

This type of blocked situation is classic in the study of institutions. For instance, Pierson 1994 works on the reforms of the 1980s in Great Britain and the United States aimed at dismantling the welfare state. He describes institutional *lock-in* phenomena, characterized by the robustness of pension systems linked to the ability of interest groups (here pensioners or veterans) to oppose reform and defend the institutions. On the other hand, the beneficiaries of change are unaware of the benefits they could derive from it and are less committed to reforming. From 1981 to 1987, the Reagan reforms have failed due to the activism of the American Association of Retired Persons (AARP).

We describe a similar situation with regards to the French audiovisual ecosystem in chapter 4. The core of the institution, defined by its previous path is the most difficult to attack by the reform. For instance, recent reform projects for the French audiovisual regulation have only led to gradual change. In that sense, Palier and Bonoli 1999 distinguish *path-shifting* reforms from reforms that actually strengthen existing institutional configurations (*path-dependent change*).

The links between media and institutions are twofold. First, institutions depend on the media to make the *rules* public. Institutions also set up the rules of media activities to monitor their externalities. The industrial organisations of media depend on the rules that have been set up to monitor

these externalities. For instance, the different institutional paths described by Starr 2005 correspond to different ways of dealing with media externalities. On the other hand, media contribute to lowering the transaction costs of institutions, facilitating coordination and achieving economies of scale.

1.3 Ecosystems

The term *ecosystem* is used in biology to refer to a system of living organisms and their interaction with non-living elements in their environment. This category is first presented in 1935, defined as a set of populations living in the same environment and having multiple interactions between them (Tansley 1935). Similarly, Willis 1997 defines an ecosystem as a network of interactions between organisms, and between these organisms and their environment. This notion takes a global perspective, considering each *ecosystem* as a coherent object of study, characterized by a structure and dynamics that differ from the sum of its parts.

The study of ecosystems, based on the exchange of energy and matter, can be generalized to many objects, outside of the fields of biology and ecology. Thus, Teece 2007 introduces the notion of the *business ecosystem*, which applies to a community of economic agents, interacting with each other, within a framework favourable to *externalities*. The ecosystem is defined as "a number of companies, producing competing or complementary goods that work together to create a new market and produce goods and services that have value for customers".

The notion of ecosystem in economics can also be seen as a generalization of *systemness* (Rosenberg 1994), as an ecosystem can consist of hardware, software and technical standards: for instance the success of the *Apple* brand can be attributed in part to its specific hardware and software elements, allowing integration and synchronization between multiple devices. We define here an economic ecosystem as a set of heterogeneous economic agents (firms, institutions, technical elements), linked both by contractual relations and external effects. This notion of ecosystem differs from the categories of industry, market, or sector, as it is based on the prevalence of externalities and non-contractual relationships.

It is important to distinguish the notion of ecosystem from this of *cluster*[4].

[4]We understand *cluster* here in the statistical sense, as a group of objects or agents that are more similar, or *closer* to each other than to those in other groups/clusters. A cluster

The notion of business ecosystems may be used to characterize companies or players interacting through a certain geographical proximity.
In media ecosystems, the players belong to different sectors of activity, may have divergent interests, and may not share any geographic proximity. Media ecosystems are characterized by the interdependence of several separate markets, some of them two-, or multi-sided. In such markets, several groups of agents interact through a third party, or *platform*. The literature explores the pricing choices of these platforms when there is some form of network interdependence or externality between several groups of agents[5]. For instance, advertisers (on one side of the market) are concerned about the number of viewers (on the other side of the market) that a television channel (the platform) can attract. The channel sets prices for viewers and advertisers taking into account these crossover network effects. These network effects can lead to coordination problems (Spulber 2010). This is why intermediaries or platforms develop strategies to internalize these effects: minimizing transaction costs, price internalization, etc.

1.4 From State monopoly to media platforms: institutional trajectory of the French audiovisual ecosystem

1.4.1 Initial conditions: the State monopoly

The institutional context of the public audiovisual sector in the 1950's created the initial conditions for the path leading to the current industrial organization. The French audiovisual sector developed around a public model, under close control from the State since the early 1960s. The *Radio Télévision Française*, created in 1949 becomes an autonomous entity in 1959 but is still under the supervision of the the ministry of information, and its director is appointed by the Council of Ministers.

Chevalier 1990 shows that the establishment of this State monopoly is mostly based on political arguments, as the terrestrial spectrum is a rare asset, distributed among States by means of international conventions, and

of firms would imply some sense of proximity, for instance in the geographical sense, but not necessarily the existence of externalities and/or non-contractual effects

[5]Rochet and Tirole 2003 argue that a market is two-sided if the platform can affect the volume of transactions by charging more on one side of the market and reducing the price paid by the other side by an equal amount.

whose use is too closely related to national sovereignty to be abandoned to private initiative. He then explains that as broadcasting techniques evolved, other concerns were highlighted: the importance of television as an instrument of political and cultural information would require that it be protected from pressure from interest groups. The argument put forward was that only public management would be able to ensure the pluralistic expression of ideas and guarantee the quality of programs.

Janin 2010 shows that there is also a technical argument for this state monopoly on terrestrial frequencies. Due to the interference that may exist between frequencies, spectrum management and allocation issues must be addressed. On the other hand, Ronald H. Coase 1959 underlines the importance of spectrum management by the market, with the allocation of property rights authorizing transactions between users to improve the efficiency of resource management.

While the radio-television was first removed from the sphere of commercial activity, the adoption of advertising in 1968 marked a turning point for public service broadcasting, with the use of private funds. This decision is justified by Prime Minister Jacques Chaban-Delmas' general policy speech on September 16th 1969. He wanted to put the two channels in competition in order to give better information to the public, and ensure the autonomy of the ORTF[6]. Chevalier shows that this independence of television from politics is not respected in practice.

From the very beginning, the subjection of television to politics was a structuring element of the French ecosystem. The State monopoly has thus long maintained this political subjection, and the use of audiovisual media to explain government policy and reach public opinion. Pierre Mendès France, President of the Council regularly used radio speeches with the intention of addressing the country and gaining its trust.

> *A partir de 1956, les interventions gouvernementales dans ce domaine stratégique et névralgique de l'information deviennent pesantes et systématiques: des dispositifs efficaces sont mis en place pour orienter l'information et exercer un filtrage préalable de son contenu; et cette emprise ne fera que s'accentuer après 1958, l'audiovisuel "colonisé par les gaullistes" devenant alors un*

[6]Entity in charge of the French television

> *véritable instrument de propagande servant à contrebalancer la puissance des journaux d'opposition*[7] Chevalier 1990

In 1974, the break-up the the ORTF gave birth to TF1, Antenne 2 and France 3. This change did not put an end to State control, but brought competition to the sector. The main objective of this reform was to introduce diversity and competition in the public service. This transition is brought about by institutional mechanisms of support and mandatory orders for broadcasters. Market organization gains ground with the opening to private capital and the growing importance of profitability, which strengthens the advertising market.

1.4.2 1982: the "concession-obligations" system

In 1981, political alternation opened the way to reforms and to the private sector, while technical constraints facilitating the public monopoly are lifted (scarcity of frequencies, high installation costs). Missika 1987 shows that direct control of the audiovisual sector through the monopoly becomes difficult, and is then replaced by alliances with private partners.

The law of July 29th 1982 redefines the framework for audiovisual broadcasting and abolishes the State monopoly. Its aim is to adapt the traditional model to new technical, cultural and political developments. The opening to the private sector goes through a heavily regulated system of public service concessions.

In 1984, CANAL+ is the first private operator to benefit from this new regulation. President Mitterand grants the licence to use a frequency to the Havas group, headed by his former Chief of Staff. The case is handled directly by the President, along with Havas, without consulting the High Authority, inviting bids, or ministerial decisions. The same procedure applied to the creation of the fifth and sixth channels. According to Chevalier 1990, it was important for the government to secure support in the audiovisual sector, while the prospect of political cohabitation was unavoidable.

[7] From 1956 onwards, government interventions in this strategic and sensitive field of information became cumbersome and systematic: mechanisms were put in place to orient information and exercice prior filtering of content; this influence only increased after 1958, while the audiovisual sector, "colonized by the Gaullists", was used as an actual propaganda tool to counterbalance the power of opposition newspapers. *Translation by V. Lavialle*

The 1982 law operates a specific partition of property rights and determines the firms' assets within the ecosystem. Broadcasters obtain access rights, or licences to broadcast, while producers gain intellectual property rights. As for cinema, a clear timeframe of exclusive windows of broadcasting, the *chronology des médias* is set. It allows each concession to be granted exclusive distribution rights in exchange for obligatory investments. This support system allows a dynamic production of French movies (more than 200 are produced each year), representing 35% of admissions to cinemas[8].

This system, along with the growth of the television market in France, created a positive sum game and rent-sharing between broadcasters and producers, financing an average of 200 films per year, and ensuring that these films have outlets.
When the game stops being positive, reform seems necessary but comes up against obstacles. The loss of positive returns contributes to slowing down reform processes, and to focus key players on the defense of the institution. Indeed, D. C. North 1990 shows how institutional change can be made difficult by the loss of increasing returns. The institutional non-reversibility is all the greater when the system is complex. In chapter 4, we show how large production companies form a coalition to defend their rents and avoid a renegotiation of the sharing of rights.

1.4.3 Digitization and the fall of barriers to entry

The development of private commercial channels was a first step in the transformation of the audiovisual sector in France. It is followed by a second technical step (Benghozi and Paris 2003) with digital technology.
Video on demand, satellite, digital television, and triple play offers have extended the number of access points in the market. However, the ecosystem managed to adapt, specifically by the capture of editorial externalities between channels of incumbent operators (chapter 4).

As to cable, its development in France lagged behind other European countries. In 1992, 1 million households were connected to the cable, compared to 10 million in Germany. In the end, these new broadcasting techniques were considered as an extension of Pay-TV. The consolidation of the private sector went through digital television.

In 2005, the number of free channels goes from 5 to 18, which damages

[8] 2015 CNC

the competitive equilibrium between broadcasters. To deal with this wave of new entrants, incumbents adopted a consolidation strategy: TF1 takes over NT1 and TMC, then launces HD1. M6 launches W9 and 6ter. These new entrants are subject to similar financing obligations, which does not disrupt the industrial organization of the sector. These developments are also accompanied by a different approach from broadcasters, with a segmentation of the public by areas of interest (*via* thematic channels).

1.4.4 Platform entry

From 2014, with the entry of Netflix and so-called SVOD platforms, a second wave of new entrants breaks the *status quo* of the ecosystem.
These platforms are online media services combining editorialization, distribution and, in some cases, audiovisual content production functions. The widespread introduction of high-speed Internet access in the 2000s allowed for the development of these services. They allow *non-linear* content consumption, independent of a schedule set by the broadcaster (see chapter 3). These new players are moving away from traditional terrestrial spectrum broadcasting networks and are not subject to regulation to the same extent as their competitors.

These changes are forcing traditional industry players to modify their business models (Gimpel 2015). New entrants such as Netflix are the most prominent examples of new platforms with a different model: they offer consumers an "all-you-can-watch" menu of streaming content for a fixed monthly price. However, consumers no longer buy the content itself and can no longer redistribute it, unlike physical CDs or DVDs. These new entrants are not always subject to the same regulations, which were designed for different market conditions.

These new digital platforms also significantly change the structure of the information and advertising markets. They can closely monitor their customers' navigation and consumption decisions in real time. As a result, the preferences are revealed in a much more dynamic process than they were with over-the-air television. Depending on how the platform shares this information with producers and advertisers, they can better target, market and price their respective content. It also leads to companies controlling large volumes of data (Google Facebook) having strong negotiating power in this advertising market (Gimpel 2015).

Appendix

27 June 1964	Creation of the *Office de radiotélévision française* (ORTF) as a national public service establishment.
July 3, 1972	Takeover of the ORTF after a draft liberalization in 1968 and 1969 under the Jacques Chaban-Delmas government. The national public service broadcasting service is declared a state monopoly.
August 7, 1974	ORTF split into seven independent companies: four national companies (TF1, A2, FR3, Radio-France), a public broadcasting establishment (Télédiffusion de France, TDF), a production company (SFP) and a national audiovisual institute (INA). Even if it establishes the principles of competition between channels, the law maintains the state monopoly.
November 9, 1981	Law on the granting of exemptions to the state monopoly.
29 July 1982	End of the monopoly and creation of the High Authority. It grants operating authorizations for radio and television stations, appoints the presidents of public channels, draws up specifications and monitors competition rules.
24 December 1985	Private Television Act. The High Authority issues authorizations, TDF keeps the broadcasting monopoly.
September 30, 1986	Freedom of Communication Act. It replaces the High Authority with the National Commission on Communication and Freedoms (CNCL) and ratifies the privatization of TF1.
November 28, 1986	Anti-concentration law limiting dominant positions in the audiovisual and written press.
January 30, 1989	The CNCL is replaced by the *Conseil supérieur de l'audiovisuel* (CSA).
August 4, 1989	Law on the joint presidency of A2 and FR3.
1 February 1994	New law amending the law of 30 September 1986 on freedom of communication, which allows an operator to hold up to 49% of the capital of a private channel.
March 21, 2000	The bill of the Minister of Culture, Catherine Trautmann, is adopted in second reading by the National Assembly. The text, which has been significantly amended compared with the text adopted at first reading in May 1999, provides in particular for the creation of a holding company bringing together the public channels (with the exception of La Sept-Arte and Réseau France outre-mer, RFO), the reduction of advertising time on France 2 and France 3 and the strengthening of public sector financing. It also deals with digital terrestrial broadcasting.
31 March 2005	Launch of the programs of the 14 free DTT channels. 30 November 2005 Presentation to the Council of Ministers of a communication on the French international news channel (CFII) and signature on the same day, by Dominique de Villepin, Prime Minister, of an agreement with France Télévisions and TF1 allowing the creation of the channel.

Table 1.1: Audiovisual Ecosystem Timeline (Acrimed.com, viepublique.fr)

Chapter 2

A Multivariate Analysis of Regulated Funding of the French Cinema by Broadcasters

Abstract. French television and cinema are closely linked. The current ecosystem of production and broadcasting of audiovisual and cinema works has been shaped by a regulation dating back to the 1980's. The right to broadcast on hertzian frequencies was granted to public, and later on to private companies, in exchange for obligations of investment in independent production. In compensation of these investments, TV channels were granted broadcasting rights, but the producer kept the ownership of other rights.

This system and the unique copyright structure it implied has allowed the French cinema industry to thrive, but now shows its limits: audience for movies on television is declining and the popularity of TV series rises, as well as that of video-on-demand platforms which base most of their editorialization strategy on serialized productions.

TV broadcasters currently represent over 30% of total investment in movie production, and prime-time television is an important target for movies. However, those movies generally aren't financially profitable and rely greatly on the institutional devices to go through production. The strategic decisions of investment and broadcasting are strictly regulated within the concession-obligations system.

In this chapter, we analyze the impact of the regulation on the broadcasters' strategic choice of investment in movies and audiovisual productions using a multivariate logistic model. We study a database provided by the CNC of 22 000 orders from broadcasters to 2000 audiovisual producers and 1600 movies by 600 producers between 2007 and 2014. We provide evidence that, by transferring most of the risk towards the investor, the current regulation may negatively affect the financing diversity of the industry by creating incentives for the broadcasters invest on the bigger producers to minimize the risk of a financial loss.

We also show how the current regulation creates an artificial separation between the audiovisual and cinema formats, which appear to be increasingly substitutuable from the broadcasters' point of view.

2.1 Introduction

The history of the French audiovisual and cinema ecosystems is one of tension between the regulation and evolution of technical constraints. The recent developments of broadcasting techniques, allowing for entry of new players bypassing entirely the regulation, questions its pertinence.

French television and cinema are closely linked. The current ecosystem of production and broadcasting of audiovisual and cinema works has been shaped by a regulation dating back to the 1980's. The right to broadcast on public hertzian frequencies (*concessions*) was granted to public, and later on, to private companies in exchange for obligations of investment in independent production. Broadcasters were required to invest a fixed percentage of their turnover in French audiovisual and cinema production.

This regulation is completed by a specific copyright system: in compensation for their investments, TV channels are granted broadcasting rights, but the producer keeps the ownership of other rights. This system is institutionalized through chronological timeframes of exclusivity in broadcasting, the *chronologie des médias*. The economic value of concessions is thus closely linked to this of the exclusive window of broadcasting.

This organization has allowed a form of protection of domestic movies and the French cinema industry, by restricting their exposure to foreign competition: American movies had to be sold to CANAL+, to be aired 10 month after their release, or three year for free-to-air TV. However, the system now shows its limits: audience for movies on television is declining, and the popularity of TV series is on the rise, as well as that of SVOD platforms which base their editorialization strategy on serialized production. As alternative devices grow in popularity as a means of consumption of audiovisual and cinema works, the value of concessions and of exclusive broadcasting falls. As the *chronologie des médias* relies on proportionality of the value of the different timeframes relative to the obligations of investment in production, this observation calls to a reform of the concession-obligation system, advocated by several institutional reports since 2010.

In this chapter, we analyze the investment strategies of broadcasters in both audiovisual and cinema production. We study a database provided by the CNC of 22 000 orders from broadcasters to 2000 audiovisual producers, and 1600 movies by 600 producers between 2007 and 2014. Using a multivariate probit model, we estimate the determinants of the investment choice

and the effect of regulation on the broadcasters' strategic decisions. We provide evidence that, by transferring most of the risk towards the investor, the current regulation may negatively affect the financing diversity of the industry, by crating incentives for the broadcasters to invest on bigger producers to minimize the risk of a financial loss.
We also show how the current regulation creates an artificial separation between the audiovisual and cinema formats, which appear to be increasingly substitutable from the broadcaster's point of view.

Our analysis is similar to one conducted by Moureau, Gergaud, and Benhamou 2009, which is, to our knowledge, the only empirical study concerned with the question of the financing of cinema by television channels in France. The authors identify the main variables influencing a broadcaster's investment decision from the definition of a quality indicator *ex ante*. They conclude that the channel's efforts and their choice of investment depend mostly on the quality of the films and the nature of the co-financing. They also observe a complementarity between the funding of cinema by television channels and public support. We seek here to extend this analysis to audiovisual financing and to shed light on the institutional and economic mechanisms that justify broadcasters' choice of investment. This study can then lead to numeric applications, in order to estimate the impact of institutional changes on the ecosystem.

2.2 Institutional framework

2.2.1 Historical context

The French audiovisual ecosystem has developed around a public model, strictly controlled by the state since the early 1960s, and the creation of the first public channel. Later, in 1964, a second public channel is created, along with the ORTF, public office in charge of handling radio and television in France and satisfying the "needs of information, culture, education and entertainment of the public"[1].

After a period of State monopoly, the liberalization process took a path of several steps, and was mostly guided by the evolution of technology and the release of technical constraints. This process started in the 1970s, as the ORTF was dissolved and three public channels, TF1, Antenne 2 and France 3, were created, institutionalizing competition in the ecosystem, as a

[1]Law n°64-621 of 1964

way to fight a monolithic public service. The transition is brought *via* institutional mechanism of obligatory funding and financial aid. The market logic gains ground, through a greater emphasis on economic profitability for channels, as competition reinforces the importance of the advertising market.

In the 1980s, technical constraints that legitimated the state monopoly have become obsolete, and a political alternation opens the way to reforms. The law of July 29, 1982 redefines the framework of the audiovisual and acts the end of the monopoly of state. The sector is opened to private actors in a highly regulated system of concessions-obligations, which is still used today, and is supervised by the *Haute Autorité de la communication audiovisuelle*, in charge of guarantying the independence of the public service and to grant authorization of hertzian broadcasting.
This process of emancipation, reinforced by the creation of an independent commission, the CNCL in 1986, later on replaced by the CSA (French superior council of the audiovisual), is not enough to completely free the audiovisual sector from the political sphere. The creation of CANAL+, first pay-TV channel was directly handled by the French President, along with the president of the media group Havas, without consulting the High Authority, nor call for tender.

The creation of this first pay-TV channel has been set with the goal of developing the French cinema ecosystem, through a mechanism of obligation of investment in cinema works. This allowed for a very dynamic production industry, with around 200 movies produced each year, for a market share of around 35 to 40% in movie theaters.

In the 2000s, the evolution of broadcasting technologies, allowed for a profusion of free-to-air channels on Digital terrestrial television, leading to a commoditization of cinema and movies. For these new entrants, broadcasting a blockbuster is a guarantee of strong audience. With thousands of films aired each year and a daily offer of around 30 movies, cinema becomes an everyday consumer product(Olivier Bomsel 2018).

This liberalization process had direct consequences on the shape of the ecosystem. First, private broadcasters become highly dependent on the value of their concession of terrestrial frequencies and windows of exclusivity. This system of protected markets and exploitation windows following a chronological timeframe (the *chronologie des médias*) is weakened by the relaxation of technical broadcasting constraints: it is now possible for *over the top* players to bypass the traditional means of distribution. Increased competition

between channels, widespread use of the Internet via online platforms and catch-up TV are leading to a decline in free channel advertising revenue. The CANAL+ group, main investor in French cinema is weakened and the terrestrial channels may lose money by broadcasting the films they have pre-purchased (Victor Lavialle 2018, Bass 2019). Several institutional reports (Bonnell 2013, Schwarz 2003) point to the low profitability of the sector, as well as to inflationary pressures. This is due to an increase in the volume of the production costs and the rigid price formation mechanism (the movie ticket price is not a market variable). The reports also point to the fact that French production of audiovisual works suffers from a lack of spontaneous demand from national broadcasters. Despite the quota system and the various regulatory funds, French production of audiovisual fiction is among the less dynamic in Europe.

2.2.2 Details on the French regulation

The regulation associated with the licences to broadcast for French TV channels cover both obligatory investments in independent production and broadcasting quotas, with the following objectives:

- Ensuring a strong exposure of French works,
- Strengthening the financing of creation,
- Developing a diversified network of independent production companies,
- Promoting the circulation of original French and European works

Broadcasting quotas set a certain proportion of antenna time for "European works" (originating from member States of the European Union and, under certain conditions, works from European third countries), or of "works of French original expression" (produced entirely or mainly in their original version in the French language or in a regional language in use in France).

Obligations of investment in the audiovisual production are imposed on channels that devote more than 20% of their broadcasting time to audiovisual works, or whose turnover exceeds €350 millions. The obligations of investment in cinema concern channels broadcasting more than 52 unique movies, or 104 cinema broadcasts per year. The terms and levels of these obligations of investment vary according to various criteria, such as the broadcaster's turnover, its presence or not on the terrestrial network, the channel's business

model and the type of programs broadcast. Table 2.1 presents a simplified representation of obligatory investments. In all cases, a minimum of 75% of the investment must be directed to independent production[2]. It is possible for free-to-air channels to reduce the amount of their obligations by investing only in *patrimonial* works (choice 2)[3].

