

# Lecture#7 Does vertical integration increase prices – part II

Data & descriptive analysis

# Data

- What would you need?
  1. Ticket prices (quantities).
  2. Theatre VI status (yes/no).
  3. Variables that affect prices beyond VI status.

# Data

- Main source: Variety magazine numbers Jan 1945 – Dec 1955.
- Weekly information for 393 theatres (how many were there in total?) for 26 cities.

# Data

- Theatre capacity
- Prices (matinees, evening)
- Theatre ownership.
- Movie(s) playing in the theatre, studio, #weeks played, estimate of box office ( $= P \times Q$ ).

# Data

- Dimensions of data: movie / theatre / week: 143 200 obs.
- Prices uniform across movies w/in theatre & week.
- **Unit of observation:** theatre/year: 2 685 obs.

# Data

- Secondary source #1: [www.cinematreasures.com](http://www.cinematreasures.com)
- Secondary source #2: Gentzkow (2006)
- Secondary source #3: Movie Fact Yearbooks

Table 1A. List of Variables, Definition, and Source

Variable Name	Definition	Data Source
Evening and Matinee Price	Prices charged in the theater in week t	Weekly Variety issues from 1945 to 1955
Box Office Revenue	Revenues reported at the theater level in week t about week t-1	Weekly Variety issues from 1945 to 1955
Admissions	Reported box office revenue divided by evening price	Weekly Variety issues from 1945 to 1955
VI Ever?	Dummy variable =1 if theater is owned by a studio at any point in time between 1945 and 1955; =0 otherwise.	Weekly Variety issues from 1945 to 1955
VI?	Dummy variable =1 if theater is owned by a studio at time t; =0 otherwise.	Weekly Variety issues from 1945 to 1955
Seats	Number of seats in the theater	Weekly Variety issues from 1945 to 1955, <a href="http://www.cinematreasures.org">www.cinematreasures.org</a>
TV	Number of years since TV was first introduced in the city	Data from Gentzkow (2006)
Pctg Integ Theater in City	Percentage of theaters owned by studios in the city at time t	Movie Fact Yearbook 1945 to 1955

<b>HHI</b>	Hirschman-Herfindhal Index using shares of the number of theaters by theater chain	Movie Fact Yearbook 1945 to 1955
<b>Year</b>	Yearly time trend that goes from 1 to 11 (1945 to 1955)	
<b>VI, Studio Movie?</b>	Dummy variable =1 if movie is distributed by same studio that owns theater at time t; =0 otherwise.	Weekly Variety issues from 1945 to 1955, AFI Archive Data
<b>VI Ever, Studio Movie?</b>	Dummy variable =1 if movie is distributed by same studio that owned theater at any point in time between 1945 and 1955; =0 otherwise.	Weekly Variety issues from 1945 to 1955, AFI Archive Data
<b>Movie Big Five?</b>	Dummy variable =1 if movie is distributed by studios Warner, Paramount, RKO, Fox or MGM; =0 otherwise.	Weekly Variety issues from 1945 to 1955, AFI Archive Data
<b>Movie Little Three?</b>	Dummy variable =1 if movie is distributed by studios Columbia, Universal or United Artists; =0 otherwise.	Weekly Variety issues from 1945 to 1955, AFI Archive Data

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Note: This table defines all variables used in the empirical analysis and describes their sources.



# First look at data – weekly data

• theaterid	city	year	yearweek	highprice	lowprice
• 1	BALTIMORE	1945	2	.6	.2
• 1	BALTIMORE	1945	3	.6	.2
• 1	BALTIMORE	1945	4	.6	.2
• 1	BALTIMORE	1945	6	.6	.2
• 1	BALTIMORE	1945	7	.6	.2
• 1	BALTIMORE	1945	9	.6	.2
• 1	BALTIMORE	1945	11	.6	.2
• 1	BALTIMORE	1945	12	.6	.2
• 1	BALTIMORE	1945	13	.6	.2
• 1	BALTIMORE	1945	14	.6	.2
• 1	BALTIMORE	1945	15	.6	.2
• 1	BALTIMORE	1945	16	.6	.2
• 1	BALTIMORE	1945	17	.6	.2
• 1	BALTIMORE	1945	18	.6	.2

