

Rational Addiction to Audiovisual Narratives

an Analysis of Broadcasting and Consumption of Fiction in France

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- TV series occupy a growing space in the audiovisual market
- For a long time, television was the only way to consume these programs
- Broadcasting technology innovations disrupts this classical model by allowing *non-linear* consumption

- New broadcasting technology allows for new forms of narrative writing
- Those induce a change in demand and utility functions for TV series, resulting in a transition from synchronized programs towards *on demand*
- Free-to-air television has to adapt to this change in demand and face the competition of Pay-TV and online services

Outline

- 1 Introduction
- 2 Literature**
- 3 Data and Methodology
- 4 Results
- 5 Conclusion

- A wide literature in social sciences
 - Combes 2015, Kranz 2015, Mikos 2016
 - Different modes of consuming TV series. Some of them can lead to addictive effects and binge watching
 - The narrative form of the series is not considered in these studies
- How can we understand these effects with an economic framework ?
 - Boyer (1978, 1983) : rational demand under habit formation
 - Becker, Murphy 1988 : the rational addiction framework
 - Applications to cultural goods : Cameron 1999, Castiglione, Infante 2015

Preferences framework (Becker and Murphy 1988)

- Let the utility function at time t be :

$$u(t) = u[y(t), c(t), S(t)]$$

- With y a non-addictive good and c an addictive good
- Let δ be the depreciation rate on past consumption

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

Habitual goods

A good is habitual if and only if

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

Addictive goods

A good is addictive if and only if

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

- Addiction is defined as a habit strong enough that steady states are unstable

- The demand function relies on two main parameters :
 - **Addictiveness** : effect of the stock of previous consumption on current and future one
 - **Discount rate** : more present-oriented individuals are more likely to get addicted
- Narrative writing can affect both these parameters :
 - Series using multiple storylines and cliffhangers reinforce the utility of past consumption
 - Risk of spoiler effects can increase the preference for the present

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Independent-episodes TV-series

We say a TV-series has independent episodes if and only if those episodes can be followed in any order without significant loss of utility

- We distinguish between two types of TV-series : independent episodes and *serials*
- Serials : the narrative develops slowly, over episodes or seasons
- We alledge that this continuity of narration gives rise to addiction effects

- Data provided by *Médiamétrie*, French audience measurement company
- Fictional program aired between 8.30 and 10 p.m. on French free-to-air channels, 2011-2016
- Live and catch-up audiences
- 36 400 observations, 5 000 different TV series and movies

The market for free-to-air broadcasting

- Shared between public (France TV), private (M6, TF1) hertzian channels, and TNT (digital terrestrial television)
- Main source of revenue : advertising space, proportional to the volume of audience
- Average time spent watching television in France : around 3h41', stable

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- 1 Identify the effect of narrative on TV series consumption
 - How do consumption patterns vary for different narrative formats?
- 2 Specify a demand function for TV-series to explain this effect

Linear model : impact of narrative on consumption

- We estimate the causal effect of the narrative structure on the proportion of live audience
- Controls : evolution of technology (year), time of the broadcast, total volume of audience and country of origin
- Results : Broadcasting a serial rather than a series with independent episodes leads to a **transfer of 4.8% of the audience towards catch-up**, all other things equal [Full Table](#)

Serials and catch-up audience

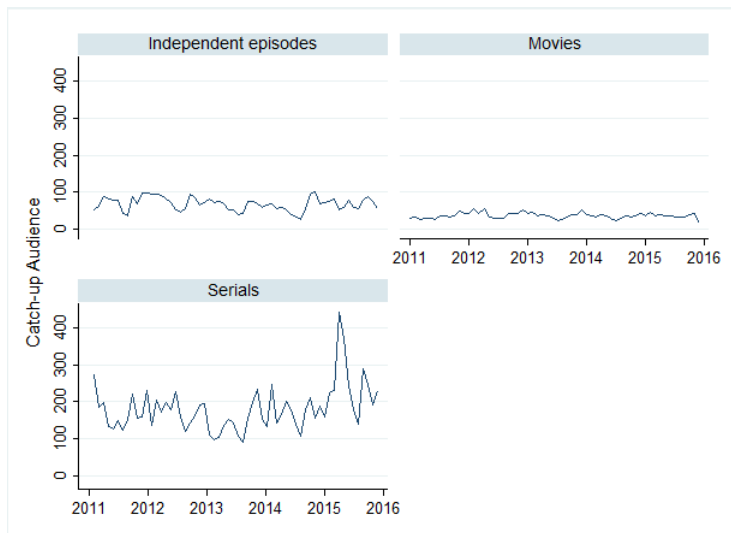


FIGURE – Cath-up audience (thousands)

The model :

$$C_{i,t} = \beta_1 C_{i,t-1} + \beta_2 C_{i,t+1} + \beta_3 X_{i,t} + \alpha_i + \varepsilon_{it} \quad (1)$$

- β_1 and β_2 measure the addictiveness of the series i
- X a vector of control variables

Estimation :

- Arellano-Bond (1991) method to deal with endogeneity of past and future consumption
- Model estimated on 101 serials of at least 10 episodes, then on a similar database of independent-episodes series

Results : rational addiction model

- Strong causal effect of the past and future consumption
- Significant effects on the independent-series database, but weaker

Variables	Myopic addiction model	Rational addiction model
Audience _{t-1}	0.389**	0.298**
Audience _{t+1}		0.236**
Advertising	-13.43 [†]	-14.39 [†]
Year	-219.7**	-213.6**
Grade	1.9	332.2

- We use ARIMA time series models to take into account the auto-regressive nature of the demand
- Can only be estimated on one series at a time
- 2 case studies presented in the article and appendix

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- The new forms of the demand function structures a captive audience for online platforms
- TV serials do not fit the constraints of free-to-air television
- The spread of audience and decline in popularity of independent-episodes series lead to a fall in profitability of these channels

- Free-to-air Television is one of the main investors in the production of fiction in France
- Their difficulty to monetize non-linear audience makes it not profitable for them to finance serials
- This can result in a sub-optimal production of these programs
- Difficulty to reform : copyright chain revenues are administered by an obsolete regulation

- The transition from *habits* to *addiction* effects in TV series changes the demand function
- This explains the shift from synchronized consumption of audiovisual programs to on-demand.
- This has strong industrial and regulatory implications for the market for broadcasting of fiction in France

Thank you for your attention !

- ① Becker G., Murphy K., *A theory of Rational Addiction*, Journal of Political Economy 1988
- ② Becker G., Grossman M., Murphy K., *An Empirical Analysis of Cigarette Addiction*, The American Economic Review 1994
- ③ Castiglione C., Infante D., *Rational addiction and cultural goods : the case of Italian theatregoer*, Journal of Cultural Economics 2015

Additional Tables and Graphs

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TABLE – Estimation results with heteroskedasticity-consistent standard errors

Variable	Coefficient	(Std. Err.)
Total audience	0.00**	(0.00)
Year	-0.47**	(0.02)
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)