	Audiovisual obligations			
	Free-to-air channels		Pay-TV channels	Cinema channels/CANAL+
	Choice 1	Choice 2		
Independence Clause	75% of investments			
AV works	15%	NA	15%	NA
Heritage works	10.5%	12.5%	8.5%	3.6%
	Cinema obligations			
	Non-specialized channel	**Specialized channel**	**1st broadcast-specialized**	**CANAL+**
Independence Clause	75% of investment			
European Movies	3.2%	21%	26%	12.5%
French Movies	2.5%	17%	22%	9.5%

Table 2.1: Simplified representation of obligatory investments

2.3 Descriptive statistics

Our empirical observations are based on the CNC (National Center for Cinema and the Moving Image) database. The CNC is an agency of the French Ministry of Culture, responsible for the production and promotion of cinematic and audiovisual works in France. It gathers a database of all orders from broadcasters to independent producers for audiovisual works as well as details of the cinema projects. We study a sample of 22 000 orders to 2000 audiovisual producers, 1600 movies for 600 cinema producers between 2007 and 2015.

[2]Article 11 of the 90-67 decree defines an independent production company as a company:

- In which the channel does not hold, directly or indirectly more than 5% of the capital
- Who does not own, directly or indirectly more than 5% of the capital of the channel
- with which the company or service does not have links constituting a lasting community of interest

[3]Defined by the CNC as original audiovisual works with a heritage vocation that are of particular cultural, social, technical, scientific or economic interest.

Genre	Pre-purchase (AV) /projects (cinema)	Production cost 2007-2015 (G€)	Production cost/hour mean	Produced hours by year
Magazine	390	0.3	127 500€	400
Performing arts	3039	0.8	140 600€	700
Documentary	18561	3.5	152 500€	2 500
Total non-fictional	**21 990**	**4.6**	**150 360**	**3600**
Animation	523	1.7	600 000€	300
Fiction	2314	6.2	988 700€	800
Cinema	2259	11	2 782 000€	400
Total fictional	**5096**	**18.9**	**1 414 700**	**1500**

Table 2.2: Database description

Table 2.3 presents the detail of financing for audiovisual works and movies. Broadcasters represent the main source of funding for most genres of audiovisual works, and 26% of cinema funding. Most of this funding comes from CANAL+ (20% of total cinema investment)[4].

		Broadcasters	COSIP	Producers (FR)	Exports	Others
Fictional Works	Short series	65%	17%	12%	2%	4%
	TV Series	69%	10%	11%	6%	4%
	TV movies	74%	9%	9%	3%	4%
	Animation	27%	16%	22%	26%	9%
Non-fictional works	Documentary	50%	20%	16%	5%	9%
	Magazines	68%	12%	14%	0%	5%
	Performing Arts	35%	27%	28%	7%	3%
		TV	**Subsidies**	**Producer**	**Exports**	**Others**
Cinema		26%	18%	25%	19%	12%

Table 2.3: Financing of French movies and audiovisual works (2007-2015)

[4]COSIP stands for institutional funding from the CNC. Funding from "TV" accounts for both investments in pre-purchase of rights and co-production

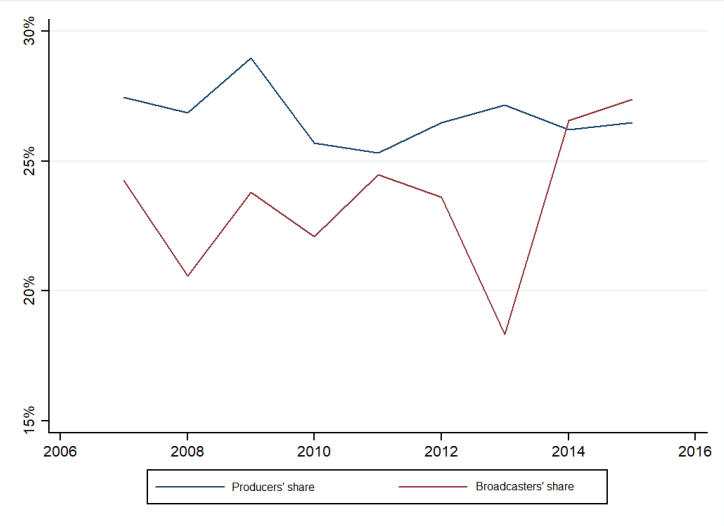


Figure 2.1: Cinema: evolution of producer and broadcaster contributions

There is an upward trend in the share of pre-purchase contributions from broadcasters, which exceed those of producers from 2014 onwards.

	TF1	M6	France TV	CANAL+
Animation	12%	6%	38%	20%
Documentary	5%	7%	29%	15%
Fiction	17%	5%	48%	11%
Magazine	1%	6%	35%	9%
Performing Arts	2%	3%	32%	3%
Cinema	8%	4%	27%	66%

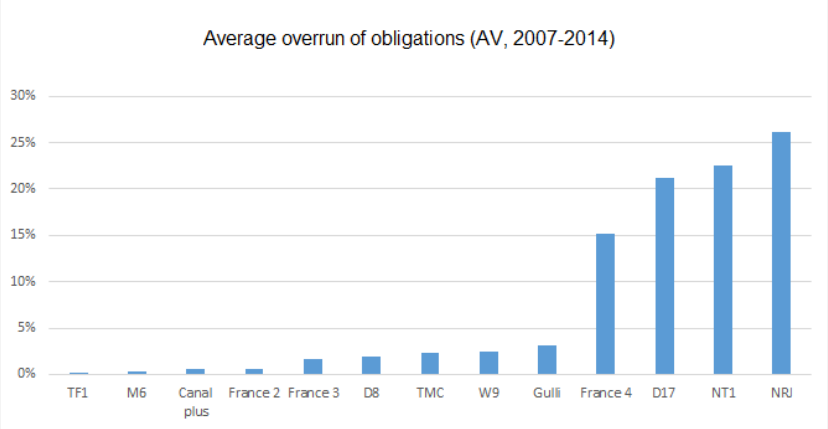
Table 2.4: Frequency of investment for broadcasters

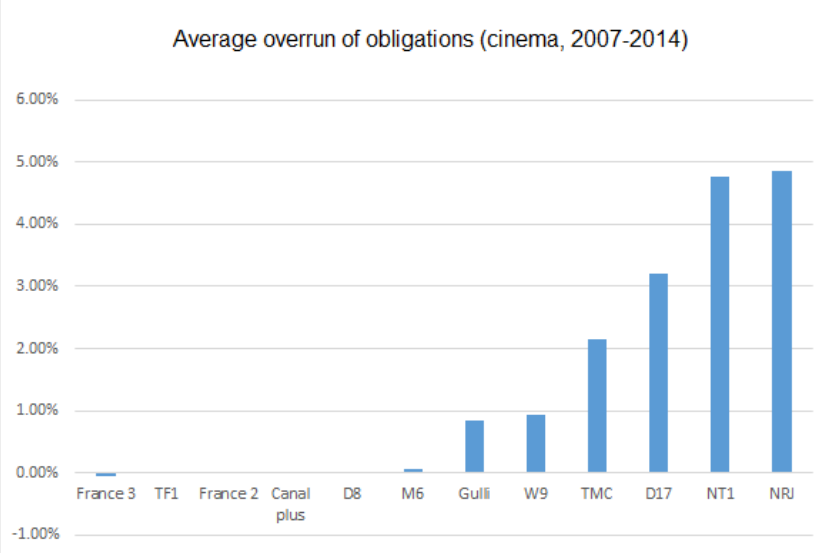
The public sector, with France Televisions participates in the financing of a large part of the programs. The other broadcasting groups are more specialized: CANAL+ group's high rate of investment in animation is due to the inclusion of specialized channels.

The cinema investments of the main broadcasters are more strongly correlated than for the audiovisual sector. This reflects a concentration of investments on high-budget movies, which are more likely to be profitable (V. Lavialle and Montecino 2016).

	Cinema				Audiovisual			
	TF1	CANAL+	M6	FTV	TF1	CANAL+	M6	FTV
TF1	1				1			
CANAL+	0.1857	1			-0.0817	1		
M6	-0.0179	0.1069	1		-0.0626	-0.0935	1	
France TV	-0.1761	0.334	-0.1029	1	-0.12	-0.1283	-0.1775	1

Table 2.5: Investment correlation matrix between groups of broadcasters





The largest audiovisual groups, on average, only marginally exceed investment requirements. This indicates that the obligations presented in the

previous section (table 2.1) are binding, and that the actual willingness to pay for channels is lower than their amount.

The saturation of the regulatory constraint for the major free-to-air television groups illustrates a more fundamental problem of valuing these programs (see chapter 3). By investing, the broadcaster actually purchases an exclusive broadcast window of the film or program. His ability to dispose of residual rights even in the context of a co-production is extremely limited. What's more, as suggests the model presented in the previous section, the level of the constraint could be reducing investment on other programs. The lack of sufficient incentives to finance programs can be explained by this, particular copyright structure, induced by the concession-obligations system, along with the progressive devaluation of the economic profitability of the exclusive broadcasting window.
In is interesting to note that most of the digital terrestrial television channels exceed their quotas on average. This could be explained by the fact that their turnover is generally lower than bigger groups, which makes the obligation easier to fulfill.

2.4 Determinants of broadcasters' investment choices

At the moment of their decision to invest, broadcasters do not know the success of a movie, and the return-on-investment they can hope for. They derive most of their revenues from the sale of advertising space, which is proportional to the total audience reached. The box office success of a movie can be a good predictor of its commercial success on Television. However, this variable is not observable by broadcasters *ex ante*.

In order to solve the problem of maximization, the broadcaster must identify a series of *ex ante* variables that they can use to predict the future success of a program. In cinema, there is a significant correlation between the production's estimated costs and the box office entries. It can be assumed that television channels use this amount as a proxy for future film revenue.

	Box office
	(Std. Err.)
Production costs	0.015**
	(0.005)
Year of production	4220.923
	(10315.466)
Promotional Costs	5.108**
	(0.297)

Table 2.6: Correlation with movie commercial success

Table 2.6 shows a positive correlation with both estimated production costs and promotional costs and box office success of a movie. Financial success of movies is generally considered highly unclear, and risk is a central part of this industry. Various economic papers estimate the determinants of box-office success and conclude to the positive effects of some variables such as movie *star* notoriety or critical reviews (Elliott 2008). The main difficulty of such an analysis is that movies are both commercial products and artistic realizations. More precisely, they are experience goods, which quality can only be observed after consumption. One of the first econometric studies of the determinants of box office success, Litman 1983 conclude to a significant effect of the presence of *stars*, production cost, distributor and awards. Most studies show that elements of investment in a movie and marketing costs have a positive effect on success: Litman and Ahn 1998, Zufryden 1996, Prag and Casavant 1994 show that the marketing effort affects positively movie success.

From the broadcaster point of view, the investment problem amounts to maximizing expected return on investment based on *ex ante* characteristics of the movie. From the variables mentioned above, only the estimated production costs and producer characteristics can be observed by the broadcaster at the moment of the investment decision.

We use multivariate probit models to estimate the determinants of the broadcaster's choice of investment. We chose this model so as to take into account the simultaneity of the choice from several broadcasters. Our main variable of interest is the impact of the producer's group on the probability of investment.

2.4.1 Separated analysis

In this first analysis, we assume that audiovisual programs and cinema movies are independent goods from the broadcaster's point of view.

The main difference between cinema and audiovisual fiction is the specific editorial protocol of movie theaters. Development costs of a movie are near to three times as much as a TV series (V. Lavialle and Montecino 2016), and the film's screening in theaters is crucial to its long term success. It also creates a specific market, where spectators, producers and theater owners interact.

In order to take into account characteristics of the producers, we use producer groups generated by a classification algorithm. Using the average yearly production cost, number of movies or audiovisual orders and average production cost by hour for each producer, we divide producers into homogeneous classes. The results of this process are summarized in tables 2.7 and 2.8. The structure of both sector is similar, with a small group of *leaders* and *big producers* with a high market share, a group of *middle* producers and a large group of smaller firms with a very small production level. Details of the methodology can be found in the appendix.

Group	**Number**	**Market share**	**Annual prod. cost (M€)**	**Years in activity (/9)**	**Hours produced (/year)**
Leaders	2	13.5%	109	9	206
Big	10	14.4%	37	6.3	59
Middle	242	39.6%	5.2	4	8.6
Small	1713	30%	0.6	3	3.4
Cinema producers	140	2.5%	0.9	2	1.5
Total	**2107**	**100 %**	**1.43**	**3**	**4.4**

Table 2.7: Ecosystem of audiovisual production (2007-2015)

Group	**Number**	**Concentration (production costs)**	**Annual prod. cost (M€)**	**Number of movies (yearly)**	**Specialization (cinema)**	**years in activity cinema**
Leaders	4	14%	41	3	86%	9
Big	28	27%	15	2	92%	7
Middle	163	36%	9	1	96%	3
Small	468	16%	2	1	78%	2
ad hoc structures	17	7%	33	1	100%	1
Total	**680**	**100%**	**4.9**	**1.1**	**83%**	**2**

Table 2.8: Ecosystem of cinema production (2007-2015)

Results of the analysis are presented in table 2.10. Declared production cost has a positive effect on the decision of investing for audiovisual and cinema, for every broadcaster except TF1. Bigger producers benefit more from

broadcasters' investments in cinema.
For audiovisual works, investments are more likely to be spread out. The fact that CANAL+ is more likely to invest in animation programs reflect the investment of youth channels in the group. The public broadcaster has a higher probability to invest on TV movies and on the Leading producing firms, while TF1 seems to specialize in TV series.

As expected, a rise in the obligation level positively impacts the probability of investment. The negative coefficients associated with TF1 and M6 could be explained by the fact that the regulatory constraints are not always saturated for these groups, as well as the lack of significant changes in the level of obligations. The effect of the different audiovisual genres on the probability of investments illustrates horizontal differentiation between channels.

2.4.2 Joint analysis

In this second section, we make the more realistic assumption that cinema and audiovisual investments are substitutes from the broadcasters' perspective. In the context of free-to-air TV, there is no fundamental difference between a TV-movie and a cinema one: both are a 1-unit fictional program and can be aired in similar circumstances. Thus, it seems reasonable to assume that a broadcaster doesn't make a difference between these two formats when investing and only considers the program which will maximize his expected audience.

Because values of coefficients are not informative about the magnitude of the effects of covariates on probabilites of success, either marginal or joint, except for determining the signs of effects, we follow Ferrante 2008 and summarize results in terms of marginal effects on success probability for each dependent variable.
Each marginal effect represents the change in probability of success given a one unit change in the associated regressor.

	Prob Marg CANAL +	Prob Marg FTV	Prob Marg TF1	Prob Marg M6
Prod. Cost	2.12E-08***	1.30E-08***	1.27E-08***	6.20E-09***
Animation	0.0136	0.0589**	-0.0195	0.00638
Cinema	0.369***	-0.0724***	-0.0518***	-0.0411***
Magazine	-0.0658***	0.0603***	-0.0456***	-0.00687
Series	-0.164***	0.124***	0.127***	-0.0321**
Short series	0.0268**	0.0631***	-0.0321***	0.0133**
Performing arts	-0.11***	0.0142	-0.0239***	-0.046***
TV movie	-0.142***	0.283***	0.0792***	-0.0273***
Documentary		*ref*		
Ad hoc	-0.204	-0.334**	-0.152***	0.298***
Middle	0.0756***	0.0354***	-0.0108*	0.0477***
Big	0.00913	-0.0281**	0.135***	0.0134***
Leaders	0.00376	0.107***	0.0374***	0.0145**
Small producers		*ref*		
Foreign coproduction	0.0431***	0.0271***	0.0109***	-0.054***
Ob. cinema CANAL	0.0122***			
Ob. AV CANAL	0.0404***			
Turnover AV CANAL	-3.77E-10***			
Turnover cinema CANAL	-1.18E-10**			
Ob. cinema FTV		0.144***		
Ob. AV FTV		0.0505**		
Ob. AV TF1			-0.00248***	
Ob. AV M6				-0.00682***
Constant	0.589*	-1.211***	0.0749***	0.15***
Observations	23,381	23,381	23,381	23,381
R-squared	0.966	0.998	0.949	0.907

Table 2.9: Variation of probability of investment: probit model

The coefficients presented in table 2.9 can be read as the variation in probability of success (investment) following a marginal change in the regressor variable. Results from other specifications of the probit model are presented in the appendix.

Once again production cost is a significant factor impacting the probability of investment. We interpret this as a bet on the box-office success of the movie, which is correlated with production cost, and one of the best predictors of future success available *ex ante* to broadcasters, along with the history of the producer.
Thus, it is not surprising that for each audiovisual group, the probability of investment is higher if the producer is from the *leaders* group or from the bigger structures than for small producers, and only the public service broadcaster France Télévisions has a higher probability to invest in a project from a small producer than a bigger one. In earlier work (V. Lavialle 2016), we show how producers from the *Big* and *Leaders* groups are the only one producing profitable[5] movies on average, while no movie with production cost higher than 7M€from a small producer has been profitable[6].

[5]Here, we define profitability of a movie as the difference between total income (box office, broadcasting, DVD, VOD) and total production and marketing costs

[6]From 2007 to 2013

Only CANAL+ is more likely to invest in Cinema than audiovisual works, which can be explained by the higher level of obligations.

2.5 Conclusion

The regulation and specific copyright structure of audiovisual and cinema production in France is unique in Europe. Though always closely linked to the political power, the evolution of the ecosystem formed by the producers, broadcasters and the regulation evolved with technology and the release of technical constraints set on broadcasting. After the opening to competition and the end of the State monopoly, the concession-obligations system ensured the funding and dynamism of the French production. The recent evolution in broadcasting technology, allowing to bypass the traditional hertzian or digital networks strongly impacts the strategies of investment of TV channels. The value of the temporal exclusivity in broadcasting decreases in front of the rise in popularity of TV series and online video-on-demand platforms.

We provide evidence to how the regulation may now negatively affect the diversity of production, as the channels are more likely to invest on projects from the bigger producers, in order to minimize the risk. What's more, it is possible that popular formats such as TV series are financed in a sub-optimal manner by broadcasters, as the structure of copyright distorts the financing decisions towards content providing a better live audience.

For further research, estimating or simulating the actual willingness to invest of broadcasters could give a better understanding of the effects of regulation on the decisions to invest. A specific study on the degree of substituability of audiovisual works and cinema from the channels point of view could also provide insight on the effects of the separated obligations for cinema and audiovisual works.

2.6 Appendix

Regresions are run at the group level for broadcasters, and not channel level. This is due to the fact most of the obligations of investment apply at group level.
Audiovisual groups in the database:

1. CANAL+ Group : CANAL+, Comédie+ , Piwi+, Planete+, Teletoon+
2. France Télévisions Group : France 2, France 3, France 4, France 5, TV5
3. TF1 Group : TF1, HD1, NT1, TMC
4. M6 Group : M6, W9, Paris Première, TEVA, Série Club, 6ter
5. Lagardère Group : Canal J, Gulli, Tiji
6. NRJ Group : Nrj, Chérie HD

2.6.1 Regression Tables

	CANAL+	France TV	TF1	M6
Production cost	9.57e-08***	3.85e-08***	5.07e-08***	4.24e-08***
Animation	0.0259	0.149**	-0.105	0.118
Cinema	1.088***	-0.241***	-0.268***	-0.404***
Magazine	-0.396***	0.145**	-0.840***	-0.0584
TV series	-0.926***	0.280***	0.468***	-0.239**
Short series	0.127**	0.156***	-0.294***	0.150**
Spectacle vivant	-0.915***	0.0685**	-0.354***	-0.447***
TV movie	-0.907***	0.717***	0.405***	-0.258***
Ad Hoc structure	-0.780	-1.081**	-0.438	1.136***
Middle	0.396***	0.0886***	-0.0732*	0.478***
Big prod.	0.0207	-0.0934**	0.766***	0.211***
Leaders	-0.0360	0.283***	0.350***	0.183**
Foreign Coproduction	0.200***	0.0658***	0.107***	-0.627***
Ob. cinema Canal				
Ob. AV Canal				
Ob. cinema FTV				
Ob. AV FTV				
Ob. AV TF1				
Ob. AV M6				
Number of movies				
Taxable Turnover (CANAL+ AV)				
Taxable Turnover (CANAL+ cine)				
Intercept	-1.478***	-0.629***	-1.743***	-1.773***
Observations	23,381	23,381	23,381	23,381

Table 2.11: Additional Regression (1)

	CANAL+	France TV	TF1	M6
Production cost	9.58e-08***	3.80e-08***	5.01e-08***	4.22e-08***
Animation	0.0242	0.154**	-0.0898	0.131
Cinema	1.087***	-0.226***	-0.255***	-0.390***
Magazine	-0.411***	0.172**	-0.827***	-0.0261
TV series	-0.933***	0.319***	0.490***	-0.217**
Short series	0.122**	0.178***	-0.285***	0.164**
Spectacle vivant	-0.906***	0.0397	-0.361***	-0.459***
TV movie	-0.920***	0.734***	0.419***	-0.251***
Ad Hoc structure	-0.807	-1.020**	-0.416	1.188***
Middle	0.393***	0.108***	-0.0709*	0.483***
Big prod.	0.0174	-0.0784**	0.765***	0.212***
Leaders	-0.0417	0.296***	0.352***	0.187**
Foreign Coproduction	0.195***	0.0776***	0.112***	-0.619***
Ob. cinema Canal	0.0504***			
Ob. AV Canal	-0.254***			
Ob. cinema FTV		1.461***		
Ob. AV FTV		0.308***		
Ob. AV TF1		0.0222		
Ob. AV M6			0.0128	
Number of movies	-0.000329***	-0.000525***	0.000204***	0.000243***
Taxable Turnover (CANAL+ AV)				
Taxable Turnover (CANAL+ cine)				
Intercept	-0.0637	-10.06***	-2.651***	-2.705***
Observations	23,381	23,381	23,381	23,381

Table 2.12: Additional Regression (3)

	CANAL+	France TV	TF1	M6
Production cost	9.58e-08***	3.80e-08***	5.01e-08***	4.22e-08***
Animation	0.0254	0.153**	-0.0898	0.131
Cinema	1.086***	-0.226***	-0.255***	-0.391***
Magazine	-0.409***	0.172**	-0.827***	-0.0262
TV series	-0.935***	0.319***	0.490***	-0.217**
Short series	0.120**	0.178***	-0.285***	0.163**
Spectacle vivant	-0.905***	0.0397	-0.361***	-0.459***
TV movie	-0.918***	0.734***	0.419***	-0.251***
Ad Hoc structure	-0.812	-1.020**	-0.416	1.188***
Middle	0.394***	0.108***	-0.0710*	0.483***
Big prod.	0.0191	-0.0785**	0.765***	0.211***
Leaders	-0.0402	0.296***	0.352***	0.187**
Foreign Coproduction	0.194***	0.0776***	0.112***	-0.619***
Ob. cinema Canal	0.0646***			
Ob. AV Canal				
Ob. cinema FTV		1.478***		
Ob. AV FTV		0.307***		
Ob. AV TF1			0.0205	
Ob. AV M6				0.0120
Number of movies	-0.000248***	-0.000528***	0.000199***	0.000242***
Taxable Turnover (CANAL+ AV)				
Taxable Turnover (CANAL+ cine)				
Intercept	-1.516***	-10.09***	-2.615***	-2.688***
Observations	23,381	23,381	23,381	23,381