# annual data

• theaterid	city	year	highprice	lowprice
• 1	BALTIMORE	1945	.6	.2
• 1	BALTIMORE	1946	.6071429	.2095238
• 1	BALTIMORE	1947	.6382353	.2411765
• 1	BALTIMORE	1948	.6	.2
• 1	BALTIMORE	1949	.6	.2
• 1	BALTIMORE	1950	.6205128	.2
• 1	BALTIMORE	1951	.7257143	.2
• 1	BALTIMORE	1952	.8926829	.2621951
• 1	BALTIMORE	1953	.72	.21
• 1	BALTIMORE	1954	.8755556	.4033333
• 1	BALTIMORE	1955	.976087	.3358696

# Weekly data

• theaterid	city	year	yearweek	highprice	lowprice
• 91	CLEVELAND	1955	5	1	.7
• 91	CLEVELAND	1955	6	.9	.7
• 91	CLEVELAND	1955	7	1.25	.7
• 91	CLEVELAND	1955	8	1.25	.7
• 91	CLEVELAND	1955	9	1.25	.7
• 91	CLEVELAND	1955	10	1.25	.7
• 91	CLEVELAND	1955	11	1.25	.7
• 91	CLEVELAND	1955	12	1	.7
• 91	CLEVELAND	1955	13	1.25	.7
• 91	CLEVELAND	1955	14	1.25	.7

# Annual data

• theaterid	city	year	highprice	lowprice
• 91	CLEVELAND	1945	.65	.44
• 91	CLEVELAND	1946	.6696429	.4778571
• 91	CLEVELAND	1947	.7	.55
• 91	CLEVELAND	1948	.7	.55
• 91	CLEVELAND	1949	.7	.55
• 91	CLEVELAND	1950	.7407407	.55
• 91	CLEVELAND	1951	.8551163	.577907
• 91	CLEVELAND	1952	.8232558	.55
• 91	CLEVELAND	1953	.9513513	.6324325
• 91	CLEVELAND	1954	1.067949	.6615385
• 91	CLEVELAND	1955	1.096512	.7

# First look at data - questions

- How extensive was VI / change in VI in the sample?
- What do the price differences look like, conditional on VI?
- What about revenue?
- What about other characteristics?

