

# Project in applied econometrics

## Report

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March 2018

### **Abstract**

This project has aimed at reproducing Moretti's 2011 paper on social learning effects in movie sales with R. We also blabla. Main results:

## **Contents**

# **1 Intuitions and detailed presentation of the model**

## **1.1 Some intuitions**

## **1.2 Presentation of the model**

bonjour je m'appelle Rémi

## 2 Analysis and main results

### 2.1 Identification of the surprises

Surprises consist in the residuals of the regression of the log-number of sales in the first week on the log-number of screens available (opened by theaters). This definition of surprises holds because we suppose that theaters are profit-maximizing agents and make use of all the available information to predict the success of a movie. If this definition is correct, we should expect log-number of screens opened by theaters first week to be a good indicator of knowledge available on the movie quality before it is released. In the Table ?? we reproduce Moretti's regression of *log\_sales\_first\_we* on *log\_screens\_first\_week*. Each column is the result of the regression when we control with some variables (film genre, rating available, cost, distributor, weekday, month, week, year). The fact that adding control variables doesn't change the robustness of the regression proves Moretti's point which is that theaters take into account these factors when deciding their number of available screens.

Table 1: Regression of first-weekend sales on number of screens

	<i>Dependent variable:</i>						
	<i>log_sales_first_we</i>						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>log_screens_first_week</i>	0.893*** (0.004)	0.896*** (0.005)	0.883*** (0.005)	0.871*** (0.005)	0.803*** (0.006)	0.806*** (0.006)	0.813*** (0.006)
R <sup>2</sup>	0.907	0.909	0.910	0.912	0.932	0.936	0.938
Adjusted R <sup>2</sup>	0.907	0.908	0.910	0.912	0.928	0.931	0.933

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

In fact, theaters perform more than what we could do using all the data available in the data set. Regressing first week-end sales on our control variables gives us a R<sup>2</sup> of .7, which is smaller than .9 performed by theaters only.

Table 2: Regression of first-weekend sales on control variables

	<i>Dependent variable:</i>
	<i>log_sales_first_we</i>
Observations	4,992
R <sup>2</sup>	0.699
Adjusted R <sup>2</sup>	0.674

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

We have performed the same kind of regression on France data from 2004 to 2008 and find quite similar results (Table ?? for France data and Table ?? for Paris data only<sup>1</sup>).

FRANCE  
PARIS

<sup>1</sup>Data available for Paris are richer of 600 movies than France.

is this use-  
ful?

nope, you  
only need  
the signifi-  
cativity of the  
coefficient

Table 3: Regression of first-week entries on number of screens for France

	<i>Dependent variable:</i>						
	log_entree_fr						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
log_seance_fr	1.208*** (0.009)	1.237*** (0.010)	1.237*** (0.010)	1.279*** (0.014)	1.282*** (0.014)	1.287*** (0.014)	1.196*** (0.014)
Observations	2,046	2,046	2,046	2,046	2,046	2,046	2,046
R <sup>2</sup>	0.893	0.899	0.900	0.917	0.924	0.925	0.943
Adjusted R <sup>2</sup>	0.893	0.898	0.898	0.910	0.915	0.916	0.935

*Note:*

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

Table 4: Regression of first-week entries on number of screens for Paris only

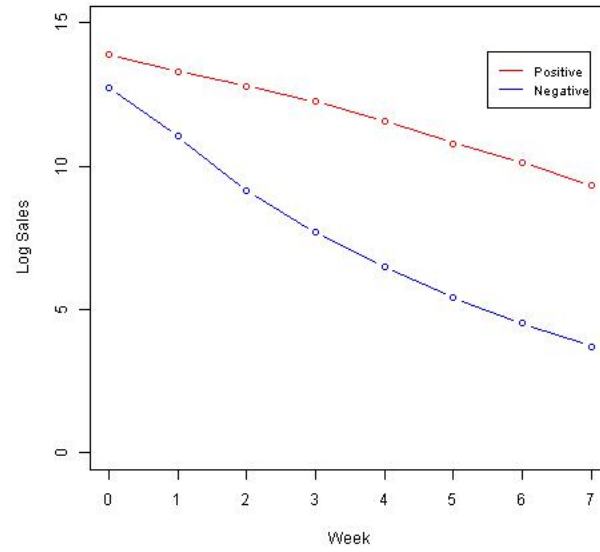
	<i>Dependent variable:</i>						
	log_entree_paris						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
log_seance_paris	1.342*** (0.010)	1.336*** (0.011)	1.337*** (0.011)	1.281*** (0.014)	1.281*** (0.014)	1.284*** (0.014)	1.152*** (0.014)
Observations	2,701	2,701	2,701	2,701	2,701	2,701	2,701
R <sup>2</sup>	0.875	0.880	0.881	0.901	0.908	0.909	0.927
Adjusted R <sup>2</sup>	0.875	0.879	0.880	0.892	0.897	0.898	0.918