Table 2.13: Additional Regression (4)

	CANAL+	France TV	TF1	M6
Production cost	9.60e-08***	3.79e-08***	5.05e-08***	4.20e-08***
Animation	0.0221	0.158**	-0.0976	0.123
Cinema	1.086***	-0.224***	-0.260***	-0.395***
Magazine	-0.411***	0.172**	-0.836***	-0.0415
TV series	-0.931***	0.321***	0.483***	-0.225**
Short series	0.121**	0.178***	-0.287***	0.155**
Spectacle vivant	-0.905***	0.0408	-0.356***	-0.451***
TV movie	-0.922***	0.738***	0.410***	-0.259***
Ad Hoc structure	-0.825	-1.025**	-0.427	1.178***
Middle	0.390***	0.104***	-0.0741*	0.478***
Big prod.	0.0137	-0.0825**	0.761***	0.207***
Leaders	-0.0446	0.296***	0.349***	0.183**
Foreign Coproduction	0.196***	0.0773***	0.109***	-0.623***
Ob. cinema Canal	0.0665***			
Ob. AV Canal	0.239***			
Ob. cinema FTV		0.454***		
Ob. AV FTV		0.144***		
Ob. AV TF1			-0.0240**	
Ob. AV M6				-0.0619***
Number of movies				
Taxable Turnover (CANAL+ AV)	-2.08e-09***			
Taxable Turnover (CANAL+ cine)	-5.68e-10**			
Intercept	1.212*	-4.990***	-1.425***	-0.832***
Observations	23,381	23,381	23,381	23,381

Table 2.14: Additional Regression (5)

	CANAL+	France TV	TF1	M6
Production cost	9.59e-08***	3.80e-08***	5.01e-08***	4.21e-08***
Animation	0.0223	0.154**	-0.0898	0.131
Cinema	1.086***	-0.226***	-0.255***	-0.390***
Magazine	-0.412***	0.172**	-0.827***	-0.0261
TV series	-0.931***	0.319***	0.490***	-0.216**
Short series	0.121**	0.178***	-0.284***	0.164**
Performing Arts	-0.905***	0.0398	-0.361***	-0.459***
TV movie	-0.922***	0.734***	0.419***	-0.251***
Ad Hoc structure	-0.824	-1.021**	-0.416	1.189***
Middle	0.390***	0.108***	-0.0709*	0.483***
Big prod.	0.0139	-0.0785**	0.765***	0.212***
Leaders	-0.0450	0.296***	0.352***	0.187**
Foreign Coproduction	0.195***	0.0776***	0.112***	-0.619***
Ob. cinema Canal	0.0691***			
Ob. AV Canal	0.233			
Ob. cinema FTV		1.440***		
Ob. AV FTV		0.305***		
Ob. AV TF1			0.0219	
Ob. AV M6				0.0123
Number of movies	0	-0.000517***	0.000203***	0.000243***
Taxable Turnover (CANAL+ AV)	-2.07e-09***			
Taxable Turnover (CANAL+ cine)	-5.58e-10			
Intercept	1.221	-9.968***	-2.645***	-2.695***
Observations	23,381	23,381	23,381	23,381

Table 2.15: Additional Regression (6)

2.6.2 Details of the classification protocol

We use an upward clustering algorithm to generate homogeneous groups of producers from the CNC database. More theoretic details can be found in section 4.5.2.

First, the variables of interest used to classify producers are determined. This selection is made by means of a main component analysis on the centred and reduced variables. This treatment also operates a reduction of the dimensionality of the problem, which allows for better computation (see section 4.5.2). We choose to keep four components, presented in table 2.16. Table 2.17 gives the position of the variables used to create the axes of each of those axes.

Axis	Eigenvalue	Difference	Proportion	Cumulative
Axis 1	2.02	.95	0.50	0.50
Axis 2	1.07	.21	0.27	0.77
Axis 3	.86	.79	0.21	0.99
Axis 4	.056	.	0.01	1.0000

Table 2.16: Principal Components Analysis

Variable	Axe 1	Axe 2	Axe 3	Axe 4
Devis total	0.67	0.15	-0.22	0.69
Devis/Années	0.69	0.08	-0.10	-0.71
Devis horaire	0.27	-0.55	0.79	0.10
Spécialisation AV	-0.01	0.82	0.57	0.01

Table 2.17: PCA: Principal Components

We define a producer P by its coordinates in the plan formed by the four principal axes:

$$P = (x, y, z, t) \in \mathbb{P} \tag{2.1}$$

We can then generate the hierarchy H, illustrated in the dendogram in figure 2.2.

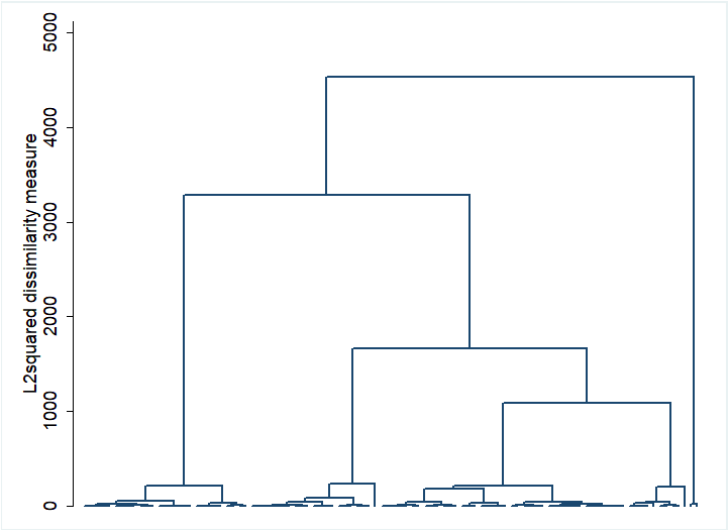


Figure 2.2: Dendogram of the classification algorithm

In order to determine the number of classes to be kept, we refer to the Calinski criterion (table 2.18, Caliński and Harabasz 1974) of the Pseudo-F. It corresponds to a division of the intra-group variance by the number of groups. Thus, the higher the value of the index, the better the cut. Secondly, we use the Duda criterion (table 2.19, Richard O. Duda 2000), given at each step by the ratio between the sum of the standard deviations of the group to be divided, Je(1) and the sum of the standard deviations of the two subgroups resulting from the division, Je(2). A high value of this index indicates a distinct structure: the higher the Je(1)/Je(2) index, the better the cut. The Duda-Hart criterion requires a hierarchical classification: at each level of the hierarchy, it must be possible to indicate which group is to be divided.

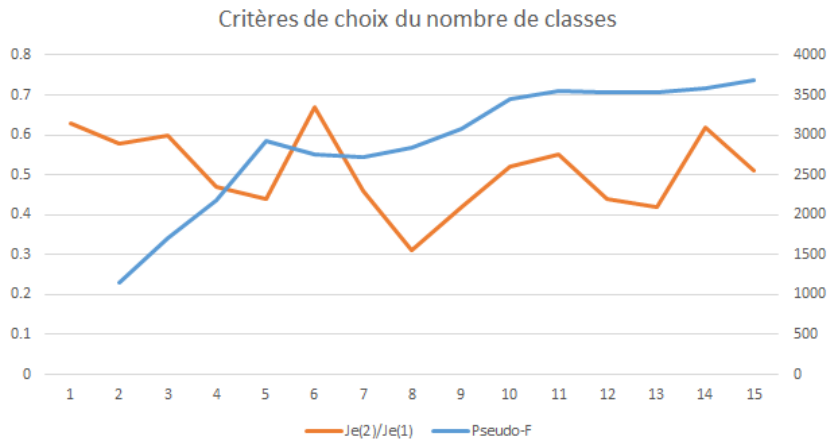


Figure 2.3: Criteria for the choice of the number of classes

Figure 2.3 shows an illustration of the evolution of the two indexes considered. Duda's index is on the left axis, and Calinski's on the right. As the purpose of the classification is to synthesize information available on producers, a smaller number of classes will be preferred. The peak of the two indexes between 5 and 6 classes leads us to choose five classes for the analysis.

Number of classes	Pseudo-F, Calinski/Harabasz
2	1157.93
3	1716.72
4	2185.11
5	2929.88
6	2764.49
7	2730.07
8	2837.08
9	3070.71
10	3447.91
11	3554.18
12	3530.99
13	3540.21
14	3588.91
15	3690.98

Table 2.18: Calinski index

— Number of classes	Je(2)/Je(1)	Pseudo-T-squared
1	0.6334	1157.93
2	0.5797	1449.58
3	0.5977	271.26
4	0.4668	287.80
5	0.4384	190.86
6	0.6702	118.11
7	0.4556	1904.89
8	0.3148	21.76
9	0.4258	148.36
10	0.5199	136.69
11	0.5541	1176.53
12	0.4383	114.07
13	0.4226	181.70
14	0.6218	77.85
15	0.5115	8.59

Table 2.19: Duda/Hart criterium

	Cinema				Audiovisual			
	CANAL+	FTV	TF1	M6	CANAL+	FTV	TF1	M6
Production cost	1.11E-07***	3.08e-08***	5.70e-08***	3.66e-08***	2.98e-08***	3.79e-08***	1.31e-08	6.35e-08***
Adhoc	-1.071*	-0.453	-0.325	1.639***				
Middle	0.609***	0.785***	0.821***	0.900***	0.335***	0.0502**	-0.122***	0.438***
Big prod.	0.623***	0.843***	0.905***	0.988***	-0.177***	-0.232***	0.817***	0.102
Leaders	-0.311	0.0834	1.213***	0.913	-0.0287	0.282***	0.310***	0.153**
Foreign Coproduction	0.202**	0.224***	-0.314***	-0.504***	0.237***	0.0553**	0.189***	-0.644***
Ob. ciné (CANAL)	-0.0605				0.0664***			
Ob. AV (CANAL)	-0.0831				0.263***			
Assiette ciné (CANAL)	-1.54E-09*							
Assiette AV (CANAL)					-2.12e-09***			
Ob. ciné (FTV)		0.479				0.506***		
Ob. AV (FTV)		-0.0205				0.143***		
Ob. AV (TF1)			0.0315				-0.0331***	
Ob. AV (M6)				0.0448				-0.0685***
Animation					0.276***	0.202***	0.0107	0.112
TV series					-0.407***	0.355***	0.664***	-0.341***
Short series					0.198***	0.159***	-0.228**	0.116
Performing Arts					-0.889***	0.0364	-0.335***	-0.421******
TV movie					-0.766***	0.772***	0.462***	-0.241
Observations	1,546	1,546	1,546	1,546	21,835	21,835	21,835	21,835

Table 2.10: Multivariate probit model (separated analysis)

Chapter 3

Rational Addiction to Audiovisual Narratives: an Analysis of Broadcasting and Consumption of Fiction in France

Abstract. TV-series have traditionally been watched and monetized through broadcasting on free-to-air and pay television. They are increasingly consumed *via* on-demand platforms and *catch-up* services. The purpose of this chapter is to evaluate how the narrative structure of TV-series influences their consumption and causes delinearization. We use data from *Médiamétrie*, reporting the live and *catch-up* audience for all movies and series aired between 8 p.m and 10 p.m on free and public French TV-channels, from 2011 to 2016. We show that when the story takes several episodes or seasons to develop, consumers are more likely to watch the program on alternative platforms or *catch-up*. We provide evidence that the consumption of such programs follows a model of rational addiction, where current consumption is influenced by its past and future values.
These results allow us to explain recent changes in the industrial organization of the French free-to-air television market. We show how the narrative structure of TV-series can explain broadcasters' competitive strategies. These results can have important policy implications, as broadcasters are one of the main investors in the production of audiovisual content in France.

3.1 Introduction

For a long time, television was the only way to access domestic audiovisual content. TV programs synchronized society around major events of the *present*, such as the newscast or sports. It created *habits*, and organized the time of the viewer with a combination of stories to the present (news, games, sports) and to the past (fiction).

The generalization of broadcasting on the Internet, via *catch-up* services, or dedicated platforms disrupts the classical model of television, which is no longer delegated the organization of the evening. These evolutions in broadcasting technology follow the video cassette recorder and the DVD, and loosens the constraint of the TV schedule, by allowing a non-linear[1] consumption of audiovisual content. This has an impact on screenwriting and narratives. TV series constitute a strong example of this change in paradigm: non-linear broadcasting allows screenwriters to develop the story over several episodes without using *tricks* such as a summary of recent events at the beginning of each episode. More intensive watching of the program also makes the spectator more likely to identify inconsistencies in the script, which incentivizes coherent narrative over a whole season. In the end, the new modes of consuming TV series change narrative writing and give rise to new formats of TV series.

We claim that new forms of narrative writing and broadcasting changes the demand and utility functions for TV series. This underlies a transition from a *synchronized* audiovisual consumption (the collective habit created by linear television) towards *on demand* consumption. Such non-linear watching patterns can lead to *addictive* effects, as illustrated by the emergence of *binge-watching*[2] with the rise of online media services.

This phenomenon has industrial and policy implications, as the evolution of TV series and their narrative leads to changes in the broadcasting strategies of channels. Free-to-air TV must face the competition of new players, using series as the center of a commercial strategy focused on these new modes of non-linear consumption. The first response of free-to-air broad-

[1] In the model of traditional linear television programming, the broadcaster selects a schedule of shows that can only be viewed at a set time. The viewer cannot interact in any way with the programming. By opposition, non-linear television can be considered to be any method or technology that allows viewers to select what shows they watch and when they watch them.

[2] Binge-watching is the practice of watching television for a long time span, usually a single television show.

casters against this new competition is the creation of catch-up services, such as *MyTF1* or *M6replay* in France, but the traditional model of television has a hard time valuing non-direct audience.

In this chapter, we estimate the economic effects of these new modes of consuming TV series, and their impact on the French broadcasting industry. We provide evidence as to how the changes in narrative writing led to a shift in the demand function for TV series. To this effect, we use the rational addiction framework[3] to characterize the consumption of series. We show how the narrative structure of fiction programs is key in explaining non-linear demand. The chapter is based on aggregate audience data of fiction programs aired between 8 and 10 p.m. on free-to-air television from 2011 to 2016.

The chapter is structured as follows: section 2 presents the related literature on the consumption of cultural goods, and specifically audiovisual fiction, as well as the economic effects of the narrative structure of these programs. In section 3, we draw an analysis of the market for broadcasting of fiction in France, highlighting the possible effects of narrative on the strategies of agents. Section 4 consists of the study of the link between narrative structure and delinearization of consumption. Finally, we estimate a rational addiction model to explain this link. We propose an application of this idea by modeling audience using ARIMA processes.

3.2 Economic effects of narrative: habits and addiction

3.2.1 TV series viewing in social sciences' literature

There are two main modes of viewing TV series. The first one relies on the schedule set by broadcasters. This is the principle of television *appointments*: episodes from the series are aired at fixed times by the TV channel, and make up appointments for the spectator.
The second mode of consuming audiovisual content has been made possible by the invention of the VCR, the DVD, and more recently by the generalization of video-on-demand and the editorial strategies of online-based broadcasters. The viewing of an episode from a series is not linked to a specific

[3]We say a good is addictive if and only if an increase in past consumption leads to an increase in current consumption holding current prices and the marginal utility of wealth fixed. This definition is from Becker, 1988, G. Becker and K. Murphy 1988

time or day, but at the spectator's convenience. Various sociological studies[4] suggest that this second mode of viewing generally leads to consuming more episodes at once, in a short time period, a behaviour often refered to as *binge-watching*. The viewer, rather than making pauses between each episode, may chose to watch for many hours in one session, at the detriment of other activities. To be able to consume an additional episode immediately, he may accept to degrade his future utility. Mikos 2016 defines binge watching as a *metaphor describing a form of intensive consumption of television series*. According to him, complex narrative structures reinforce this phenomenon. He claims that:

> *Complex narrative structures reinforce the distinction since viewers can immerse themselves more deeply in the fictional worlds and so experience the "complex pleasures of narrative", in which one is caught in the contradictory desire to find out what happens next and for the story not to end* (Mikos 2016)

This quote highlights that behaviours such as *binge-watching* are induced or reinforced by narrative writing. As we stated, the evolution of broadcasting technologies allows screenwriters to develop more complex narratives, over a complete season. Such TV series narrative might give rise to addictive effects. Kranz 2015 shows that the identification with the main characters of a series is one of the most powerful vectors of intensive watching. This identification, made possible by the evolution of characters is notably absent from other narrative formats (for instance movies), making these effects specific to TV series. This dichotomy between different modes of viewing TV series translates into economics as different utility functions associated with different programs.
From the consumer's point of view, the opposition between linear and non-linear watching translates more into *rationed* and *all you can watch* consumption. The constraint of the television schedule imposes a specific pattern of consumption and can prevent addictive effects from developing.

This evolution of viewing and emergence of new modes of consumption has direct applications to the broadcasting industry and TV series marketing. Some broadcasters have been able to identify the binge watching phenomenon and applied it as part of their editorial strategy. The marketing for *La Vengeance aux Yeux Clairs*[5] by TF1 takes advantage of this specificity of

[4]See Combes 2015, Kranz 2015

[5]French TV series aired from September 8th 2016 on TF1. Produced by J-L Azoulay and JLA Productions

consumption by making the entire season available on demand after the live broadcast of the first episode.

While non-linear consumption emancipates the spectator from the TV schedule, it's important to note that some phenomena can still lead to a relative synchronization in viewings. For instance, the common term *spoiler* refers to the act of revealing a key element of the plot of an episode to someone who has not seen it yet. The utility of watching a *spoilt* episode is thus considerably lower. This effect can be linked to network externalities, as the probability of the spoiler occurring increases with the number of viewers. It affects the consumer by increasing his rate of preference for the present: the expected utility of watching the episode at some future point in time has to be discounted by the probability of a spoiler occurring.
The importance of such peer effects in the emergence of addiction is well known in the literature of rational addiction, and is explained for instance in Laux 1999 for the case of tobacco consumption.

Many econometric studies investigate the consumption of cultural goods[6], or apply the theoretical framework of rational addiction to goods such as drugs, cigarettes or alcohol[7]. On the other hand, very few articles focus on the addictive effects of cultural goods. Cameron 1999 studies this phenomenon in the case of cinema demand. His results fail to support the presence of rational addiction. Yet, Castiglione and Infante 2015 demonstrate that some addictive effect exists in the demand for theatre in Italy. To the best of our knowledge, this chapter carries out the first analysis of TV series consumption based on rational addiction, and provides new evidence allowing a better understanding of non linear forms of consumption.

To identify the economic effects of the narrative structure in TV series, we use a typology distinguishing series with independent episodes and series where the narrative builds up during several episodes (*serials*)[8]. The series with independent episodes, or *recurring characters* is a format linked to traditional television. The continuity is ensured by the persistence of the main characters (*e.g.* TV shows such as *Friends* or *The Simpsons*). In that sense, such programs are close to the franchises of cinema (*James Bond*, *Sherlock*

[6]see for instance Borgonovi 2004, Ateca-Amestoy, Serrano-del-Rosal, and Vera-Toscano 2008, Werck, Heyndels, and Geys 2007, Zieba 2009

[7]See Chaloupka 1991, G. Becker, Grossman, and K. Murphy 1994 , Bask and Melkersson 2004

[8]Details on this typology can be found on table 3.9

Holmes, *etc.*). We say a series has independent episodes[9] if and only if those episodes can be followed in any order without significant loss of utility.

By opposition, *serials* create an attachment, not only to recurring characters, but also to the narrative itself, broken over several episodes or seasons. Episodes are interdependent and narrative develops slowly (*e.g. Game of Thrones*, *House of Cards*). We allege that this continuity of narration gives rise to addiction effects that are unique to this format, and, by construction, weak or non-existent for independent series. It is important to note that this typology is simple and corresponds to ideal-type cases. While a continuum exists between series with completely independent episodes and ones where a story is broken over strongly linked episodes, such a rough distinction is necessary to our economic and statistical analysis. The typology originates from genre description in the database, completed by the analysis of synopsis for each individual series.

3.2.2 Preferences and cultural goods: a theoretical framework

Several theories of preference formation for cultural goods account for the importance of experience in explaining demand. First, a theory of *habit formation* was applied by Houthakker 1970 in the estimation of the demand for cultural goods in the United States. This form of preference modeling assumes that the utility derived from the consumption of a good depends on past consumption *via* a habit variable:

$$U = u(c_t, h_t) \tag{3.1}$$

$$h_t = f(c_{t-1}) \tag{3.2}$$

A second way of modeling consumption of cultural goods is to assume consumers are uncertain about the quality of goods, and update their preferences in response to their experience. In Levy-Garboua and Montmarquette 1996, consumers discover their preferences through this sequential process. The taste for experience goods increases with consumption and stabilizes after some time.

The contribution of the theory of rational addiction, developed by G. Becker and K. Murphy 1988, is the introduction of a fundamental distinction between *habits* and *addictions*, based on two key variables: the utility of

[9]Later referred to as *independent series*

adjacent consumption and the discount rate. This also allows to takes into account expectations about the future, as the consumption of an episode from a TV series depends on the anticipation of being able to watch the entire season, or several seasons, which is not modeled in previous theories.

We develop an application of the rational addiction model to television series. We assume viewers are rational agents, and behave in a way that maximizes their inter-temporal utility under budget constraint[10]. They have limited time and resources to establish their current and future levels of consumption.

Let u be the utility of the viewer, so that:

$$U(c_t) = f(c_t, S_t) \tag{3.3}$$

It is assumed that U is a concave function. S stands for the stock past consumption of c. The utility from watching any given episode depends on the value of the episode as well as the amount and timing of watching the previous episodes. We assume that the consumer doesn't chose the order in which he sees the episodes and watches them in order.

The stock of past consumption depreciates with time such as:

$$\frac{\partial S(t)}{\partial t} < 0 \tag{3.4}$$

This stands for the consumer's progressively forgetting the past developments of the narrative.

$$\dot{S}(t) = c(t) - \delta S(t) \tag{3.5}$$

We define an *habitual* good such as an increase in consumption at time t causes a raise of future consumption.

$$\frac{\partial c(t)}{\partial S(t)} > 0 \tag{3.6}$$

With a level of consumption c such that $c \leq \delta S$, the evolution of the stock S converges (equation 3.5) and there is a steady-state equilibrium in the long run.
We define an *addictive* good such that:

[10] As we deal with free-to-air television, the budget constraint should be understood as a limited free-time constraint

$$\frac{\partial c(t)}{\partial S(t)} > \delta \tag{3.7}$$

In that case, the evolution of the stock of consumption will diverge and lead to an ever-growing consumption, given that $c(0) > 0$.