Table 1B. Summary Statistics at the Theater/Year and Theater/Week Level

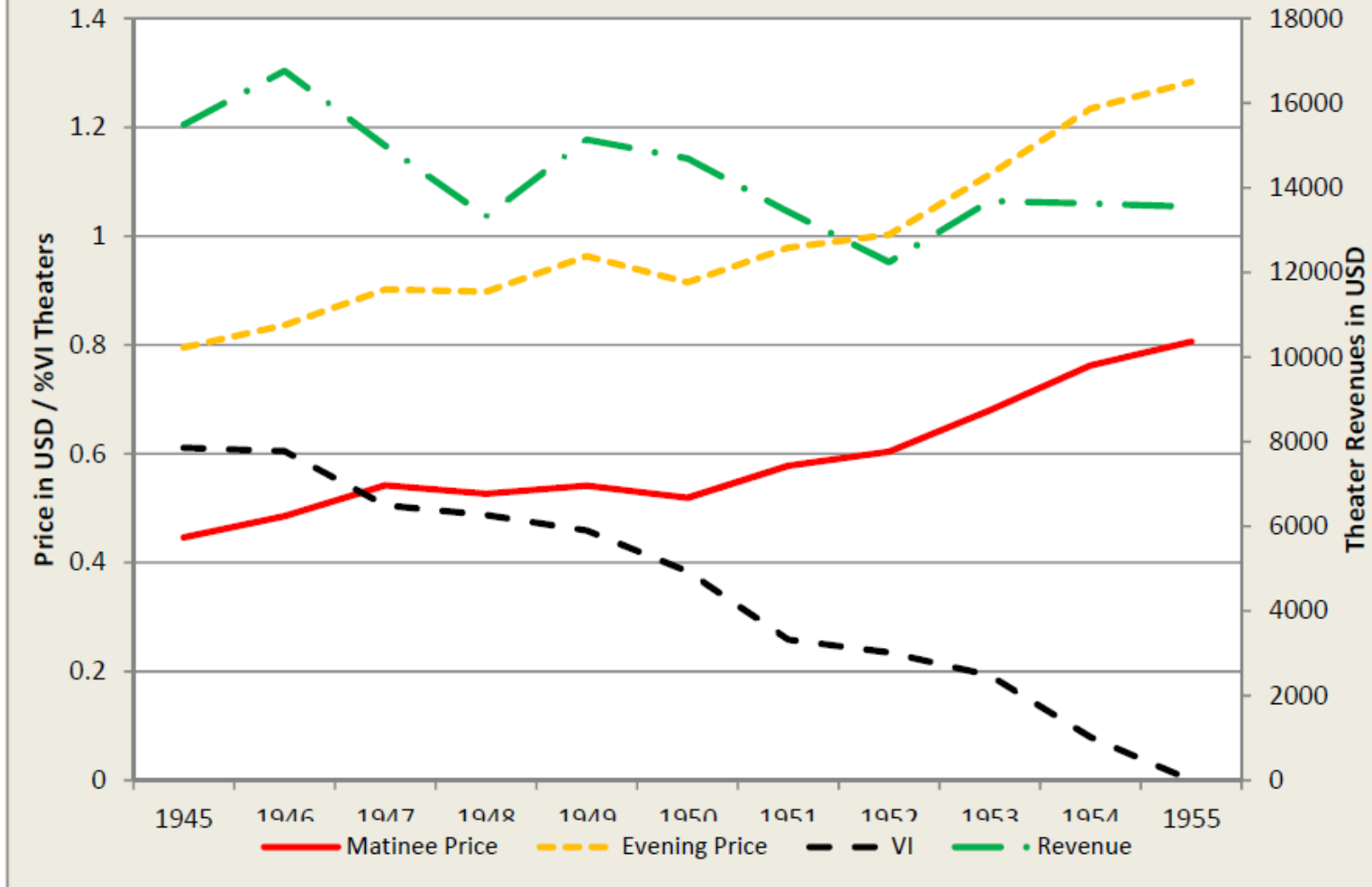
Variable	Mean	Std. Dev.	(1)	(2)	(3)	Difference		
			VI Ever=0	VI Ever=1 & VI=0	VI Ever=1 & VI=1	(2)-(1)	(3)-(1)	(3)-(2)
<u>Theater/Year Level Data</u>								
Evening Price	1.00	0.40	1.019	1.122	0.909	0.103***	-0.11***	-0.213***
			0.417	0.478	0.284	0.022	0.016	0.020
Matinee Price	0.60	0.23	0.629	0.657	0.530	0.028**	-0.099	-0.127***
			0.275	0.207	0.155	0.013	0.010	0.009
VI?	0.32	0.46	0	0	1	0	1	1
			-	-	-	-	-	-
VI Ever?	0.56	0.50	0	1	1	1	1	0
			-	-	-	-	-	-
Box Office Revenues	12961.67	12465.38	9547.798	14784.230	16277.320	5236.427***	6729.522***	1493.09*
			7328.036	14680.950	14904.430	521.3	495.79	784.345

Table 1B. Summary Statistics at the Theater/Year and Theater/Week Level

Variable	Mean	Std. Dev.	(1)	(2)	(3)	Difference		
			VI Ever=0	VI Ever=1 & VI=0	VI Ever=1 & VI=1	(2)-(1)	(3)-(1)	(3)-(2)
Tickets Sold	13114.16	9132.09	10108.320	12741.090	17325.760	2632.772***	7217.44***	4584.67***
			7512.389	6873.640	10629.810	367.825	396.59	493.823
TV	2.84	2.83	2.864	4.737	1.569	1.873***	-1.295***	-3.168***
			2.847	2.717	2.093	0.141	0.112	0.125
Pctg Integ Theater in City	12.04	13.85	10.024	8.080	17.300	-1.945***	7.276***	9.220***
			13.055	13.169	13.765	0.659	0.59	0.716
HHI	1075.95	1131.19	1238.320	971.748	929.683	-266.577***	-308.638***	-42.066
(by theater number)			1425.546	743.881	836.400	62.524	53.268	42.409
<b><u>Theater Characteristics</u></b>								
Seats	1590.69	1046.69	1476.24	2174.61	2276.36	698.38***	800.13***	101.75*
			986.26	1032.05	1118.76	50.42	46.12	57.45

Note: The first half of this table presents summary statistics of all variables used in this paper (2685 theater/year observations for 393 theaters). The second part of the table provides summary statistics by whether the theater was never integrated (VI EVER=0), formerly integrated (VI EVER=1 & VI=0) and currently integrated (VI EVER=1 & VI=1). The last three columns shows differences across all three groups of theaters in columns indicated as (1), (2) and (3). In total, the sample contains 2685 observations of which 1192 observations are from independent theater (never integrated), 590 are of theaters formerly integrated, and 903 are of currently integrated theaters. Numbers in smaller font are standard deviation for the averages in columns (1), (2) and (3). Number is smaller font below differences are standard errors.