*Note:*

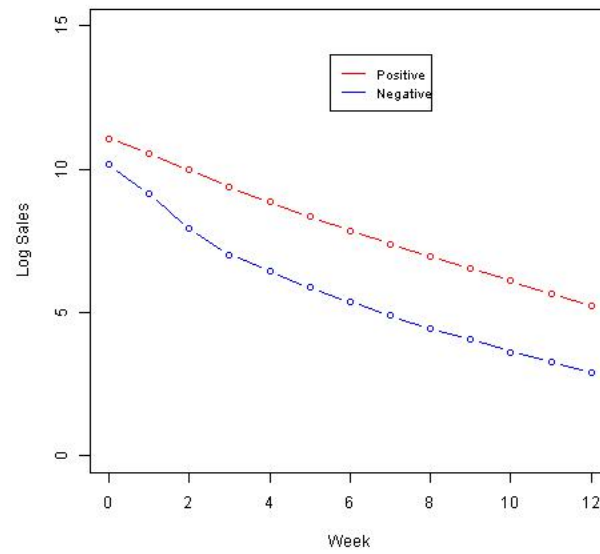
\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

Figure 1: We find the same graph as Moretti

**Decline in sale for movies with positive and negative surprises**



**Decline in sales for french data**



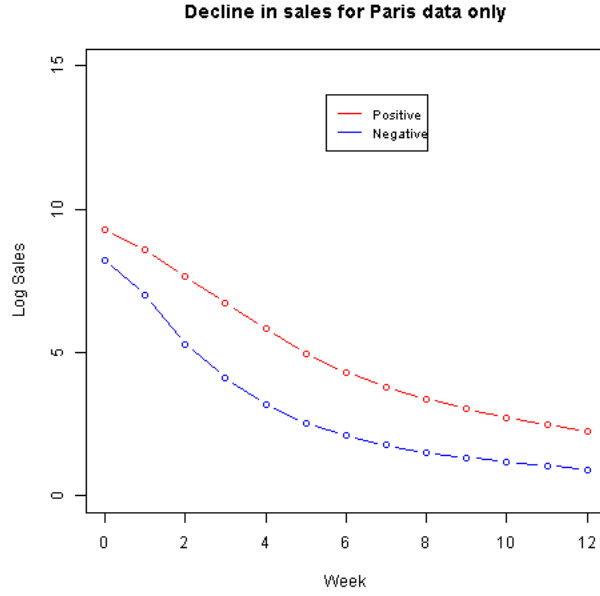


Table 5: Decline in box-office sales by opening week surprise

	<i>Dependent variable:</i>			
	log_sales			
	(1)	(2)	(3)	(4)
t	−0.952*** (0.007)	−0.952*** (0.006)	−1.289*** (0.009)	
t:surprise		0.475*** (0.009)		
t:positive_surprise			0.640*** (0.013)	
I(t *bottom_surprise)				−1.353*** (0.011)
I(t *middle_surprise)				−1.011*** (0.011)
I(t *top_surprise)				−0.491*** (0.011)
Observations	39,936	39,936	39,936	39,936
R <sup>2</sup>	0.772	0.788	0.787	0.790
Adjusted R <sup>2</sup>	0.739	0.758	0.756	0.760

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Table 6: Precision of the prior

	<i>Dependent variable:</i>	
	log_sales	
	(1)	(2)
t	−1.291*** (0.010)	−1.267*** (0.087)
t:positive_surprise	0.654*** (0.013)	−0.061 (0.121)
t:sequel	0.037 (0.038)	
t:positive_surpriseTRUE:sequel	−0.225*** (0.053)	
t:var_surprise		−0.045 (0.174)
t:positive_surpriseTRUE:var_surprise		1.416*** (0.243)
Observations	39,936	39,936
R <sup>2</sup>	0.787	0.787
Adjusted R <sup>2</sup>	0.756	0.757
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01	

Table 7: Decline in box-office sales by opening week surprise

	<i>Dependent variable:</i>			
	log_entree_fr			
	(1)	(2)	(3)	(4)
t	−0.526*** (0.002)	−0.526*** (0.002)	−0.571*** (0.003)	
t:surprise		0.076*** (0.004)		
t:positive_surprise			0.087*** (0.004)	
t:bottom_surpriseFALSE				−0.459*** (0.004)
t:bottom_surprise				−0.574*** (0.004)
t:middle_surprise				−0.088*** (0.005)
Observations	26,598	26,598	26,598	26,598
R <sup>2</sup>	0.851	0.853	0.853	0.854
Adjusted R <sup>2</sup>	0.838	0.841	0.841	0.841
<i>Note:</i>		*p<0.1; **p<0.05; ***p<0.01		