Following Becker and Murphy, we note the inter-temporal utility of a consumer with length of life T such as:

$$U_0 = \int_0^T e^{-\sigma t} u[y(t), c(t), S(t)]\mathrm{d}t \tag{3.8}$$

The consumer's maximization program can be written as:

$$\max_{c(t),y(t)} U_0 = \int_0^T e^{-\sigma t} u[y(t), c(t), S(t)]\mathrm{d}t \tag{3.9}$$

$$\text{s.t.} \int_0^T e^{-rt}[y(t) + c(t)]\mathrm{d}t \leq A_0 + \int_0^T e^{-rt}\omega(t)\mathrm{d}t \tag{3.10}$$

Where sigma stands for the preference for the present, A_0 the initial value of assets, r the interest rate, constant over time and $\omega(t)$ the earnings at time t.
In the case of strictly addictive goods, G. Becker and K. Murphy show that only two stationary states can exist, one stable (total abstinence), and the other one unstable. In the second one, consumption continues to increase even if the viewer is aware of possible harmful effects on its future utility (*binge watching*). We tend towards a bi-modal consumption: quasi-abstinence or excessive consumption.

This framework identifies two key variables of addiction. First, the *addictiveness*, $\frac{\partial c(t)}{\partial S(t)}$ is linked to the growing utility of the narrative, and can be stronger as the story crosses several intrigues, and uses devices such as cliffhangers[11]. Thus, narrative writing can be aimed at generating addiction.

The particularity of TV-series relatively to other addictive goods is the importance of novelty. The series can only be addictive as long as the story evolves from an episode to the next one and new seasons are produced. The addictive behaviors are limited by the number of available episodes, and total abstinence is imposed at the end of the season or series. It is important

[11] A cliffhanger is a plot device in fiction which features a main character in a precarious or difficult dilemma, or confronted with a shocking revelation at the end of an episode of serialized fiction. A cliffhanger is hoped to ensure the audience will return to see how the characters resolve the situation.

to note that the rate of depreciation of the capital $S(t)$ is an incentive for the producer to minimize the time between two seasons of a series, in order to benefit from addictive effects. On the other hand, he has incentives to wait and observe the success of a first season before choosing to invest in an additional one. The time period between two seasons of a serial is also an opportunity for producers and broadcasters to offer substitutes, in order to keep the audience captive. This explains the growing importance of recommendation algorithms on online platforms.

The discount rate, σ is the other key variable in explaining addiction, as the higher it is, the more likely the consumer is to get addicted. Younger consumers are thought to have a higher discount rate, leading to a short-term preference. The risk of *spoilers*, linked to network effects leads to an increase in σ.

3.3 Competition for broadcasting of fiction on the free-to-air television market

We claim that the specifics of TV series narrative, and the difference in demand function for linear and non-linear watching can help understand the industrial organization of the French market for fiction broadcasting.
We use audience data from Médiamétrie. The database covers every fictional program aired between 8:30 p.m. and 10 p.m. (*prime time*) on French free-to-air channels from 2011 to 2016. More details about the dataset can be found in table 3.8 in the appendix. The audience is estimated using surveys on a representative sample of the French population.

3.3.1 Demand for TV programs: the audience scatters

The market for free-to-air broadcasting during prime-time in France is shared between public channels (France Télévisions), free hertzian private channels (TF1, M6) and TNT channels. Their main source of revenue comes from the sale of advertising space, the price of which is proportional to the audience. Public channels don't broadcast advertising during the time slots we study.

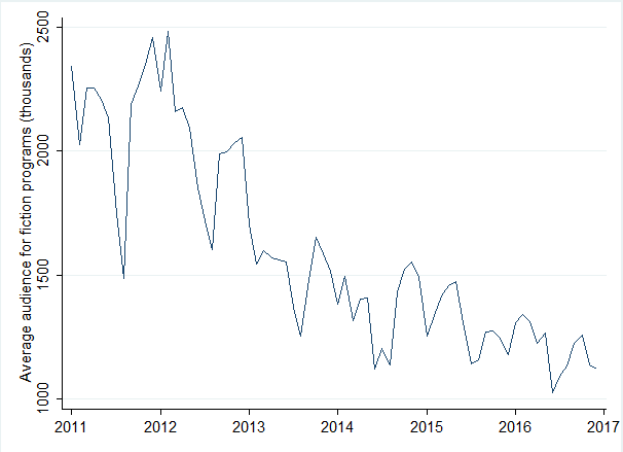


Figure 3.1: Average audience for fiction programs (thousands)

The average time spent watching television remains stable in France, around 3 hours and 41 minutes[12]. This average rises to 5 hours for those over 50, and is the lowest among young people.
The average audience for a fictional program decreased by almost 40% between 2011 and 2016. This fragmentation of demand is partly due to the entry of new TNT channels, such as HD1, Numéro 23, RMC Découverte, Chérie 25, available in December 2012.

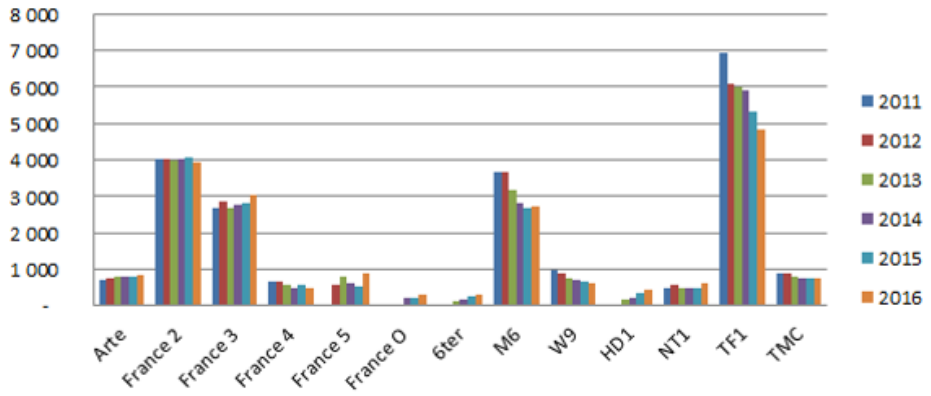


Figure 3.2: Average audience for fiction programs for each channel (thousands)

This downward trend impacts mostly the private channels M6 and TF1. The average audience of France Télévisions, the public service broadcaster,

[12]Médiamétrie

is maintained, and that of the TNT channels is increasing, though still low.

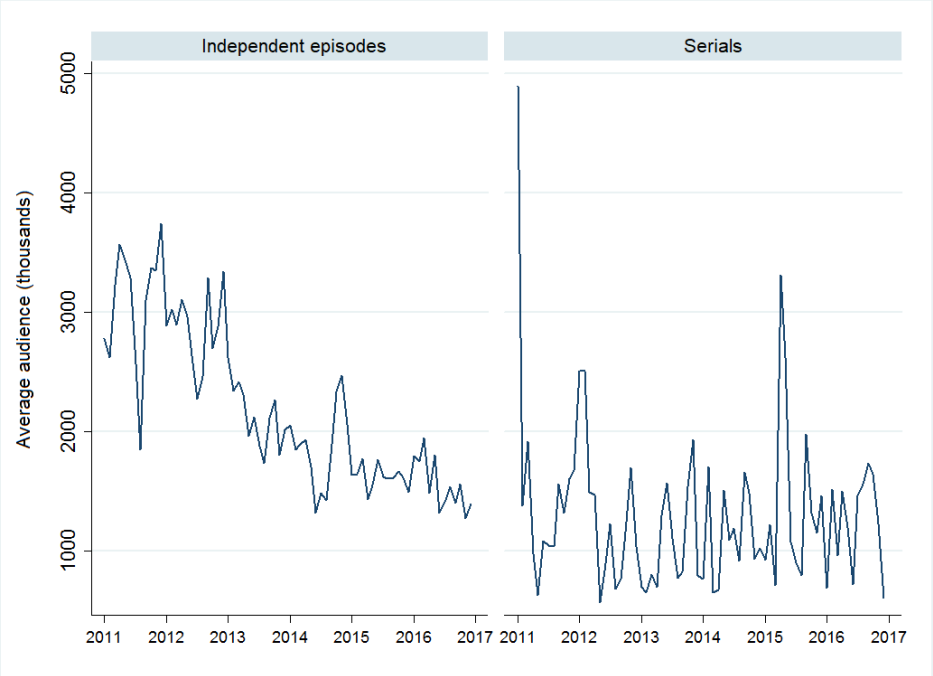


Figure 3.3: Audience for TV series (mean)

Contrary to the general trend, the demand for serials is holding still (see figure 3.3). This effect may reflect unobserved characteristics of these programs. Indeed, as the development of such programs has accompanied the evolution of broadcasting technology, notably allowing for non-linear consumption, these series could be on average more recent, and potentially more popular. We do not have the data necessary to control such effects. The initial peek in figure 3.3 can be explained by lack of data in the first months of 2011.

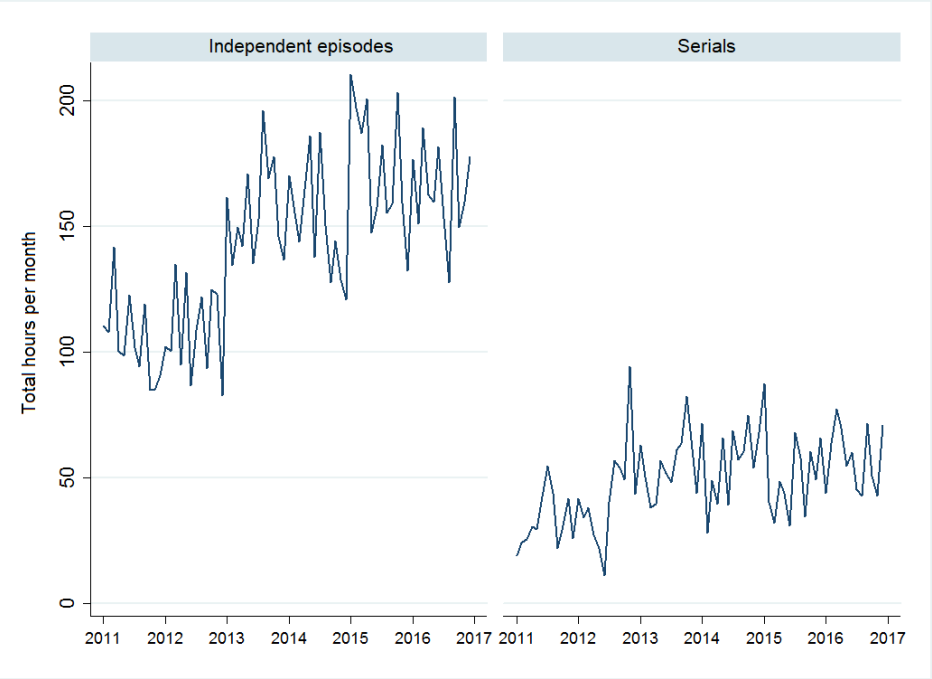


Figure 3.4: Evolution of TV series broadcasting

The growth in the broadcasting of series is similar for both narrative formats (independent and serials). We can deduce an increase in demand for serials from the maintaining of the average audience despite an increase in the number of episodes aired (figures 3.3 and 3.4).

3.3.2 Strategies and competition for the broadcasting of fiction

The volume of fiction programs aired on French television doubled between 2011 and 2016. This evolution can be explained in part by the entry of channels HD1, 6ter, Numéro 23, RMC Découverte and Chérie 25. This volume also increased within various broadcasting groups.

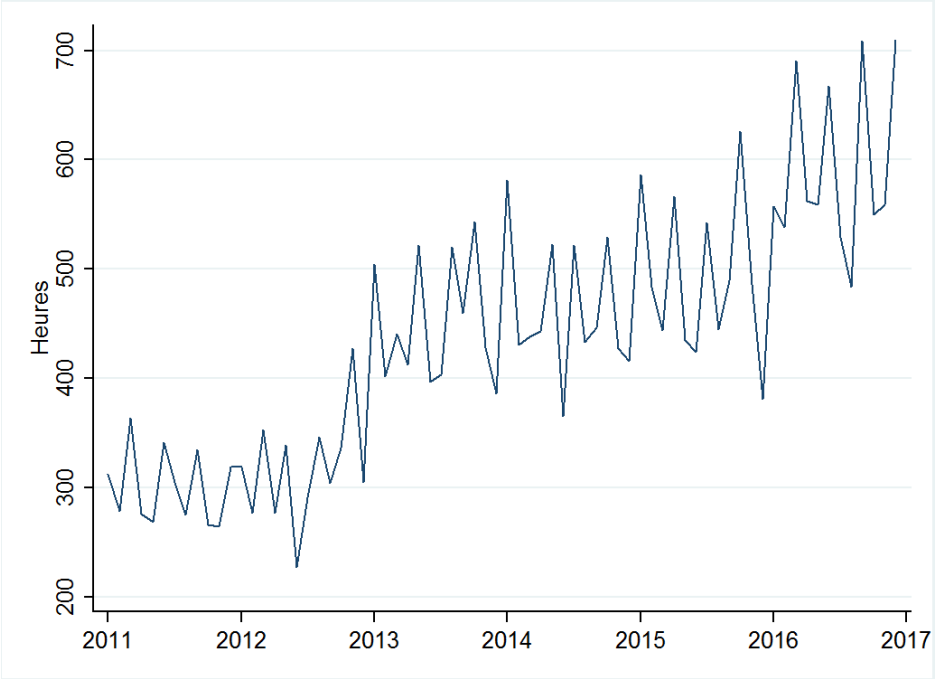


Figure 3.5: Total hours of fiction aired on free-TV

The strategic choice of programs does not necessarily correspond to the changes in demand highlighted in the previous section. While the demand for serials seems to be increasing, free-to-air channels tend to chose more movies since 2016.
After a transition towards serials, TF1 chooses movies as their main format for 2016 (figure 3.6). The same transition can be observed on the TF1 group's TNT channels.

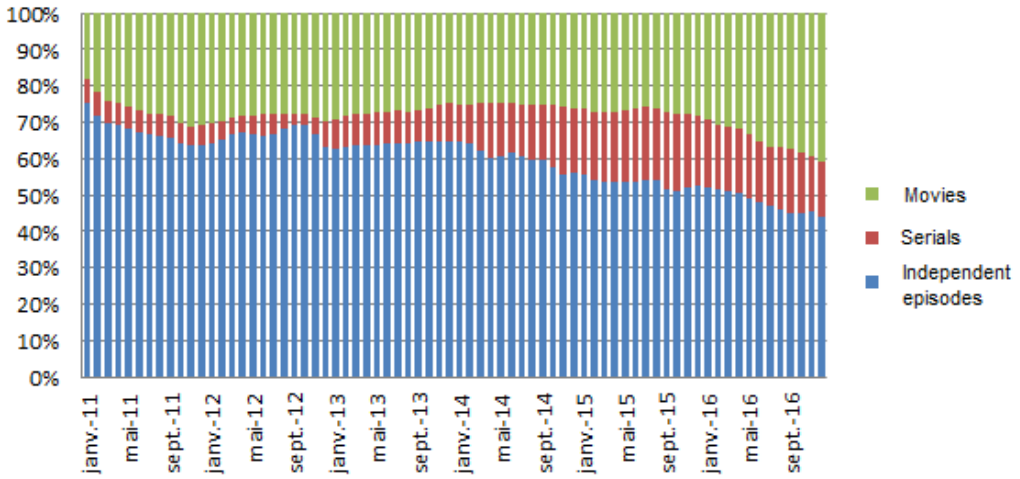


Figure 3.6: Program choice for TF1

M6 adopts a similar strategy, but focuses on independent-episodes series. The share of serials increases between 2012 and 2015 then drops in favor of movies.

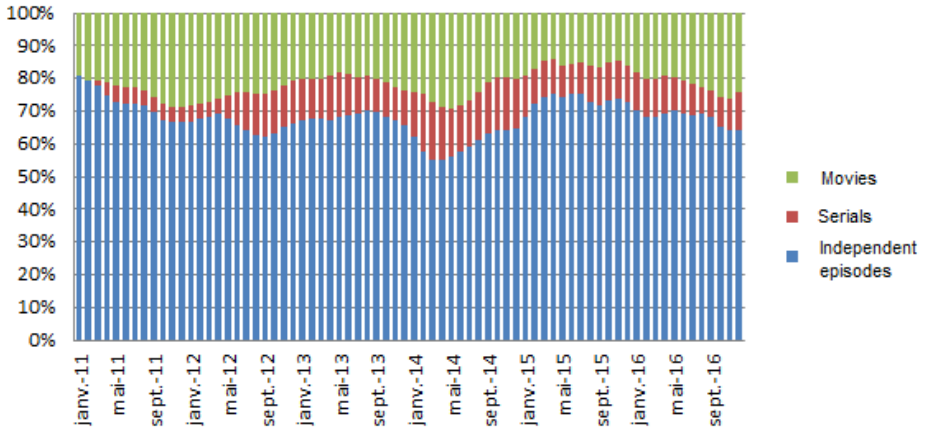


Figure 3.7: Program choice for M6

This strategic choice can be explained by the effects of the narrative structure on demand. Because of its potentially addictive nature, the serial can be seen as a way to retain audience. This idea is illustrated in figure 3.4: serials are the only format that keeps a stable audience. However, the addictive effets of such programs, inducing behaviors like binge-watching leads to a delinearization of consumption. There is a strong correlation between the broadcasting of these series and catch-up audience (figure 3.8). The switch

towards movies in 2016 is explained by the difficulty for free-to-air channels to make sufficient profit on their catch-up platforms. It is interesting to remark that serialized series make up the majority of catch-up audience (figure 3.9).

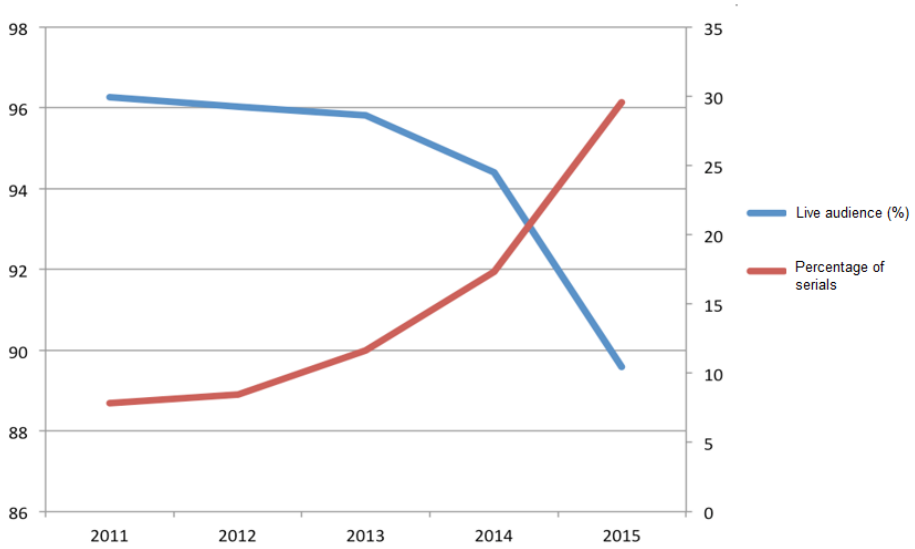


Figure 3.8: Live audience and share of serials in broadcasting (TF1)

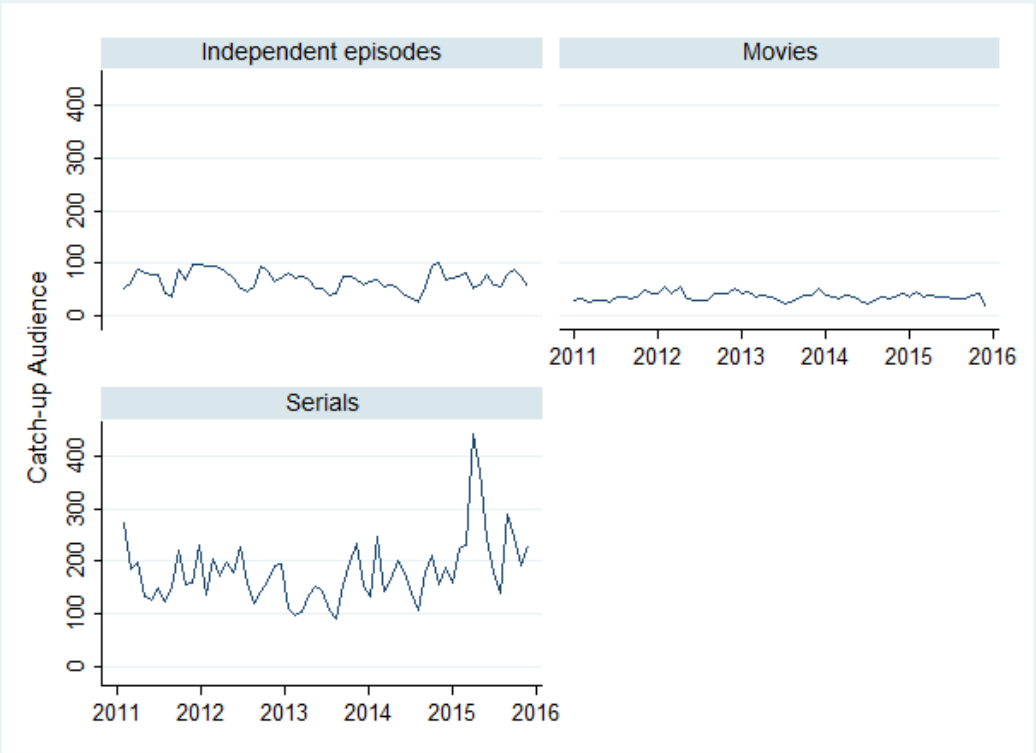


Figure 3.9: Catch-up audience (thousands)

The distribution of the channel's broadcasting time between the various narrative formats constitutes an axis of horizontal differentiation. Figure 3.10 shows a certain uniformity in the choices of main TV channels. We can see consolidation strategies of the groups with their TNT channels, diversifying the programs chosen, in order to attract consumers with different preferences. We can interpret the void in the bottom left corner of figure 3.10, as corresponding to the positioning of pay-TV and VOD-platforms.

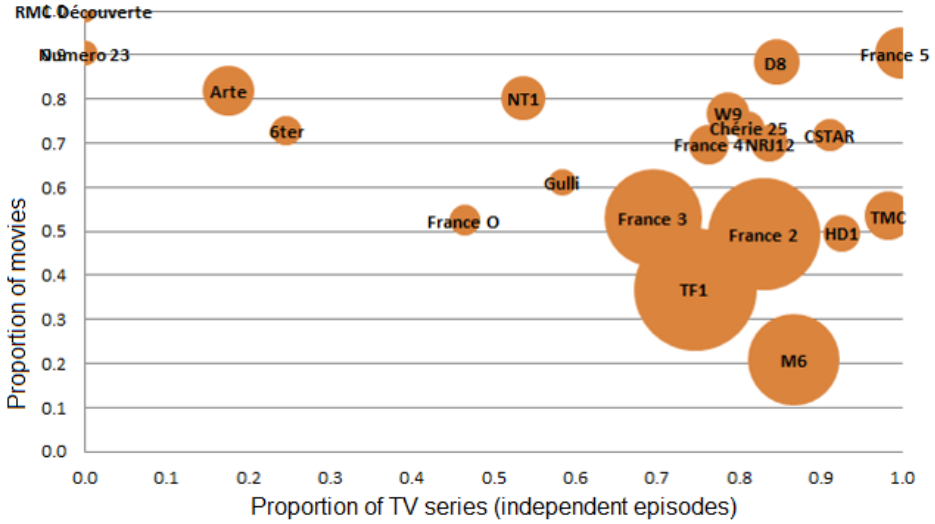


Figure 3.10: Channel differentiation by program type (2016)

3.4 The effect of narrative format on the demand for TV series

We now test the predictions from the model presented in the previous sections. First, we try to establish a causal link between the narrative format of TV series (independent or serialized), and the mode of consumption (linear or non-linear). In order to explain this effect, we estimate several models for demand, taking into account the possible addictive effects for serials. First, we use an Arellano-Bond (Arellano and Bond 1991) generalized moments method to estimate a rational addiction. We then present a case study using SARIMA processes.

3.4.1 Serials induce non-linear consumption

Editorial strategies aimed at non-linear viewing and the entry of online platforms have led to a change in the series' mode of consumption. The last decade has also been marked by illegal downloading (since 2012, every year, *Game of Thrones* is the most pirated series in the world, with an average of 14.4 milion downloads per episode[13]). These two factors contributed to move TV series away from the television screen, towards computers, tablets, mobiles or alternative devices. This induces a new way to appreciate the

[13]Source: *Torrentfreak.com*

narrative, that we try to evaluate.

The non-linear broadcasting strategies of free-to-air TV channels are based on the development of catch-up platforms:*MyTF1*, *6play*, *M6replay* or *Pluzz* (France Télévisions). These allow delayed watching of programs for a period of 7 days.

For most channels, we report a negative correlation between the share of serials in the programmation and the share of live audience. This effect is especially strong for TF1 (-0.98) and *Arte* (-0.83).

We estimate the causal effect of the series' narrative structure on the share of live audience. We estimate a linear model, specified by equation 3.11. We use robust standard errors to account for heteroskedasticity in the data. Results of the estimation are reported in table 3.1.

$$P_{live} = \alpha * \mathbb{1}_{\text{Serial}} + \beta * t + \gamma * A + \sum_i \delta_i * \text{X} + C + \varepsilon \tag{3.11}$$

With P_{live} the share of live audience in total (live + catch-up) audience, t a time variable, A total audience, ans X a vector of control variables, $C \in \mathbb{R}$ and ε an error term. We control for several important effects. First, to account for evolution of technologies, we include a control for the year and the channel (as some channel may have better performing replay services). The month and day dummies control for the potential effect of the time of the broadcast. Finally, we control for the total volume of audience and the country of origin of the program. The model is estimated on 21 808 observations.

Table 3.1: Estimation results with heteroskedasticity-consistent standard errors

Variable	**Coefficient**	**(Std. Err.)**
Total audience	0.00**	(0.00)
Year	-0.47**	(0.02)
TF1 (base)	0.00	(0.00)
France 2	-2.6**	(0.17)
HD1	1.5**	(0.24)
M6	0.32*	(0.13)
NRJ12	2.9**	(0.23)
TMC	2.7**	(0.21)
W9	2.9**	(0.20)
Serialized	**-4.81****	(0.11)
USA	-2.4**	(0.07)
France (base)	0.00	(0.00)
UK	-3**	(0.25)
Sweden	-4.6**	(0.74)

The results presented in Table 3.1 confirm that choosing to air a serial instead of a series with independent episodes leads viewers to switch towards catch-up. We estimate that *ceteris paribus*, choosing to air a serial rather than a series with independent episodes will lead to a transfer of 4.8% of the audience towards catch-up.
The trend of growing non-linear consumption can be explained by the technical progress of digital catch-up platforms. We interpret channel-specific effects as the performance, or the existence of a catch-up platform. We also remark a significant effect of the country of origin upon the mode of consumption: American, British or Swedish series are more likely to be consumed on demand that French series. It's possible that this effect actually captures the effect of popularity or quality of the series, which we do not measure.

3.4.2 Model of rational addiction

Empirical strategy

As detailed in the previous sections, our analysis is that this de-linearization of viewings induced by the narrative forms of serials can be explained by a model of rational addiction. In this section, we seek to prove that consumption of TV series on French free-to-air channels follows such a model.

Specifically, we will determine whether current consumption can be explained by the past and anticipations of future consumption.

As presented in the theoretical framework section, if individuals are rational and the TV series is an addictive good, past and future consumption should have a positive impact on current consumption. From this framework, we derive the following model:

$$C_{i,t} = \beta_1 C_{i,t-1} + \beta_2 C_{i,t+1} + \beta_3 X_{i,t} + \alpha_i + \varepsilon_{it} \tag{3.12}$$

With C the consumption of TV series, t the episode and i the series. X stands for a vector of exogenous variables. We control for the country of origin, the TV channel which aired the series, date, advertising time during the broadcast, and the evaluation of viewers for the whole series[14]. α_i stands for fixed effects and ε the error term. We say a good is addictive or habitual when $\beta_1 > 0$, and the degree of addiction increases with β_1.

As detailed previously, numerous articles applied the rational addiction framework to explain consumption of such addictive goods as cigarettes (G. Becker, Grossman, and K. Murphy 1994), gambling (Farrell, Morgenroth, and Walker 1999) or cultural goods (Yamamura 2009). The estimation of such models has to deal with the endogeneity of past and future consumption.

To deal with this bias, we reproduce here the approach of Castiglione and Infante 2015 for the estimation of the model 3.12. We use an Arellano-Bond estimator[15], which transforms regressors by differencing, then uses a generalized moments method. Lagged values of the dependant variable and exogenous variables are used as instruments. We use the Arellano-Bover/Blundell-Bond estimator which is a variation allowing to take into account eventual unit roots in the data[16].

Results

The model is estimated over 101 serials, for which at least 10 episodes have been broadcast. We correct for heteroskedasticity in the data using robust

[14]Source: *Allociné* data

[15]see Arellano and Bond 1991

[16]A unit root is a feature of non-stationary stochastic processes that can cause statistical interference. An exogenous shock can have long lasting effects on such processes and change their trajectory.

standard-errors. The results are shown in table 3.2. We estimate a model of *myopic addiction*, where the anticipations for the future consumption are not taken into account and the rational addiction model specified by equation 3.12. For the second model, we make an assumption of perfect expectations and use actual values of the future audience in the regression, as we argue that a consumer can accurately anticipate their future consumption.

Table 3.2: Estimation results: rational addiction model

Variables	**Myopic addiction model**	**(Std. Err.)**	**Rational addiction model**	**(Std. Err.)**
Audience_{t-1}	0.389**	(0.119)	0.298**	(0.1)
Audience_{t+1}			0.236**	(0.054)
Advertising	-13.43†	(7.52)	-14.39†	(7.9)
Year	-219.7**	(52.3)	-213.6**	(51.8)
Grade	1.9	(481.3)	332.2	(446.6)
TF1	3987.5**	(762.1)	3397.8**	(867.5)
TF1 Group	-393.9	(306.4)	-607.8†	(365.0)
Season (summer)	-135.5	(139.3)	-123.0	(113.6)
France	-35.5	(162.1)	1.7	(195.1)
USA	-104.6	(244.6)	-41.5	(196.4)
M6 Group	-320.0	(407)	-289.8	(321.4)
M6	1595.0**	(317.2)	1294.7**	(314.7)
France TV	900*	(413.9)	634.3†	(381.0)
N	2473		2473	

The results shown in table 3.2 support the hypothesis that TV series viewing follows a model of rational addiction: both effects from past and future consumption are positive and significant. The effect of advertising is negative and significant at the 10% threshold.

When the error terms are independent and identically distributed, their first order differentiations are serially correlated. So, as expected, the Arellano-Bond test rejects the hypothesis H_0 for the first order of differentiation:
$\mathcal{H}_0$: *There is no autocorrelation of residuals*
H_0 is no longer rejected for second order differentiation. Thus, we don't detect any specification problem in the estimated model.

Estimating the model with catch-up audience (table 3.10 in the appendix) proves a significant effect of the series' appreciation by spectators. We find a significant and positive effect of past *live* viewing on the present catch-up consumption.

We also estimate this model on a similar database of independent-episodes series. The results are presented in the appendix. We find a significant effect for both past and future consumption, though significantly lower than for serials.

3.4.3 Case study 1: *Plus Belle la Vie*

In the previous section, we provide evidence for an addictive effect on TV series demand. This effect is characterized by the strong influence of viewing episode $n-1$ in viewing episode n, and explains the link between serials and non-linear consumption. This autoregressive aspect of demand supports the modeling using ARIMA processes and time-series methods. The main limit to this methodology is we can study only one series at a time.

We propose here a case study of the French serial, or *soap opera Plus Belle la Vie*. We consider the *soap opera* to be a particular case of serial, as the episodes are likend to each other, featuring family-type intrigues, romances and moral conflicts. The specificity of these series is that they are generally broadcast on a daily basis, and during *access-prime time* hours[17]. This choice is mostly due to the high number of observations (more than 1300 episodes), and to the fact that its broadcasting was uninterrupted for the whole period. This series gives a good example of *habitual* effects, as defined by equation 3.6, as most of the audience is live, and the broadcasting pattern each day at a precise hour establishes an *appointment* for consumers.

Table 3.3 presents the evolution of live audience (actual and differentiated) over the period. We observe peaks in the audience, that we interpret as *season's finale* effects. Negative peaks can be interpreted as rebroadcasts of old episodes, independent from the current narrative. We reject the presence of a unit root in the data using an augmented Dickey-Fuller test.

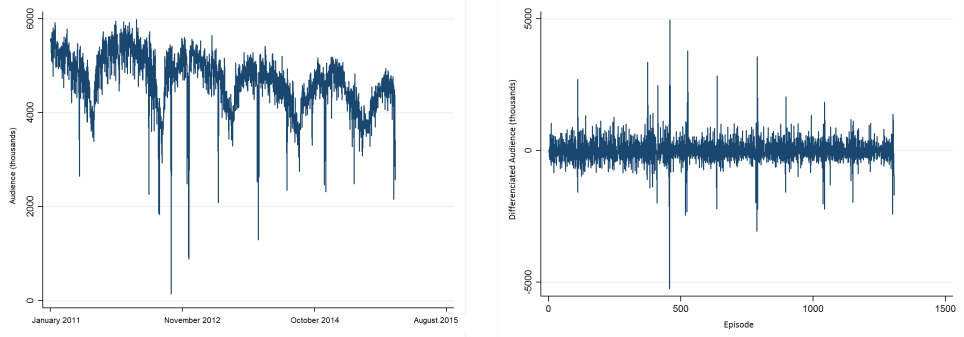


Table 3.3: Live audience for *Plus Belle la Vie* and first-difference series

The model we chose to estimate is a seasonal autoregressive integrated

[17]Access prime time is the time-frame preceding *prime-time*, generally from 6 to 8p.m.

moving average process. The autoregressive part (AR) indicates that we regress the dependant variable on its own lagged values. This allows us to take into account the effects of addiction or habits. The moving average (MA) equation allows to smooth out short-term fluctuations of the error term, as well as serial correlation between these residuals. The autocorrelations and partial autocorrelations diagram, presented in the appendix (figure 3.12) support a strong weekly seasonal effect. The ARMA model can be written as follows:

$$\left(1 - \sum_{i=1}^{p'} \alpha_i L^i\right) X_t = \left(1 + \sum_{i=1}^{q} \theta_i L^i\right) \varepsilon_t \tag{3.13}$$

Where L is the lag operator, α_i the parameters of the AR part, θ_i the parameters of the MA part and ε_t the error terms, assumed to be independant, identically distributed variables drawn from a normal distribution with zero mean.

As the series has positive autocorrelations out to a high number of lags, we also estimate the model on the differenciated series. Representations of the live audience for *Plus Belle la Vie* are shown in figure 3.3. The model is estimated with different specifications for robustness checks, and includes a seasonal component of 5 days. Results are shown in table 3.4.

Table 3.4: Estimation of live audience as a seasonal autoregressive process

	(1) A_{live}	(2) ΔA_{live}	(3) ΔA_{live}
ARMA			
AR(1)	0.599**	0.499**	0.441**
	(26.67)	(56.06)	(34.64)
AR(2)			0.0129
			(0.90)
AR(3)			0.0125
			(0.63)
MA(1)	-0.125**	-1.000**	-0.959**
	(-4.73)	(-71.84)	(-114.51)
$ARMA_5$			
AR(1)	0.886**	0.0978**	0.142**
	(45.91)	(3.76)	(6.26)
MA(1)	-0.601**	-0.764**	-0.833**
	(-24.16)	(-33.56)	(-42.03)
sigma			
	440.5**	449.6	450.3**
	(144.27)	(.)	(134.72)
N	1306	1300	1300

t statistics in parentheses

$^{\dagger}p < 0.05$, $^{*}p < 0.01$, $^{**}p < 0.001$

The results presented in table 3.4 confirm those of the previous rational addiction model. Previous consumption, modeled as the AR(1) term is significant and strong, between 0.4 and 0.6, both for the non-differentiated and the differentiated model. The second and third lags of live audience do not appear to have a significant effect on current consumption. The seasonal component of the model is significant as predicted.

We estimate a similar model for catch-up audience. We include the live audience of the previous episode as an exogenous regressor. Results shown in table 3.14 support an effect of the live audience of the previous episode for both the differenciated and non-differenciated models. The autoregressive and moving average terms are significant and of comparable size as the

estimates for the rational addiction model of the previous section.

Table 3.5: Estimation of catch-up audience as a seasonal autoregressive process

	(1) Δ Replay Audience	(2) Replay Audience
Δ Live Audience$_{t-1}$	0.00904*	
	(3.12)	
Live Audience$_{t-1}$		0.00890*
		(3.15)
ARMA		
AR(1)	0.267**	0.910*
	(11.69)	(3.25)
AR(2)	0.00890	-0.138
	(0.35)	(-1.50)
MA(1)	-1.000	-0.641†
	(-0.00)	(-2.32)
ARMA$_5$		
AR(1)	0.157**	1.020**
	(5.41)	(23.62)
AR(2)	0.0598†	-0.0680†
	(1.97)	(-1.98)
MA(1)	-0.863**	-0.759**
	(-40.45)	(-20.27)
sigma		
	78.72	78.11**
	(0.00)	(71.29)
N	1299	1305

t statistics in parentheses

$^{\dagger}p < 0.05$, $^{*}p < 0.01$, $^{**}p < 0.001$

These results provide evidence of strong habits or addictive effects in the consumption of TV series. This holds in the case of independent-episodes series but these effects are significantly lower than when the narrative develops over the whole season.

3.4.4 Case study 2: *Desperate Housewives*

We provide here a time-series analysis of the series *Desperate Housewives*, broadcast by M6 between 8.50 and 10 p.m, for two seasons (2011 and 2012). This program is an American comedy and drama series, roduced by ABC Studios and Cherry Production and aired from 2005 to 2012 in France. The viewing of this series follows a different pattern from *Plus Belle la Vie*. First, its broadcasting is on a weekly basis rather than daily. The narrative structure of *Desperate Housewives* is widely different from this of France's favourite soap opera. Seasons are shorter, episodes are longer and more closely linked within a season.

Results from the ADF test attest for the presence of a unit root in the data. Thus, we will work only on the differentiated series.

Table 3.6: Augmented Dickey-Fuller test

Spread	Critical value for the 5% threshold	Test value	p-value
2	-2.966	-1.939	0.3141
3	-2.969	-1.780	0.39065
4	-2.972	-1.435	0.5655
5	-2.975	-1.420	0.5725

We estimate an ARIMA(1,1,1) model to account for the live audience of the series. This corresponds to the following specification:

$$\Delta A_n = \Delta\alpha A_{n-1} + C + \varepsilon_n + \theta\varepsilon_{n-1} \tag{3.14}$$

Results are presented in table 3.7

Table 3.7: ARIMA model for *Desperate Housewives*

	Estimated coefficient	Test value
C	-15.64	0.06
AR(1)	0.49	0.007
MA(1)	-1	0.00

Test values for Bartlett and Ljung-Box fail to reject the hypothesis: $\mathcal{H}_\prime$*: The residual follow a random noise distribution.* We interpret the presence of a unit root in the series as the fact audience is susceptible to both positive and negative shocks, and does not go back to an equilibrium level after such

a variation. The means that the broadcasting of a program with such an audience profile is very dependent on the presence of a catch-up offer, which smooths consumption and avoids shocks.

Another consequence is that if a popular program (such as a sport game or another TV series) is broadcast on a competing network, it could result in a persisting negative shock for the series. The channel thus has incentives to shift the broadcast to a more convenient time, or rely on its catch-up platform. This effect highlights the better adequation of the SVOD and VOD platform broadcasting technology for such series, as they insure against the risk of a negative shock.

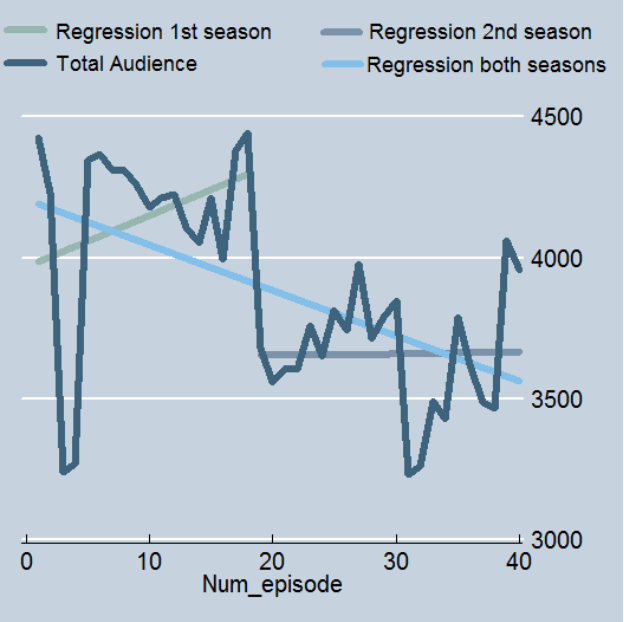


Figure 3.11: Testing for rupture in the estimation

We test for rupture in the estimation between season 1 and 2 using the chow test. The test hypothesis is:

$\mathcal{H}_0$: *Estimated coefficients in season 1 and 2 are equal*

We reject $\mathcal{H}_0$ at the 5% threshold.

It is interesting to note that the consumption models for season 1 and 2 are different. This can be explained by the rational addiction framework: the consumption stock depreciates with time. If too much time passes between the broadcast of the 2 seasons, some consumers will stop watching the series.

The audience base should stabilize around the *core* viewers after a number of seasons.

3.5 Conclusion

The evolution in broadcasting technology, and the growth of online video services, led to a change in the demand function for TV series. We show how new consumption patterns, free from the constraint of the linear television program are conducive to the emergence of addiction effects.

The existence of addictive effects for certain types of TV series results in a delinearization of consumption. These effects can explain the competitive dynamics observed in the market for free-to-air fiction broadcasting. Channels that do not strongly value their catch-up platform are rely more on the broadcasting of movies or series with independent episodes.

These results have strong industrial and policy implications for the French TV market. The new forms of the demand function structures a captive audience for online platforms. The decline in popularity of the independent-episodes series and increased competition lead to a fall in profitability for free-to-air broadcasters. Their difficulty to monetize their non-linear viewers makes it less profitable for them to finance serials. As those channels represent one of the main investors in the French audiovisual industry, it is possible that the production of serials in France is suboptimal. Giving free channels better incentives to invest in such programs by reforming the partition of rights could help in re-orienting the industry towards serials.

3.6 Appendix

Variable	
Date	
Time of broadcast	
Duration	
Channel	
Program name	
Program label	
Genre	32 modes (thriller, animation etc.)
Live audience	
	-Older than 4
	-4-14 years-old
	-15-24 years-old
	-25-34 years-old
	-34-49 years-old
	-50 and more
	-Men
	-Women
	-Lives in Île de France
	-Lives outside of Île de France
Global audience	
	-Older than 4
	-4-14 years-old
	-15-24 years-old
	-25-34 years-old
	-34-49 years-old
	-50 and more
	-Men
	-Women
	-Lives in Île de France
	-Lives outside of Île de France

Table 3.8: Description of the database

Type	Definition	Examples
Independent episodes series	Episodes are independent. The unity of the series is due to the presence of recurring characters or places.	*Columbo, Navarro, The Simpsons*
Serialized series/serial	The story takes place over a season or more. The viewer must watch all episodes in order to understand the narrative	*Game of Thrones, Desperate Housewives*
Soap opera	Particular case of serial. Features family-type intrigues, romances and moral conflicts. Generally broadcast on a daily basis	*Plus Belle la Vie, The Young and the Restless.*

Table 3.9: Definition of narrative structures

3.6.1 Rational addiction model

Table 3.10: Rational addiction model on catch-up audience

Variable	Coefficient	(Std. Err.)
Audience_{t-1} (catch-up)	0.163*	(0.070)
Audience_{t+1} (catch-up)	0.120*	(0.053)
Audience_{t}	0.089**	(0.016)
Publicité	0.325	(0.369)
Year	15.193†	(8.638)
TF1	-17.045	(75.364)
TF1 Group	-65.615	(45.112)
Summer	-7.279	(11.939)
France	22.982	(24.892)
USA	2.162	(26.136)
M6 Group	-70.599	(59.445)
M6	6.094	(43.776)
France TV	-57.019*	(29.050)
Note	128.469**	(39.985)

Table 3.11: Rational addiction model: Independent-episodes series

Variable	Coefficient	(Std. Err.)
Audiencet_{-1}	0.229**	(0.051)
Audiencet_{+1}	0.101**	(0.034)
Year	-83.648	(53.068)
TF1	4000.792**	(407.804)
TF1 Group	117.537	(236.826)
Summer	-311.691**	(68.447)
France	-305.212*	(130.647)
USA	431.298†	(236.203)
M6 Group	-176.585	(347.082)
M6	2188.294**	(314.153)
France TV	1984.754**	(340.142)
Episode	-1.314	(3.786)

Table 3.11 presents the estimation results on the database for independent episodes series. The effect of past and future consumption is still significant, though lower than for serials. In addition, the effect of future (anticipated) consumption is very low compared to this of the serials, which suggests that consumption of series with independent episodes is more of a habit than an addiction.