Table 8: Precision of the prior

	<i>Dependent variable:</i>		
	log_entree_fr		
	(1)	(2)	(3)
t	−0.570*** (0.003)	−0.698*** (0.013)	−0.678*** (0.004)
t:positive_surprise	0.105*** (0.005)	0.109*** (0.018)	0.009 (0.006)
t:saga	−0.027 (0.016)		
t:positive_surpriseTRUE:saga	−0.145*** (0.019)		
t:var_surprise		0.370*** (0.035)	
t:positive_surpriseTRUE:var_surprise		−0.062 (0.050)	
t:art_essai			0.259*** (0.006)
t:positive_surpriseTRUE:art_essai			0.066*** (0.008)
Observations	26,598	26,546	26,598
R <sup>2</sup>	0.855	0.854	0.880
Adjusted R <sup>2</sup>	0.843	0.842	0.870
<i>Note:</i> *p<0.1; **p<0.05; ***p<0.01			

Table 9: Decline in box-office sales by opening week surprise

	<i>Dependent variable:</i>			
	log_entree_paris			
	(1)	(2)	(3)	(4)
t	−0.583*** (0.002)	−0.583*** (0.002)	−0.564*** (0.003)	
t:surprise		−0.032*** (0.004)		
t:positive_surprise			−0.039*** (0.005)	
t:bottom_surpriseFALSE				−0.594*** (0.004)
t:bottom_surprise				−0.541*** (0.004)
t:middle_surprise				−0.021*** (0.006)
Observations	35,113	35,113	35,113	35,113
R <sup>2</sup>	0.810	0.810	0.810	0.811
Adjusted R <sup>2</sup>	0.794	0.794	0.794	0.795
<i>Note:</i>		* p<0.1; ** p<0.05; *** p<0.01		

Table 10: Precision of the prior

	<i>Dependent variable:</i>		
	log_entree_paris		
	(1)	(2)	(3)
t	−0.560*** (0.003)	−0.772*** (0.017)	−0.616*** (0.005)
t:positive_surprise	−0.030*** (0.005)	−0.213*** (0.024)	−0.126*** (0.007)
t:saga	−0.118*** (0.017)		
t:positive_surpriseTRUE:saga	−0.022 (0.020)		
t:var_surprise		0.576*** (0.045)	
t:positive_surpriseTRUE:var_surprise		0.480*** (0.065)	
t:art_essai			0.087*** (0.006)
t:positive_surpriseTRUE:art_essai			0.156*** (0.009)
Observations	35,113	35,074	35,113
R <sup>2</sup>	0.811	0.814	0.819
Adjusted R <sup>2</sup>	0.795	0.798	0.804
<i>Note:</i> *p<0.1; **p<0.05; ***p<0.01			

**2.2 Divergence of the sales**

**2.3 Precision of the prior**

## 2.4 Size of the Social Network

Consumers with a larger social network receive more feedbacks from their peers and thus they are able to evaluate more precisely the quality of the movie.

Table 11: Precision of peers' signal

	<i>Dependent variable:</i>	
	log_entree_fr	
	(1)	(2)
$t$	-0.663*** (0.007)	-0.451*** (0.005)
$t \times \text{positive\_surprise}$	0.061*** (0.010)	0.076*** (0.006)
$t \times \text{tout\_public}$	0.115*** (0.008)	
$t \times \text{positive\_surprise} \times \text{tout\_public}$	0.031*** (0.011)	
$t \times \text{seance\_fr\_first\_week}$		-0.033*** (0.001)
$t \times \text{positive\_surprise} \times \text{seance\_fr\_first\_week}$		0.011*** (0.001)
Observations	26,598	26,598
R <sup>2</sup>	0.856	0.867
Adjusted R <sup>2</sup>	0.844	0.856
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01	

## 2.5 Does Learning Decline Over Time?

Table 12: Convexity of the sales profile

	<i>Dependent variable:</i>
	log_entree_fr
$t$	$-0.978^{***}$ (0.011)
$t^2$	$0.034^{***}$ (0.001)
$t \times \text{positive\_surprise}$	$0.393^{***}$ (0.016)
$t^2 \times \text{positive\_surprise}$	$-0.026^{***}$ (0.001)
Observations	26,598
R <sup>2</sup>	0.861
Adjusted R <sup>2</sup>	0.850
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

### 3 Conclusion: some comments