3.6.2 ARIMA Models

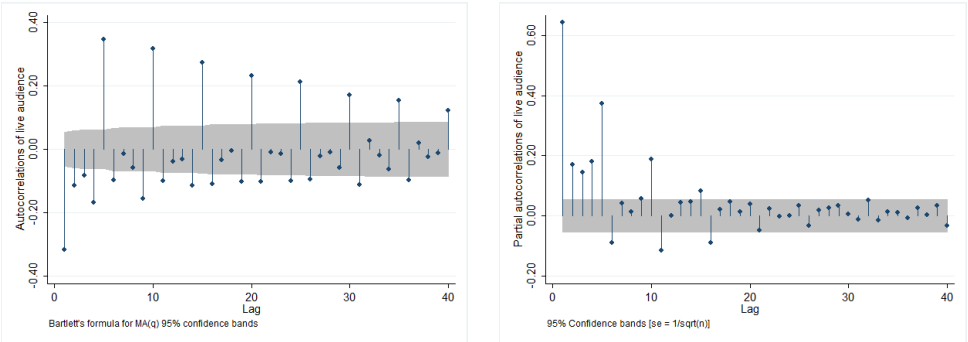


Table 3.12: Autocorrelations for live audience (*Plus Belle la Vie*)

In the previous models, we take into account a one-week diffusion cycle. The evolution of audience, presented in the figure 3.12 shows longer variations,

on a seasonal scale. We provide a modelling of the audience on a monthly basis.

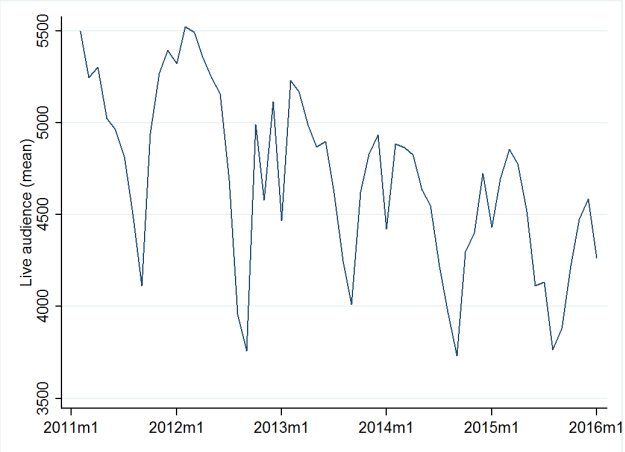


Figure 3.12: Mean of monthly audience

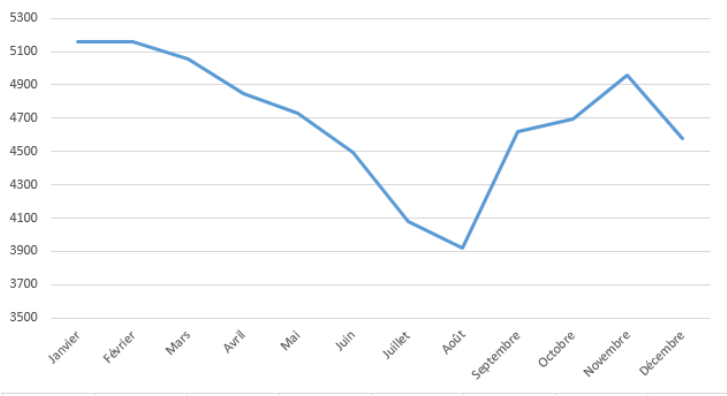


Figure 3.13: Monthly live audience for *Plus Belle la Vie* (2011-2015)

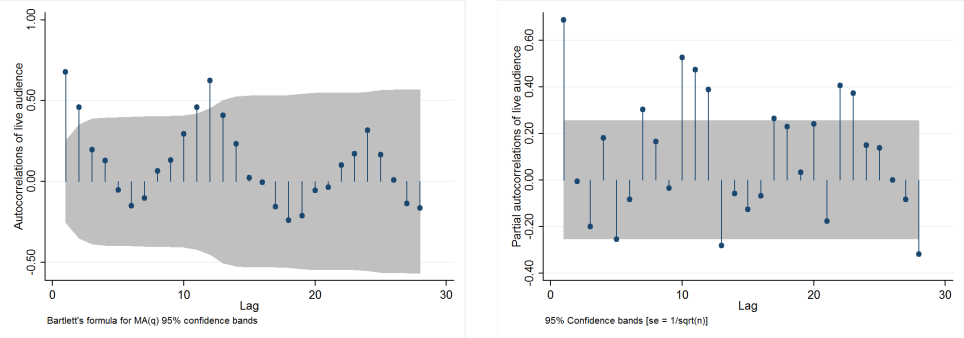


Table 3.13: Autocorrelations for monthly live audience (*Plus Belle la Vie*)

Table 3.14: Estimation results : arima

	(1)	(2)
	$\text{ARIMA}(1,0,0) \times (1,0,0)_{12}$	$\text{ARIMA}(1,0,2) \times (1,0,1)_{12}$
Live audience		
Intercept	4690.4**	4679.4**
	(26.37)	(10.08)
ARMA		
AR(1)	0.630**	0.878**
	(5.99)	(7.61)
MA(1)		-0.432*
		(-3.08)
MA(2)		0.0745
		(0.52)
ARMA_{12}		
AR(1)	0.715**	0.942**
	(8.31)	(14.02)
MA(1)		-0.449
		(-1.59)
sigma		
Constante	230.0**	201.7**
	(12.04)	(9.73)
N	60	60

Chapter 4

Regulation game and copyright in digital media industries: the destructive-creation of the French audiovisual ecosystem

Abstract. Media industries are facing radical transformations due to the evolution of broadcasting technologies, consumer behavior and new business models. Digitization modifies externalities and internalization mechanisms within the industrial ecosystem formed by the production and broadcasting firms.
While the American studios are reinforcing their vertical integration to compete with new entrants, French incumbents remain very scattered. This situation stems from France's institutional path for creating audiovisual markets, privileging vertical disintegration and dispersion of copyright.
We show how entry of new players, bypassing traditional means of transmission challenges the regulated sharing of property rights. In the early 2000s, a first wave of new players, allowed by the increase in the number of terrestrial channels, has been internalized by the incumbents, by the sharing of the rent in a positive-sum game. The transition to a negative-sum game in recent years prevents a similar process from taking place and may unlock the regulation game by way of creative-destruction.

4.1 Introduction

The French audiovisual ecosystem reflects the institutional choices made in the 1960's and the 1980's regarding the television externalities and the ways to internalize them. Television in France started as a state monopoly and has remained as such until 1984. During this period, administrative rules prevailed. No ownership was formally granted, neither for the broadcasting licenses, nor for TV programs.

The state monopoly was justified by the political instability of the Fifth republic installed by De Gaulle in 1958, after the unrest of the Algeria war. The political power wanted to keep control over the most powerful mass media (Peyrefitte 2002) while censorship and the allocation of subsidies muzzled the cinema (Gimello-Mesplomb 2003). The opening of the TV market was decided in 1984 by President Mitterrand who granted a broadcasting license to a private company in order to set up a pay-TV service. France is the only country in the world where TV de-monopolization started with a pay-TV channel on terrestrial broadcast.

The first broadcasting license was granted for free to Canal Plus, who did also benefit from market exclusivities such as the right to air a film one year only after its theatrical release, or the right to show adult movies. In counterpart, the broadcaster should spend a fixed share of his turnover to buy films and TV shows from independent producers. The TV operator was chosen for his political loyalty. The wide differentiation between the old public TV and the glamourous Canal Plus, accessible countrywide, boosted the success of the service. Therefore, independent producers were allocated large budgets, which generated the surge of new talents as well as an institutional gratitude from the entertainment community.

The conditions of this first deal shaped all the further concessions granted to commercial broadcasters. The principle was to separate the broadcasting license from the ownership of the shows. The same scheme applied to all Hertzian channels – whether new or formerly public – granted to private operators. The license was given for free, the operator was selected through a beauty contest, and obligations were attached to the license for commissioning and funding independent producers.

Finally:

- All broadcasters, including the public ones, were granted free terrestrial

licenses in exchange for funding independent cinema and TV producers. Through this funding, the TVs would acquire temporary broadcasting rights for the programs.

- The producers flourished in a large ecosystem gathering 700 companies specialized in cinema and 2000 companies focused on TV shows. These producers kept the ownership of the copyrights.

An objective of this regulation was to prevent the broadcasters to amass copyrights so to restrain their assets to the broadcasting concessions. From an institutional standpoint, it kept the broadcasters under political control. The principle was almost comparable to what D. C. North, Wallis, and Weingast 2009 call a "limited access order" where monopolies are granted to individuals against political allegiance. More precisely, the TV ecosystem was an island of limited access order in an open access (a market economy) State. The so-called "cultural exception" was the ideological justification, the belief associated with it. On the economic side, it did make sense as long as TV was the only access to residential viewers. The broadcasters were even given new licenses (new accesses) when digital terrestrial TV increased the competition among channels. Therefore, the copyrights of the shows were mostly valued through the broadcast on domestic TV. Although their residual value was small, producers were attached to it as a patrimonial asset.

The 50-year growth of the TV market has been a positive sum game between broadcasters and producers. It dramatically changed with the surge of *over the top* (OTT) services[1]. The Internet has brought in a large set of externalities (both in transactions and in media) that could not get regulated with the same tools as television. Therefore, a new competition arose that compromised the former equilibrium.

The funny thing is that reforming the TV ecosystem has proven quite impossible, for reevaluating the obligations and the rights is perceived by producers as an expropriation. During the fifty years of the TV game, the producers with easy access to media have organized to protect their interests. Any threat regarding what they consider as their patrimony is promptly denounced as an offence against French culture. Since 2008, great reforms are periodically announced that rapidly end in anticlimax.

[1]Over the top is a term used to describe content providers distributing streaming media over the Internet, bypassing the traditional means of telecommunications

The topic of this chapter is then: how does this path-dependent media ecosystem adapt to the new paradigm of platforms? Who are the winners and the losers of the regulation game? How do the winners keep on capturing it when the sum of the game turns into negative? If the system can't be reformed, how will its destructive-creation proceed? To the benefit of whom?

A subsidiary advantage of the French TV regulation is that it provides extensive data regarding all the orders related to TV obligations. It allows to illustrate how some producers have captured the regulation to their own benefit and how the entry of platforms has modified the game. In the next section we detail the TV regulation and its impact on both the industrial organization and the performance of the sector. The third section examines the impact of the entry of over-the-top platforms on the ecosystem.

4.2 The System of obligatory funding and its implications

4.2.1 The French system of obligatory funding

The French regulation scheme is based on a partition of property rights between licenses to broadcast and copyright. The licenses are granted to private firms in exchange for obligatory funding and broadcasting of the French cinema and audiovisual production.

The terms and level of quotas, concerning both investment in independent production and in so-called heritage works[2] , vary according to various criteria such as the broadcaster's turnover, its presence or not on the terrestrial network, the channel's business model and the type of program broadcast.

The broadcasting quotas concern the share of broadcasting hours of European works, or of works of *French original expression*, that is to say works produced entirely or mainly in their original version in the French language or in a regional language in use in France. Similarly, European audiovisual works are produced in member states of the European Union or, under certain conditions, works from European third countries.

[2]Defined by the CNC as original audiovisual works with a heritage vocation that are of particular cultural, social, technical, scientific or economic interest.

Quotas for contributions to audiovisual production are imposed on channels that devote more than 20% of their broadcasting time to audiovisual works, or whose turnover exceeds €350 million. The cinema investment obligations concern channels broadcasting more than 52 movies or 104 unique cinema broadcasts per year, as well as specialized channels. Table 4.5 in the appendix present a summary of the terms and conditions offered to broadcasters with regards to their obligations. In all cases, a minimum of 75% of the investment must be directed to independent production. This independency clause creates a separation of the broadcasting and production industries.

This division of property rights is accompanied by a market organization fixed by the law which specifies the exclusive window granted to each contributor, so-called *chronologie des médias*. This regulatory device allows the broadcasters to exploit movies according to a timetable reflecting their level of investment. Each window provides an exclusivity guaranteed by law. It operates a discrimination scheme through which different versions of the movie are gradually marketed at a decreasing price, and reflects a principle of coherence in relation to the weight and obligations of each party in the pre-financing of the movies.

This system is unique, as exclusive broadcasting windows are usually freely negotiated between the relevant parties. It also protects the French movies from the foreign competition: non-French studios can benefit from the one-year TV window[3] , only if they sell to the pay-TV duopoly, Canal Plus and OCS[4] . Otherwise, they have to wait for three years[5] before accessing free TV. In the meantime, their release investment has been lost.

In 2009, a new exclusive window for SVOD platforms complying with the obligations system is added six months after free-to-air TV. Timeframes have been shortened in 2018, in accordance with requests from broadcasters.

[3] 8 months from 2018 onwards

[4] Orange Cinema Series, a subsidiary of Orange, the French telco incumbent.

[5] 30 months from 2018 onwards

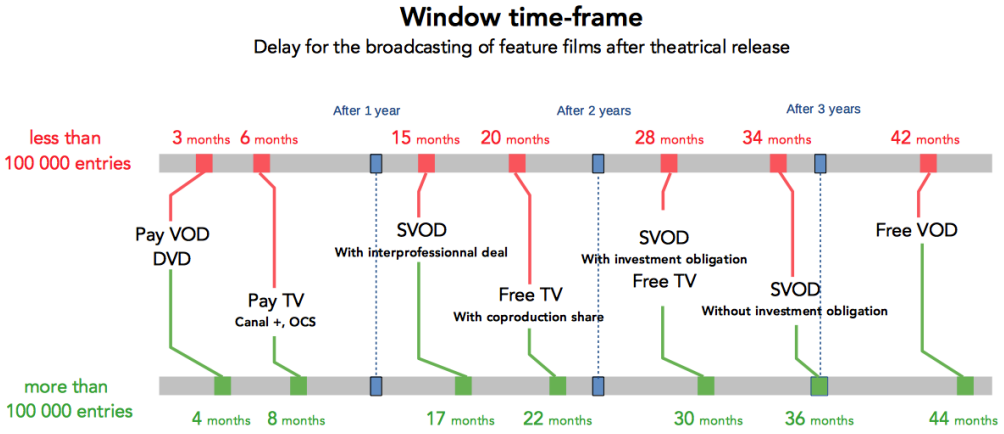


Figure 4.1: Window time-frame, *Chronologie des Médias*

4.2.2 Data and empirical methodology

This study is based on a database completed by the CNC[6], including all orders for audiovisual programs over the 2007-2018 timeframe.

Each of these orders corresponds to an application for admission to the Audiovisual Support Fund (COSIP), which represents 21% of total audiovisual funding in 2014. To be eligible, these programs must qualify as heritage works, defined as "original audiovisual works with a heritage vocation that are of particular cultural, social, technical, scientific or economic interest". Such a work must belong to one of the following genres: fiction, animation, creative documentary or recreation and recording of live performances based on a unitary and autonomous work. So-called flux programs (news, sports, games, talk shows, reality shows, ...) are excluded from this database. Finally, to be eligible, these works must be produced with the assistance of authors, main actors, technical collaborators of French creation, or nationals of European countries, and technical industries established in these same

[6]The CNC (National Centre for Cinema and the Moving Image) is an agency of the French Ministry of Culture, responsible for the production and promotion of cinematic and audiovisual arts in France. Its role is to administer the regulation of cinema, support its economy, as well as this of audiovisual arts, and protect the French cinematographic heritage. It also collects extensive data on the funding of audiovisual and cinema works in France

countries.

This first database is completed by another one indexing all French-initiated movies approved by the CNC during the period. It details the year of approval, the date of release in theaters, the title, the producer(s), the estimated budget as well as the details of the financing plan with contributions from the various French and foreign partners.

Very few producers are active both on the audiovisual and movie production sectors. Between 2007 and 2014, 270 companies produced audiovisual and cinematographic works, out of 3658. The production ecosystem is complex and difficult to assess: many companies are capitalistically linked to the same entity. This results in an overestimation of the number of producers and therefore underestimation of the industry's level of concentration. We choose to consider the subsidiaries as belonging to the parent group. This cross-checking is carried out using the data from *Ecran Total* grouping together the capitalist links between the various production companies.

Genre	**Frequency**	**%**	**Budget 2007-2018 (M€)**	**Average budget by hours (€)**	**Annual volume (hours)**
TV Magazine	515	1,42	368	122 942	382
Live Entertainment	4 758	13,11	1 166	143 145	736
Documentary	24 058	66,28	4 662	158 217	2 415
Non-fiction Total	29 331	80,81	6 197	141 434	3 534
Animation	712	1,96	2 416	636 022	316
Fiction	3 034	8,36	8 558	980 616	815
Cinema	3 219	8,87	15 274	2 711 401	469
Fiction Total	6 965	19,19	26 249	1 442 680	1 601
Total	**36 296**	**100,00**	**32 445**	**792 057**	**5 134**

Table 4.1: Database Description

Table 4.1 summarizes the cinema and audiovisual production over the 2007-2018 timeframe. Fiction works represent a majority of the total investment (79%) for 24% of produced hours.

4.2.3 Industrial organization and regulation capture

We implement a hierarchical classification algorithm to describe the production industry for audiovisual and cinema works. Details of the methodology can be found in the appendix. We present a division of the industry in 4 different classes of producers, mainly differentiated by their annual budget and volume of production.

Both the cinema and audiovisual sectors are highly concentrated: a small group of large firms take up a large share of the orders (table 4.2). The

audiovisual production industry is dominated by fifty producers (2.3% of the industry) who account for 25% of the market in terms of total budget. The most productive class, the leaders declare an average annual budget close to €70M and produce 24 times more hours of programs than their competitors.

Most of the registered producers are absent from the market for capital-intensive programs, such as fiction and specialize in magazine or documentary. The group of small producers (85% of the industry) produce on average 3 hours of content each year (one or two programs), with an average hourly budget of €30 000.

The cinema sector is more concentrated with 25% of the total budget captured by 0.4% of the producers. As our dataset doesn't give us a precise breakdown of the co-productions funding (35% of movies), we consider that co-producers have an equivalent contribution to the film budget. In doing so, we underestimate the share of the largest and overestimate the share of the smallest. Despite all this, the average allocated budget per film of a large cinema producer is €6M, three times the budget of 98% of the firms.

Producer group	Frequency (%)	Average annual budget (M€)	Market share (over budget)	Average production (hours/year)
Leaders	0.1 %	69.2	9.1%	170.2
Large	2.2 %	4.2	15.4 %	29.9
Medium	11.9 %	2.1	40.7 %	10.1
Small	85.8 %	0.3	34.8 %	2.9
Total	100%	0.6	100%	7.1

Table 4.2: The Audiovisual production industry - Clustering

Producer group	Frequency (%)	Average annual budget (M€)	Market share (over budget)	Average production (moves/year)
Large	0.4%	43.5	25.6 %	7
Medium	21.0 %	4.7	57.9 %	2
Small	78.6%	2.6	16.5 %	1
Total	100%	4.2	100%	2

Table 4.3: The Cinema production industry - Clustering

Both the audiovisual and cinema industries are dependent on broadcasters' funding, as well as on various subsidies. This is especially true for audiovisual fiction, where TV channels represent on average 70% of the total budget. The production ecosystem is mostly constituted of suppliers without equity capital, whose survival depends on the mandatory orders of television channels. In contrast, the larger firms capture a large portion of the obligatory investment. 76% of the leaders' budget come from broadcasters, compared to 52% for small structures.

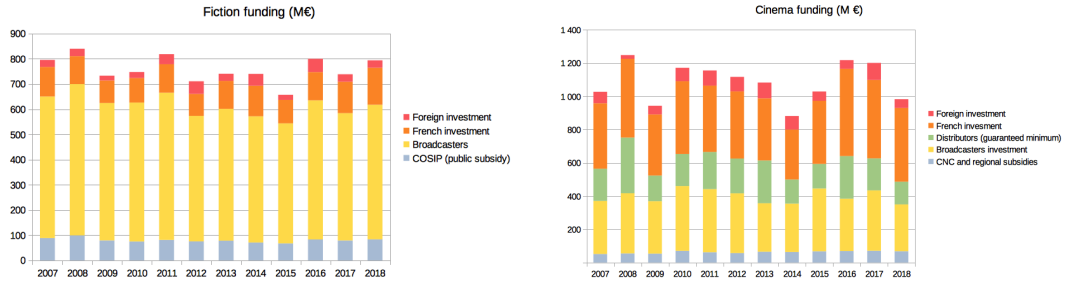


Figure 4.2: Audiovisual Fiction and cinema Funding

The existence of this extremely dispersed production sector is due to a number of factors, including the obligatory investments. The lack of barriers to entry in the production sector makes it possible for new entrants to set up a production structure and get funds from broadcasters. The discourse of the French cultural exception, allows producer lobbies to obtain diversity clauses in the regulatory game.

The partition of property rights puts the ecosystem on a path of vertical disintegration between production and broadcasting. This separation is established by the Tasca decrees (1990), which include a clause of independence in mandatory investments (75% of investment should go to a capitalistically independent producer[7]).

As television channels obtain only an exclusive broadcasting right as a compensation for their initial investment, they have low incentive to order exportable programs. This results in an orientation of the production ecosystem towards fulfilling domestic demand. Thus, the property rights given to producers have a low value, as the demand outside of the antenna of TV channels is poor. Very few productions have an international funding strategy (figure 4.3), which reflects the ecosystem's national orientation.

In contrast, the studio model adopted in the USA or UK allows invest-

[7]Article 11 of the 90-67 decree defines an independent production company as a company:

- In which the channel does not hold, directly or indirectly more than 5% of the capital
- Who does not own, directly or indirectly more than 5% of the capital of the channel
- with which the company or service does not have links constituting a lasting community of interest

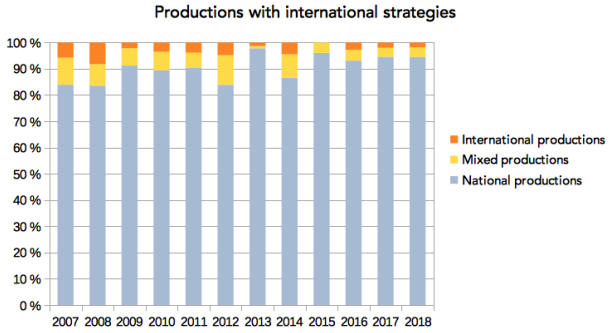


Figure 4.3: International funding strategies

ments to be internalized on several media, and thus gives incentives to resell and export (figure 4.4) .

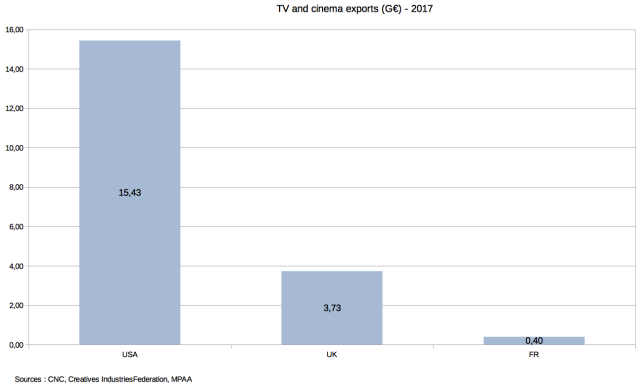


Figure 4.4: TV and Cinema exports

4.2.4 How works the regulation game

Several institutional reports call for an in-depth reform of the regulatory system (Vallet 2013, Boutonnat 2018), in order to reflect the change in technology, externalities and new entrants. However, a reform can be perceived as an expropriation by the producers, especially the bigger ones who benefit from the obligatory funding. Even players not directly gaining anything from the regulation may fear situations of uncertainty and the risk of imbalance that would result from a reform. Institutional change always induce a period of disequilibrium, which makes support for such changes more costly (Sened

1991, Fink 1987).

Reforming requires this *diagnostic* phase, but also a strategic one, to mobilize support and avoid criticism, a phase during which it is necessary to "find a grip on the institution", i.e. to find room for maneuver in order to be able to act (Lagroye and Offerlé 2011). The *winners* of the regulatory system, which we identify as the largest producers, have a more solid grip on the institution than the reformer: they can mobilize coalitions to avoid change, while the potential beneficiaries of the change ignore the long-term benefits they could gain from a reform. They are also less united than the proponents of the institutions. The larger producers are more mobilized to maintain the status quo than smaller producers for reform, but in addition, not all players are equally gifted with power. Gimello-Mesplomb 2003 show how, since the late 1940s, film producers have been able to organize collectively in order to defend their interests.

The collective organization bodies of the cinema professionals, in the form of associations or trade unions give them a strong capacity to mobilize and defend their interests. These are grouped into three main organizations, the ARP, the BLIC and the BLOC. The ARP (*Association des Réalisateurs et Producteurs*) is mostly composed of employers' organizations and defends the producers' interests. Its position is the absence of justification to change the regulation, as producers have no incentive to change. They benefit from an automatic support fund after their first production, a source of income is ensured by the obligations, and rely on the *intermittent* status of to reduce their fixed costs (Menger 2011).

The BLIC (*Bureau de liaison de l'industrie cinématographique*) is composed of several associations and federations of distributors and theater-networks. It defends a form of protectionism of the cinema ecosystem: media timeframe, strict control over movie screening. Several reports (Gomez 2011, Kopp 2016, Boutonnat 2018) point to the lack of transparency of the sector, mostly due to the absence of contractual relations.

These interest groups have an influence on the political debate, and are regularly heard in the context of the elaboration of reform projects. They can easily mobilize talents (actors, directors) to defend the cultural exception if their interests are threatened.

Finally, Knight and Sened 1995 show that the long-term maintenance of an institution can be explained by its ability to provide distributional bene-

fits to those who have the power and/or authority to change it. In that sense, the benefits distributed to small businesses (diversity investment clauses for CANAL+ for instance) are a key element to consolidate their adherence to the status quo.

4.3 Entry of platforms and transition to a negative-sum game (2015-2018)

Digitization, and the evolution of broadcasting technologies lead to a progressive fall of barriers to entry. With the generalization of broadband access, the French administered ecosystem is facing a sudden opening to competition from international players, bypassing traditional means of distribution, and regulation.

4.3.1 Digitization and the fall of barriers to entry

Digitization, the process of allowing the transmission of information in a digital format, changes the nature and distribution of rents in the ecosystem (Weeds and Seabright 2006). In the context of analogue broadcasting, transmission capacity formed a major barrier to entry, as the number of available channels was restricted by spectrum availability. Broadcasters earned massive rents, which were compensated by the obligatory investments and quotas.

The fall of costs of reproducing and transmitting information, and digital compression allowing for the transmission of more channels than what was previously possible with analogue technology reduced these barriers to entry in the broadcasting market. The competitive introduction of DTT channels to new entrants in the early 2000s posed a first threat to incumbents. This was cancelled by the gradual purchase of DTT operators by Hertzian groups, who maintained their position in a growing market (TF1 group takes over TMC and NT1 in 2009). In that sense, the first consequences of digitization were internalized by the ecosystem, and the changes in competition took place in a national and highly regulated frame. The growing market for television content allowed for rent sharing between incumbents and new entrants in a positive-sum game.

The entry of platforms, starting in 2014 with Netflix, creates a break in this process. The roll-out of high-speed internet connection allows entry of *over the top* (OTT) operators, distributing content over the internet without

any intermediary. Their services are marketed directly online to the consumer, with access possible through mobile devices or television. This mode of broadcasting is not subject to the scarcity of frequencies, nor barriers to entry. Competition then takes on an international aspect, and is accompanied by a change in usage and consumption patterns.

The entry of OTT platforms is correlated to a gradual decline in television audiences (figure 4.4):

	15+	15-24	25-49	50+
2011	3h57	1h59	3h45	4h56
2017	-1.3% (3h54)	-23% (1h31)	-12%(3h17)	+3% (5h05)

Table 4.4: Evolution of the individual watching time: live TV+replay (Médiamétrie)

According to Concurrence 2019, this trend is confirmed by a -6.3 minutes fall in 2018. CSA 2018 establishes a causal link between consumption of audiovisual content online and this fall of TV consumption, especially for younger audiences.

Development of online advertising, weakens revenue for free to air channels[8]. Similarly, this new competition weakens pay-TV channels by offering similar offers at a lower cost. According to CNC and CSA , the low price offered by OTT offers encourages consumers to leave traditional offers, and could explain a 3.5% decline of pay-TV revenue in Europe between 2015 and 2018. Analysis of individual consumption time for free-to-air television shows a fall of audience between 2011-2017 (figure 4.5). This fall of audience also impacts advertising revenue.

As for online advertising, taking up a larger market share, revenue is captured by the search engines and social networks, with Google and Facebook at the top of the list, while audiovisual incumbents occupy a weak position (9% market share in 2017[9] for audiovisual operators) and benefit from limited growth prospects. (IREP 2018).

In that sense, this second opening of the French audiovisual market shifts the regulation game to negative-sum. Over the top broadcasting puts an end to the technological oligopoly of broadcasters, and thus lowers the value

[8]Decision n°18-A-03, 6/03/2018 autorité de concurrence

[9]Observatoire de l'e-pub, 20e édition, PWC 2018

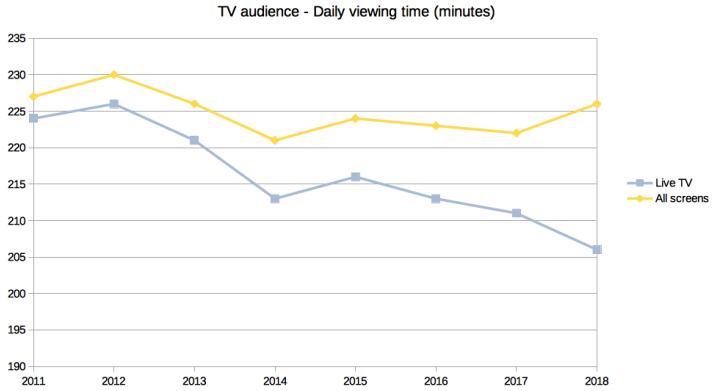


Figure 4.5: TV audience

of their concessions, which was an important source of rents. Control over these means of distribution of content no longer grants exclusive access to the consumer. In this sense, platforms threaten to end the *limited access order* of the audiovisual industry.

4.3.2 Consequences on the competition game

This opening of the broadcasting market results in control over scarce content gaining importance over control over the means of transmission. As sports rights or other valuable content has always been a key element in the competition between broadcasters (Steiner 1952), the increase in the number of channels and opening of the broadcasting market to a wide range of new players reinforces its value (Weeds and Seabright 2006).

As content is becoming easier to create and broadcast, the proliferation of screens and stories makes the viewer's attention even rarer. TV that was the only home media able to convey video stories has become a source amongst many others. Even social networks have become competitors. Their success can eventually be explained by the attention paid by each member to the creation of her own personal stories.

In that sense, control over *premium* content becomes the main source of rents, as such content would guarantee a high audience.
Nicita and Rossi 2009 use the notion of substitutability with other contents to define *premium*. Such contents can be defined as specific information goods characterized by a low degree of substitutability with other contents from the

consumer's perspective. In other words, low quality content is not a good substitute for high quality *premium* content. Examples of such programs for the TV market include successful movies or series, as well as sports rights. *Over-the-top* broadcasting changes the nature of competition for attention. By investing in addictive stories or programs, series-centered SVOD players make their content even less substitutable from the consumer's point of view (V. Lavialle and O. Bomsel 2017). In that sense, competition focuses on radical differentiation of content, in order to keep the attention of subscribers as long as possible.

On the production side, investments to vertically differentiate content add to the already high fixed costs in the industry, as *premium* content is generally capital-intensive[10] , involving high sunk costs and economies of scale. This leads to an increase in market concentration, by pushing small producers who cannot bear such high costs towards marginal formats.

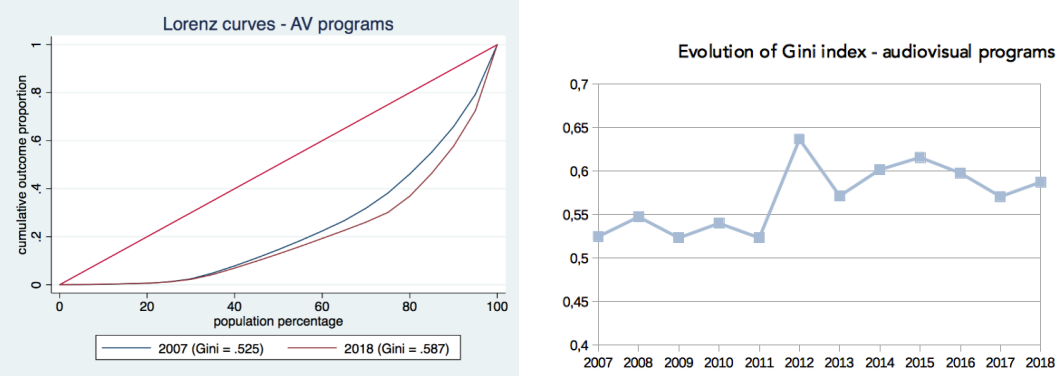


Figure 4.6: Rise in capital-intensity of audiovisual programs

Figures 4.6 and 4.7 illustrate this process of rise in capital intensity of programs, leading to a concentration of the production sector between 2007 and 2018.

The rules of vertical separation between the production and broadcasting sectors give French producers an incentive in the short term to sell their under-exploited catalogue collections, financed by national channels, to platforms.

[10] Fiction programs cost on average 1M€ per hour, 2.8M€for cinema, compared to 150k€for documentary

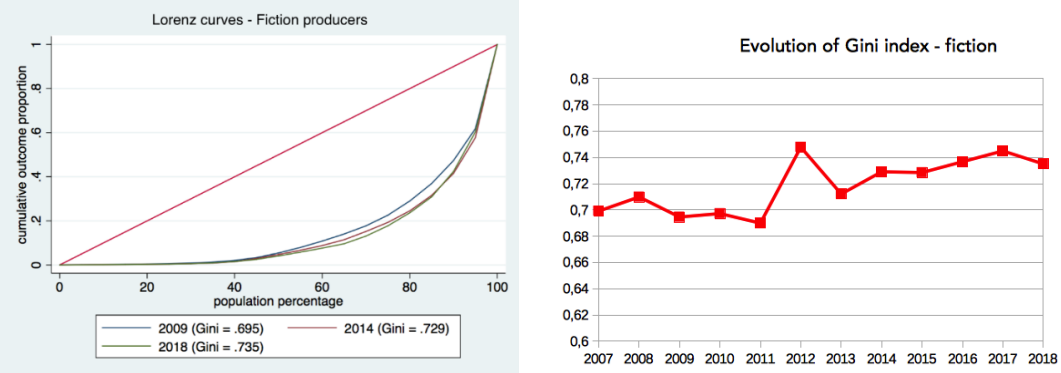


Figure 4.7: Concentration among the fiction producers

The current regulation system also suffers from the profound changes in uses, directly linked to these evolutions in the transmission of information (see previous section). The possibility of accessing content on various devices and time frees the spectator from the television schedule. The window timeframe, which guaranteed the value of movies for each broadcaster is made obsolete: consumers demand a quick availability of content, and may turn to piracy if not the case. The American ISP Sandvine's Global Internet Phenomena report (Sandvine 2019) shows that peer-to-peer piracy is growing after a long period of decline (BitTorrent representing 3% of global downstream and 22% of upstream traffic in 2018 in the US). The report points to the dispersion and exclusivities of *premium* content as an explanation for the growth.

4.3.3 The destructive creation of the French audiovisual ecosystem

The status quo maintained in recent years is threatened in a context where SVOD platforms play a major role on the market, without complying with the rules of the *chronologie des médias* or creative funding obligations, while incumbent players are in great difficulty. Pre-purchases, particularly of pay-TV channels, are in the center of the French cinema financing model. In accordance with its obligations, Canal+ has pre-purchased 107 films in 2016 for a total of 141.7 million euros. However, as this investment is directly correlated to turnover of the channel, of which it must represent 12.5%, any decline in the broadcaster's activity will transfer to the movie industry.

The entry of OTT platforms and the decline in profitability of TV channels shift the French regulation game from positive-sum to negative-sum (V. Lavialle and Montecino 2016). In the end, the more the market deteriorates, the more prohibitive the costs of restoring a positive-sum and reforming.

As the exclusive broadcasting windows do not give enough compensation for the investments in production, there are low incentives for new entrants to invest in independent production and take part in the regulatory system. In that context, new entrants operate a form of *destructive creation*, by avoiding the regulation game altogether, and forcing traditional actors to imitate them. Indeed, the international platforms adopt a bypass strategy, using the regulatory heterogeneity between European countries to escape the regulation imposed on French broadcasters. This gives them a competitive advantage compared to regulated agents. To escape the French regulatory framework, Netflix has set up its head office in the Netherlands. The company therefore has no obligation to contribute to the funding of audiovisual production in France, nor any obligation to promote French works on its service. Moreover, the editorial approach based on a personalized recommendation algorithm does not allow the application of broadcasting quotas in a manner similar to that of traditional channels.

Although not subject to financing obligations, the video-on-demand service does invest in French production (*Marseille* 2015, *Plan Coeur* (2018) *Deutsch les Landes* (2018) ...). However, contrary to the incumbents' obligatory investments, the platform retains the copyright of the purchased works. This is still a winning situation for large producers working with platforms: they still gain from keeping the regulation as it stands, capturing funding both from regulated and non-regulated players.

The incumbents' best response strategy to compete with these new entrants is to enter the market for SVOD platforms: traditional Pay-TV operator CANAL+ launched the service *MyCanal*, followed by the free-TV broadcasters TF1, M6 and France Télévisions with *Salto*.

Bellon 2016 explains the difficulties for the regulation to integrate the new entrants by the diverging interests of the institutional structures in charge. The Ministry of Economy seeks to encourage activity and digital technology, while the Ministry of Culture's main objective is to preserve the system of support for creation and the *cultural exception*. In addition, the development of a French player capable of competing with the international platforms is hampered by regulatory authorities, less attentive to the political objectives

set by each ministry than to compliance with competition rules in the audiovisual and telecommunications markets.

Indeed, the French new media services are subject to a heavier regulation than international platforms: in the 08/12/2019 decision[11] , the French competition authority imposes on *Salto* to limit its joint purchases of linear and non-linear broadcasting rights. In addition, *Salto*'s supply conditions will be regulated in several ways, to limit its ability to supply exclusive content to its parent companies.

4.4 Conclusion

The French audiovisual ecosystem is formed by two very separate subsystems, TV and cinema, whose separation has been created and kept on by the regulation. The production ecosystem is formed by large suppliers who benefit from economies of scale in the production of recurrent products, and a large number of small firms with very little capital. The rise of TV series as the main premium fiction program leads to an increase in the capital-intensity of orders, and to the concentration of supply. The smaller producers' lack of capital makes them dependent on the order of TV channels. As the broadcasters do not have sufficient incentive to invest in programs that can be valued outside of their exclusive window, the residual property rights granted to these producers have low value (copyright on programs with low export/resale potential).

After a first wave of new entrants with the addition of new digital frequencies, this ecosystem is now threatened by the entry of the OTT players, made possible by the adoption of broadband access. This, accompanied by changes in modes of consumption is turning the television game into a negative-sum one.

The adaptation of the ecosystem to this new industrial paradigm cannot be achieved by way of reform, as disrupting the status quo would incur prohibitive costs for the reformer. Indeed, the strong path dependency effects attached to the regulation means that a reform will have more difficulties attacking the core of the institution, which is defended by a series of inheritances and vetoes from interest groups. In that context, it is possible that the new entrants, by succeeding in avoiding regulatory control will operate a

[11] décision 19-DCC-157 du 12 août 2019

destructive creation, by making obsolete the institutional frame of the French audiovisual and cinema markets. The choice made by the French regulator to disintegrate broadcast from content production has kept down the market value of audiovisual copyrights. This choice corresponded to a balance kept between regulated broadcasters and disintegrated producers so to keep the ecosystem under political control. The transfer of asset value from the broadcasters to independent producers may eventually benefit to non-French players who will in the end purchase the wealthiest production companies.

4.5 Appendix

4.5.1 Additional Tables

	Audiovisual obligations			
	Free-to-air channels		Pay-TV channels	Cinema channels/CANAL+
	Choice 1	Choice 2		
Independence Clause	75% of investments			
AV works	15%	NA	15%	NA
Heritage works	10.5%	12.5%	8.5%	3.6%
	Cinema obligations			
	Non-specialized channel	**Specialized channel**	**1st broadcast-specialized**	**CANAL+**
Independence Clause	75% of investment			
European Movies	3.2%	21%	26%	12.5%
French Movies	2.5%	17%	22%	9.5%

Table 4.5: Simplified representation of obligatory investments

	COSIP (public subsidy)	Broadcasters	French private Investment	Foreign Investment
2007	88	562	117	28
2008	99	601	111	29
2009	79	545	89	19
2010	75	551	97	24
2011	81	584	113	40
2012	75	498	87	50
2013	78	523	111	28
2014	71	501	121	47
2015	67	476	93	20
2016	83	552	112	53
2017	79	505	125	30
2018	84	534	147	29

Table 4.6: Fiction Funding (2007-2018), M€

	CNC and regional subsidies	Broadcasters investment	Distributors (guaranteed minimum)	Foreign private investment	French private investment
2007	51,3	319,4	193,5	68,9	394,1
2008	54,7	362,2	335,1	22,3	473,9
2009	53,6	315,3	154,6	52	367,8
2010	70,4	389,7	192,8	80,8	438
2011	61,7	380	223,5	91,2	399,3
2012	56,8	359,6	209,3	87,1	404,3
2013	65	291,8	257,4	94,6	374,1
2014	63,2	291,4	144,9	81,3	300,9
2015	67,6	378	147,9	56,1	379,7
2016	69,2	315	256,5	52	525,1
2017	70,9	363,3	192,5	102,4	472
2018	68	281,7	136,8	52,7	443,7

Table 4.7: Cinema Funding (2007-2018), M€

	Shortcom	Sitcom	Serie 52'	Serie 90'	TV movie
2007	43	281	262	53	168
2008	69	369	267	33	174
2009	68	260	198	42	184
2010	46	253	166	49	216
2011	77	220	241	62	174
2012	124	245	213	52	134
2013	172	168	270	64	108
2014	127	192	257	50	124
2015	104	196	276	61	105
2016	135	200	405	62	95
2017	139	292	340	18	82
2018	75	438	354	23	105

Table 4.8: Number of fiction hours

	Audiovisual programs	Fiction programs
2007	0,52	0,70
2008	0,55	0,71
2009	0,52	0,69
2010	0,54	0,70
2011	0,52	0,69
2012	0,64	0,75
2013	0,57	0,71
2014	0,60	0,73
2015	0,62	0,73
2016	0,60	0,74
2017	0,57	0,74
2018	0,59	0,73

Table 4.9: Gini indexes

4.5.2 Hierarchical upward classification

Audiovisual Database

The hierarchical upward classification allows us to obtain a partition of the population into homogeneous groups.

The objective of the model is to divide n individuals (production companies) into a given number of classes. Classification is based on a measure

of dissimilarity, or distance between individuals. The goal is to minimize the distance between individuals within a group and to maximize it between groups.

We choose here to use a hierarchical upward classification algorithm which has the advantage of allowing an ex-post choice in the number of classes. We start from a situation where all individials are alone in a class, then are grouped into larger and larger classes, grouping at each stage the nearest classes in the sense of the distance measurement chosen.

Let Ω Be the entire study population. We define,H, a hierarchy so that:

$$\Omega \in H \tag{4.1}$$

$$\forall \omega \in \Omega, \{\omega\} \in H \tag{4.2}$$

$$\forall (h, h') \in H^2, (h \cap h' = \emptyset) \vee (h \subset h') \vee (h' \subset h) \tag{4.3}$$

At the top of the hierarchy, all individuals are grouped into a single class. At the bottom, all individuals are alone. So we start from n classes and try to reduce this number to p classes, with p arbitrary. At each step, the two closest classes are merged. We call aggregation index the distance between those two classes. Since the closest individuals are grouped first, the first iteration has a low aggregation index, which will increase from iteration to iteration.

For the estimation of the model, we use the Ward method, aiming to maximize the inter-class inertia, defined as follows:

$$d(C_1, C_2) = \frac{n_1 n_2}{n_1 + n_2} d(G_1, G_2) \tag{4.4}$$

with n_1 et n_2 the number of individuals within each class, and G_1 et G_2 their respective center of gravity.

Inertia, or the within-cluster sum of squares criterion, can be recognized as a measure of how internally coherent clusters are. It suffers from various drawbacks:
Inertia makes the assumption that clusters are convex and isotropic, which is not always the case. It responds poorly to elongated clusters, or manifolds with irregular shapes. Inertia is not a normalized metric: we just know that lower values are better and zero is optimal. But in very high-dimensional spaces, Euclidean distances tend to become inflated (this is an instance of the so-called “curse of dimensionality”). Running a dimensionality reduction algorithm such as PCA prior to the clustering can alleviate this problem and

speed up the computations.

Once the hierarchy is established, the choice of the number of classes chosen is arbitrary, as the model is primarily descriptive. However, different criteria can be used to ensure the relevance of this choice. We present in details the methodology adopted for the classification of audiovisual producers, then present the results for the cinema producers.

First, we determine the variables of interest used to classify producers. This selection is made by means of a principal component analysis on the centered and reduced variables. The procedure gives us principal axes summarizing the information by operating a reduction of dimensionality. We choose to keep 3 components, accounting for around 75% of the information (table 4.10). The model is run of the following variables:

- **Devis** : is the total budget for all productions of an industrial group
- $\mathbf{Nb}_{film}$: $is the total number of productions$**Heures** : $is the total number of hours produced$
- **gAnim ; gDocu ; gFict ; gMaga ; gSpec** : are the budgets used by genre (respectively animation, documentary, fiction, magazine and live entertainment)
- **F100** : is the number of movies with a funding entirely french
- **MINO** : is the number of movies with a foreign funding share below 50
- **MAJO** : is the number of movies with a foreign funding share above 50

Table 4.11 shows the position of the variables on each axis of the selected components. We generate a cluster analysis from these coordinates.

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	5,47106	4,10702	0,4974	0,4974
Comp2	1,36404	0,26643	0,124	0,6214
Comp3	1,09761	0,0840711	0,0998	0,7212

Table 4.10: Principal components analysis

Variable	Comp1	Comp2	Comp3
$z_d evis$	0,3563	0,3046	-0,2832
$z_n b_f ilm$	0,3973	-0,2636	0,0142
$z_h eures$	0,4005	-0,0777	-0,004
$z_g Anim$	0,0624	0,393	0,3367
$z_g Docu$	0,3259	-0,3683	-0,023
$z_g Fict$	0,2701	0,3822	-0,5123
$z_g Maga$	0,1079	-0,2661	0,391
$z_g Spec$	0,2688	0,1618	0,2912
$z_F 100$	0,3682	-0,354	0,002
$z_M AJO$	0,3423	0,1926	-0,0088
$z_M INO$	0,1875	0,3691	0,5527

Table 4.11: Principal components analysis: variable projections

We then define a producer by its coordinates in the plane formed by the three principal axes:

$$P = (x, y, z) \in \mathbb{P} \tag{4.5}$$

We then generate the hierarchy, illustrated in figure 4.9.

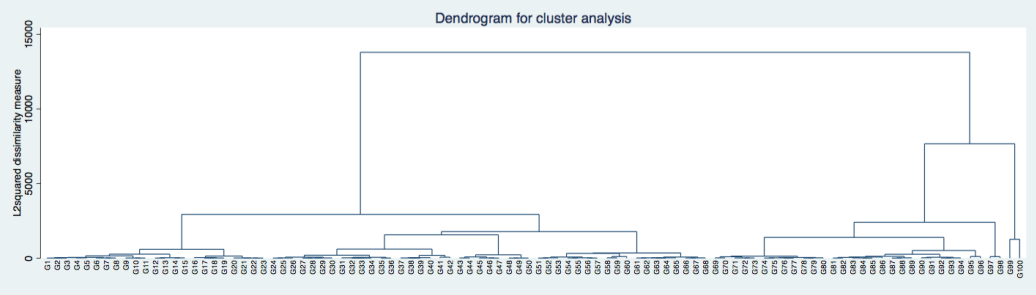


Figure 4.8: Dendogram for cluster analysis

In order to chose the number of classes, we use two criteria. First, the Calinski Pseudo-F criterion (Caliński and Harabasz 1974) corresponds to a weighting of the intra-group variance by the number of groups. The higher the value of the index, the better the cut. Secondly, we use the Duda criterion (Richard O. Duda 2000), given at each step by the ratio between the sum of standard deviations of the groups to be devided (Je(1)) and the sum of the standard deviations of the two resulting subgroups Je(2). A high value of this index indicates a good cut. Table 4.12 presents the evolution of the

two criteria for each number of classes.

As a first step, we choose 5 classes. The fourth group is differentiated only by a large foreign funded production. In a concern of clarity we decided to merge it with the third group Large producers .
Results of the model are presented in the main chapter, table 4.2.

Number of Clusters	Calinski/ Harabasz (Pseudo-F)	Duda (Je(2) / Je (1))
2	1347,54	0,4703
3	1508,87	0,7236
4	1374,14	0,5664
5	1357,08	0,7123
6	1356,41	0,5184
7	1404,6	0,5448
8	1495,67	0
9	1641,92	0,5469
10	1648,57	0,6088
11	1690,66	0,6017
12	1739,45	0,701
13	1746,33	0,4774
14	1763,65	0,6114
15	1774,93	0,6075

Table 4.12: Duda and Calinski indicators

Cinema classification

The same model is estimated for cinema producers. We use the following variables:

- montant : is the budget of the movies produced
- mttEq : is the budget divided by the number of coproducers. This biased variable is used in absence of a precise breakdown of investments.
- nb$_{f}ilm$: $isthenumberofproductionsF100 : isthenumberofmovieswithafundingentirelyfr$

- MINO : is the number of movies with a foreign funding share below 50
- MAJO : is the number of movies with a foreign funding share above 50
- act : is the number of active year on the period

Our three main components represent 94% of the information.

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	5,04129	3,93632	0,7202	0,7202
Comp2	1,10497	0,691038	0,1579	0,878
Comp3	0,413934	0,145579	0,0591	0,9372

Table 4.13: Principal components: cinema

Below, the position of the variables on each axis of the selected components.

Variable	Comp1	Comp2	Comp3
z$_m ontant$	0,4065	-0,318	0,301
z$_m ttEq$	0,3906	-0,3117	0,3889
z$_n b_f ilm$	0,4384	0,0638	-0,0446
z$_F$100	0,4185	-0,1824	-0,1747
z$_M AJO$	0,3967	0,017	-0,2154
z$_M INO$	0,2001	0,7774	0,5583
z$_a ct$	0,3428	0,3998	-0,6063

Table 4.14: Principal components: cinema, projection

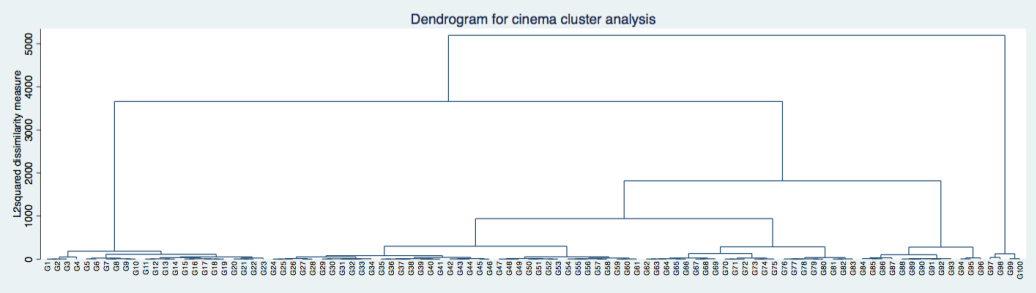


Figure 4.9: Dendogram for cluster analysis (cinema)

Number of Clusters	Calinski/ Harabasz Pseudo-F	Duda Je(2) / Je (1)
2	626,38	0,5809
3	905,54	0,5981
4	1112,25	0,5745
5	1248,7	0,5744
6	1163,32	0,497
7	1139,72	0,4411
8	1168,97	0,6658
9	1169,44	0,4253
10	1153,48	0,2804
11	1156,33	0,6401
12	1169,69	0,454
13	1191,42	0,7049
14	1204,5	0,5957
15	1192,63	0,4984

Table 4.15: Duda and Calinski criterion: cinema

Conclusion

Media publish narratives which add meaning to various goods. They help building and publishing public images, representing and complementing all economic, social, cultural and political activities. They are a source of externalities, which can be positive (sharing of knowledge, coordination, synchronization...) or negative (disinformation, rumors, incitement to crime...). Such externalities can also link different media, or industries. Thus television maintains externalities with cinema, music or even sport. The way these external effects are captured is central to the study of media *ecosystems*. This form of industrial organization directly results from the internalization of such effects, and differences in the way to deal with them explains the large divergences in industrial paths among countries (chapter 1).

In that regard, the trajectory of evolution of the French audiovisual sector and its regulation is a good example of the impact of opening of accesses in a closed ecosystem. Strongly structured by the regulatory framework resulting from the liberalization of State television in the 1980s, this ecosystem has been strongly protected, and dominated by terrestrial broadcasting. The logic of the public service concessions system adopted in 1982 was to grant protected markets in exchange for production and broadcasting obligations that would serve cultural objectives. To limit the power of the television channels, vertical restrictions were imposed, and property rights of the programs they invested in would be kept by the producer. This led to the creation of a large ecosystem of small producers, dependent on the obligatory funding system to exist.
Until the 2000s, the various players in the industry were able to share rents in a positive-sum game. The progress in broadcasting techniques, leading in particular to a fall in barriers to entry, poses a threat to this ecosystem. The increase in the number of licensed terrestrial channels, allowing entry of new broadcasters has however been internalized by incumbents, through the acquisition of these firms, and thanks to the growth of the television market. The market penetration of new global players, with new offers adapted

to changes in consumption patterns poses a new challenge to the ecosystem and raises questions about the relevance of the regulatory framework and the possibilities for reform.

Chapter 2 provides an overview of the investment strategies of broadcasters, which are subject to obligations to contribute to independent production. We show how they are more likely to invest in projects driven by large production structures, or *leaders*, in order to minimize risk and maximize the expected live audience. We also show some signs of horizontal differentiation between the main television channels. However, we do not consider any counterfactual to investment obligations, or the actual willingness of broadcasters to pay for each project. As a result, it is difficult to isolate the effect of the investment obligations on strategic choice, or to quantify more precisely the possible substitutions effects between investments in cinema and in TV fiction.

Chapter 3 focuses on the demand side, more specifically on the consumption patterns of television series. While this format has long been overshadowed by cinema in France, it expanded quite early in the United States with satellite pay-TV. The vertically integrated studio model encourages broadcasters to producer their own content and promote their brand. HBO, Showtime or AMC then began to target a young, urban, cultivated audience, with more demanding and daring series from a narrative point of view (Ziemniak 2017). This contributes to the emergence and persistence of a qualitative gap between French and American series, while series with longer episodes and narratives (structured around blocks of one and a half hours) persist in France. This delay in the relative development of the French series is also explained by the regulatory orientation of pay-TV towards cinema rather than audiovisual fiction.
The popularity of modern television series formats grew in France in the mid-2000s, with the arrival of American *procedurals*, such as *CSI: Crime Scene Investigation* on private channels, drawing high audiences. The recent growth of 52-minute-episodes series indicates a transition to more industrialized production processes and is reflected in an increase in the capital intensity of French audiovisual programs (see chapter 4).
The evolution of broadcasting technologies, and the rise of online video services has profoundly affected demand for TV series. This chapter therefore focuses on the new forms of consumption of these programs. The rational addiction framework allows us to show how the narrative structure of some series may influence consumption patterns. However, if *serials* create a captive audience for subscription-based on-demand video platforms, the analysis

method proposed in this chapter is limited by the nature of the data. It would be interesting to access the viewing history of identified consumers on platforms, in order to more closely analyse the patterns.

Chapter 4 details more precisely the French audiovisual and cinema production ecosystems. They are very compartmentalized, and are dominated by large production structures capturing most of the regulated funding (chapter 2). They also benefit from economies of scale linked to the production of recurring products (series, TV film collections). The rise in power of television series as the main *premium* programs reinforces this phenomenon of concentration in the ecosystem.
The entry of subscription-video-on-demand platforms, bypassing traditional broadcasting channels leads to a crisis in the investment obligation regime, historically resulting from the concession of growing and protected markets. Indeed, in the face of this new competition, the television markets opens up and is no longer protected. We also show that it loses some growth drivers as a result of this fall in barriers to entry. While a reform to re-balance the assets of the various players is diagnosed by public authorities, the outcome of these projects generally end up being *path-dependent changes*, to use Bruno Palier's expression (Palier and Bonoli 1999), in that they do not change the trajectory of evolution of the regulation.
Thus, the adaptation of the ecosystem cannot be achieved through reform, because of the heavy path-dependency effects, as well as the veto power of some players. The beneficiaries of the current regulatory game have a strong ability to defend their interests, while the potential winners of an institutional change are not organised to defend it. In addition, the mechanics of licensing and protected markets make each in-depth reform look like a form of *expropriation*. In this context, we show how the entry of new players can bring a form of creative destruction, and unlock the institutional game.

This thesis opens many perspectives for future research. From an empirical point of view, the method developed in chapter 3 can be pursued by using more precise consumption data, in order to highlight these effects of *addiction* to narrative. Chapter 2 highlights the capture of regulated investments by the largest producers, but the data we use does not allow for a precise analysis of the effect of obligations on broadcasters' financing strategies. This work led to a more in-depth analysis of the investment decisions of television channels in French cinema (Bass 2019). Finally, chapter 4 could be completed by a more precise analysis of the hearings of the various producer unions in the context of the preparation of reform projects. This study would allow for a more in-depth analysis of the mechanism of institutional

games, as well as the question of the lobbying of powerful producers and its tools (professional associations, consultation bodies, etc.), and their interactions with the State institutions in charge of managing the regulatory system.

Conclusion et Résumé en français

Les médias ont vocation à rendre publics des récits qui ajoutent du sens à divers biens. Ils contribuent à la construction et à la publication d'images publiques, représentant et complétant toutes les activités économiques, sociales, culturelles et politiques. Ce processus de publication est générateur d'externalités, qui peuvent être positives (coordination ou synchronisation, partage de connaissances, circulation de l'information...) ou négatives (propagation de rumeurs ou *fake news*, incitation au crime...). De tels effets externes peuvent également relier différents médias, ou industries. Ainsi la télévision entretient des externalités avec le cinéma, la musique ou encore le sport. La façon dont ces effets sont internalisés est centrale dans l'étude des écosystèmes de médias. De fait, cette forme d'organisation industrielle résulte directement de la capture des effets externes, et les différences dans la façon de les traiter expliquent les grandes divergences de trajectoires industrielles entre les pays (chapitre 1).

A cet égard, la trajectoire d'évolution du secteur audiovisuel français et de sa régulation est une bonne illustration de l'impact de l'ouverture des accès dans un écosystème fermé. Fortement structuré par le cadre réglementaire issu de la libéralisation de la télévision d'État dans les années 1980, cet écosystème a été fortement protégé de la concurrence extérieure, et dominé par la diffusion hertzienne. La logique du système adopté en 1982 était d'accorder des marchés protégés en échange d'obligations de production et de diffusion servant des objectifs culturels. Pour limiter le pouvoir des chaînes de télévision, des restrictions verticales leur sont imposées, et les droits de propriété des programmes reviennent au producteur. Cela a conduit à la création d'un large écosystème de petits producteurs, dépendant de ce système de financements obligatoires pour exister.
Jusqu'aux années 2000, les différents acteurs de l'industrie pouvaient partager les rentes dans un jeu à somme positive. Les progrès des techniques de diffu-

sion, qui se traduisent notamment par une diminution des barrières à l'entrée, constituent dès lors une menace pour cet écosystème. L'augmentation du nombre de chaînes hertziennes sous licence, permettant l'entrée de nouveaux diffuseurs, a toutefois été internalisée par les opérateurs historiques, grâce à l'acquisition de ces entreprises et à la croissance du marché de la télévision. La pénétration du marché par de nouveaux acteurs mondiaux, avec de nouvelles offres adaptées à l'évolution des modes de consommation, représente un nouveau défi pour l'écosystème français et pose la question de la pertinence du cadre réglementaire et des possibilités de réforme.

Le chapitre 2 donne un aperçu des stratégies d'investissements des diffuseurs, soumis aux obligations de contribution à la production indépendante. On montre comment ils sont plus susceptibles d'investir dans des projets portés par les grosses structures de production, ou *leaders*, afin de minimiser le risque et de maximiser l'audience en direct espérée. Nous montrons également quelques signes de différenciation horizontale entre les principales chaînes de télévision. Cependant, nous n'estimons pas de contrefactuel aux obligations d'investissement, ou la volonté réelle des diffuseurs de payer pour chaque projet. De ce fait, il est difficile d'isoler l'effet de l'obligation de financement sur les stratégies d'investissement, ou de quantifier plus précisément les effets de substitutions possibles entre l'investissement dans le cinéma et dans la fiction TV.

Le chapitre 3 s'intéresse à la demande, et plus précisément aux formes de consommation des séries télévisées. Alors que ce format est longtemps éclipsé par le cinéma en France, la série se développe aux Etats-Unis avec la télévision payante par satellite. Le modèle de studio intégré verticalement incite les diffuseurs à produire leur propre contenu et à promouvoir leur marque. HBO, Showtime ou encore AMC commencent alors à cibler un public jeune, urbain, cultivé, avec des séries plus exigeantes et audacieuses d'un point de vue narratif (Ziemniak 2017). Cela contribue à l'émergence et à la persistance d'un écart qualitatif entre les séries françaises et américaines, alors que persistent en France des séries aux épisodes et à la narration plus longs (structurés autour de blocs d'une heure et demi). Ce retard de développement relatif de la série française s'explique également par l'orientation réglementaire de la télévision payante vers le cinéma plutôt que la fiction audiovisuelle.
La popularité des formats de séries télévisées modernes s'accroît en France au milieu des années 2000, avec l'arrivée des *procedurals* américains, tels que *Les Experts: Miami* sur les chaînes privées, générant une audience élevée.
La croissance récente des séries de 52 minutes indique une transition vers des processus de production plus industrialisés et se traduit par une augmenta-

tion de l'intensité capitalistique des programmes audiovisuels (chapitre 4).
L'évolution des techniques de diffusion, et la montée en puissance des services de vidéo en ligne a également profondément affecté la demande pour les séries TV.
Ce chapitre s'intéresse donc aux nouvelles formes de consommation des séries télévisées. Le cadre d'analyse de l'addiction rationnelle nous permet de montrer comment la structure narrative de certaines séries influe sur le mode de consommation.
Si les séries à épisodes *suivis* créent une audience captive pour les plateformes de vidéos à la demande en ligne par abonnement.
La méthode d'analyse proposée dans ce chapitre est limitée par la nature des données. Il serait en effet intéressant d'accéder à l'historique de visionnage de consommateurs identifiés sur des plateformes afin d'en déceler les motifs.

Le chapitre 4 détaille plus précisément les écosystèmes de production audiovisuel et cinéma français. Ceux-ci, très cloisonnés, sont dominés par de grosses structures de production, captant l'essentiel des financements réglementés (chapitre 2). Ils bénéficient, en outre d'économies d'échelle liées à la production de produits récurrents (séries, collections de téléfilms). La montée en puissances des séries télévisées comme principal programme *premium* renforce ce phénomène de concentration de l'écosystème.
L'entrée des plateformes de vidéo à la demande par abonnement, diffusant en dehors des canaux historiques conduit à une crise du régime des obligations d'investissements, historiquement issu de la concession de marchés croissants et protégés. En effet, face à cette nouvelle concurrence, le marché de la télévision cesse d'être protégé. On montre également qu'il perd certains relais de croissance du fait de cette ouverture. Alors qu'une réforme permettant de rééquilibrer les actifs des différents joueurs est diagnostiquée par les pouvoirs publics, l'issue des différents projets peut être considérée comme des "*path-depedent change*", selon l'expression de Bruno Palier (1999), en ce qu'ils ne modifient pas la trajectoire d'évolution de la réglementation.
Ainsi, l'adaptation de l'écosystème ne peut se faire par la réforme, du fait de la forte dépendance au sentier et des vétos de certains acteurs. Les bénéficiaires du jeu actuel bénéficient d'une forte capacité à défendre leurs intérêts, tandis que les gagnants potentiels d'une réforme ne sont pas organisés pour la défendre. En outre, la mécanique des concessions de licences et de marchés protégés fait passer chaque reforme pour une forme d'*expropriation*. Dans ce contexte, on montre comment l'entrée des nouveaux acteurs peut opérer une forme de destruction créatrice, et débloquer le jeu institutionnel.

Cette thèse ouvre de nombreuses perspectives pour de futures recherches. D'un point de vue empirique, la méthode développée dans le chapitre 3 peut être poursuivie en utilisant des données plus précises de consommation, afin de mettre en évidence ces effets d'*addiction* au récit. Le chapitre 2 met en évidence la capture des financements réglementés par les plus gros producteurs, cependant les données utilisées ne permettent pas d'analyser précisément l'effet des obligations sur les stratégies de financement des diffuseurs. Cette analyse a donné lieu à une analyse plus poussée des décisions d'investissement des chaînes de télévision dans le cinéma Français (Bass 2019). Enfin, le chapitre 4 pourrait être complété par une analyse plus précise des auditions des différents syndicats de producteurs dans le cadre de l'élaboration des projets de réforme. Cette étude permettrait d'analyser plus en profondeur le mécanisme des jeux institutionnels, ainsi que la question du *lobbying* des producteurs puissants et de ses outils (syndicats, organes de concertation, etc.), et de leurs interactions avec les organes d'État en charge de la gestion du système réglementaire.

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RÉSUMÉ

L'écosystème de la production audiovisuelle est structuré par la réglementation issue de la libéralisation de la télévision d'État (1984-86). Celle-ci accorde aux chaînes des fréquences hertziennes en échange d'obligations de financement et de diffusion. Il en résulte un système administré dont les règles ont très peu évolué en trente ans. Cette organisation industrielle s'essouffle: la part de marché des films français en salle stagne, tandis que le public vieillit. La rentabilité des chaînes de télévision s'effrite et les fictions qu'elles financent s'exportent mal. L'entrée des plateformes étrangères telles que Netflix fragmente encore l'audience. L'objectif de ce travail est d'étudier l'évolution de l'industrie audiovisuelle française et de sa régulation, depuis la libéralisation de la télévision d'État, ainsi que d'analyser l'effet de l'entrée des diffuseurs "over-the-top" sur l'écosystème historique.

MOTS CLÉS

Economie industrielle, régulation, audiovisuel cinéma

ABSTRACT

The French ecosystem of audiovisual production has been structured by the liberalization of state television (1984-1986). Radio frequencies were granted to broadcasters in exchange for a commitment to invest a percentage of their turnover into French production. The result is a heavily regulated system whose rules have changed very little in thirty years. This industrial organization is showing its limits: the market share of French films in theaters is stagnant, while the audience is aging. The profitability of TV-channels crumbles and series they finance don't sell. The entry of foreign platforms such as Netflix fragments the audience even more. The purpose of this thesis is to study the creation of the industrial ecosystem of the French Television, its evolution and the impact of the entry of international players on the incumbents' strategies and on regulation.

KEYWORDS

Industrial economics, Regulation, Audiovisual, Cinema