Figure 3. Pricing and VI 1945-1955





# Further questions

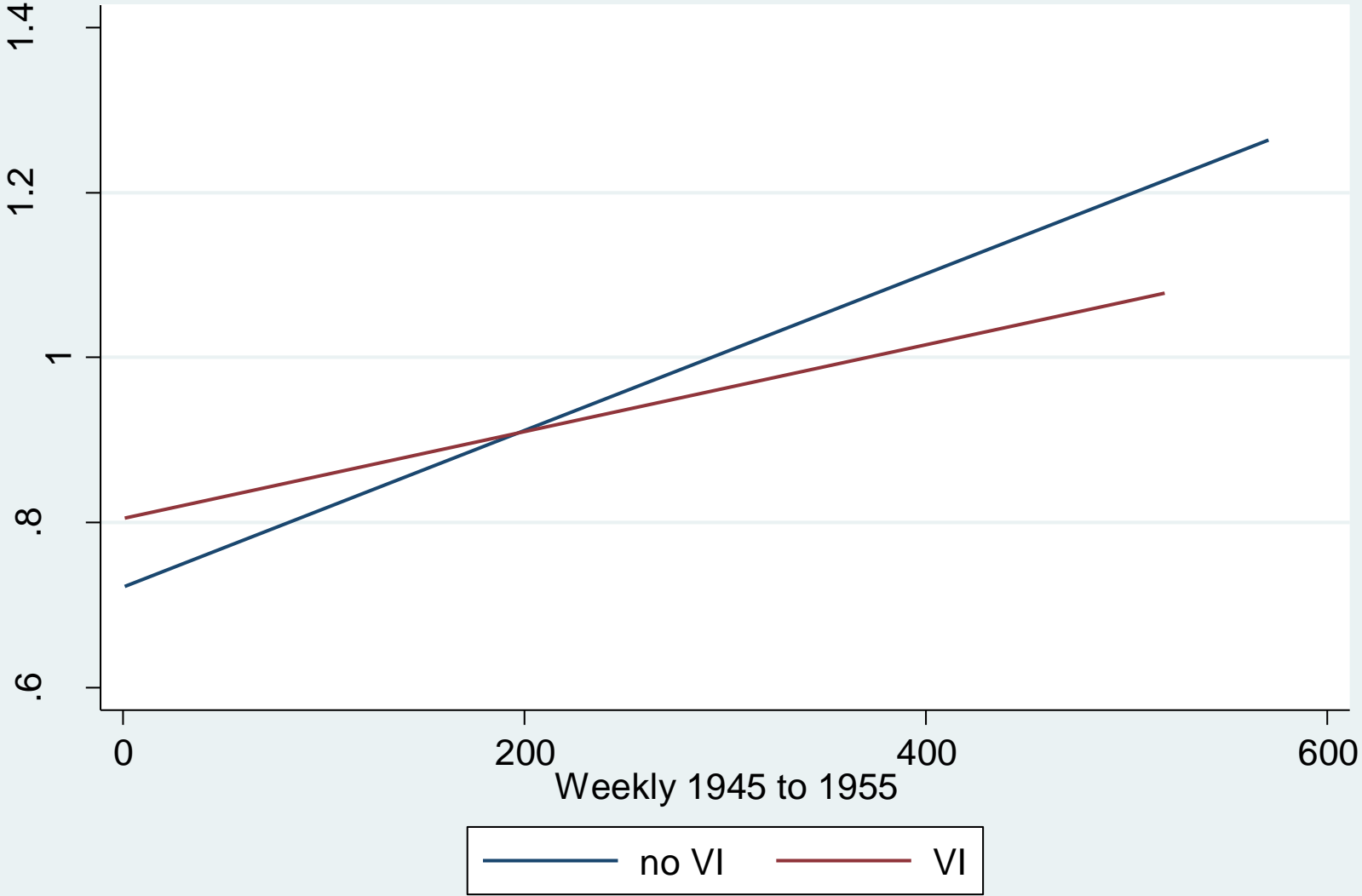
- Are there differences in what movies are being shown, cond. on VI?
- How do prices develop, conditional on VI?

**Table 2. Summary Statistics at the Theater/Movie Level**

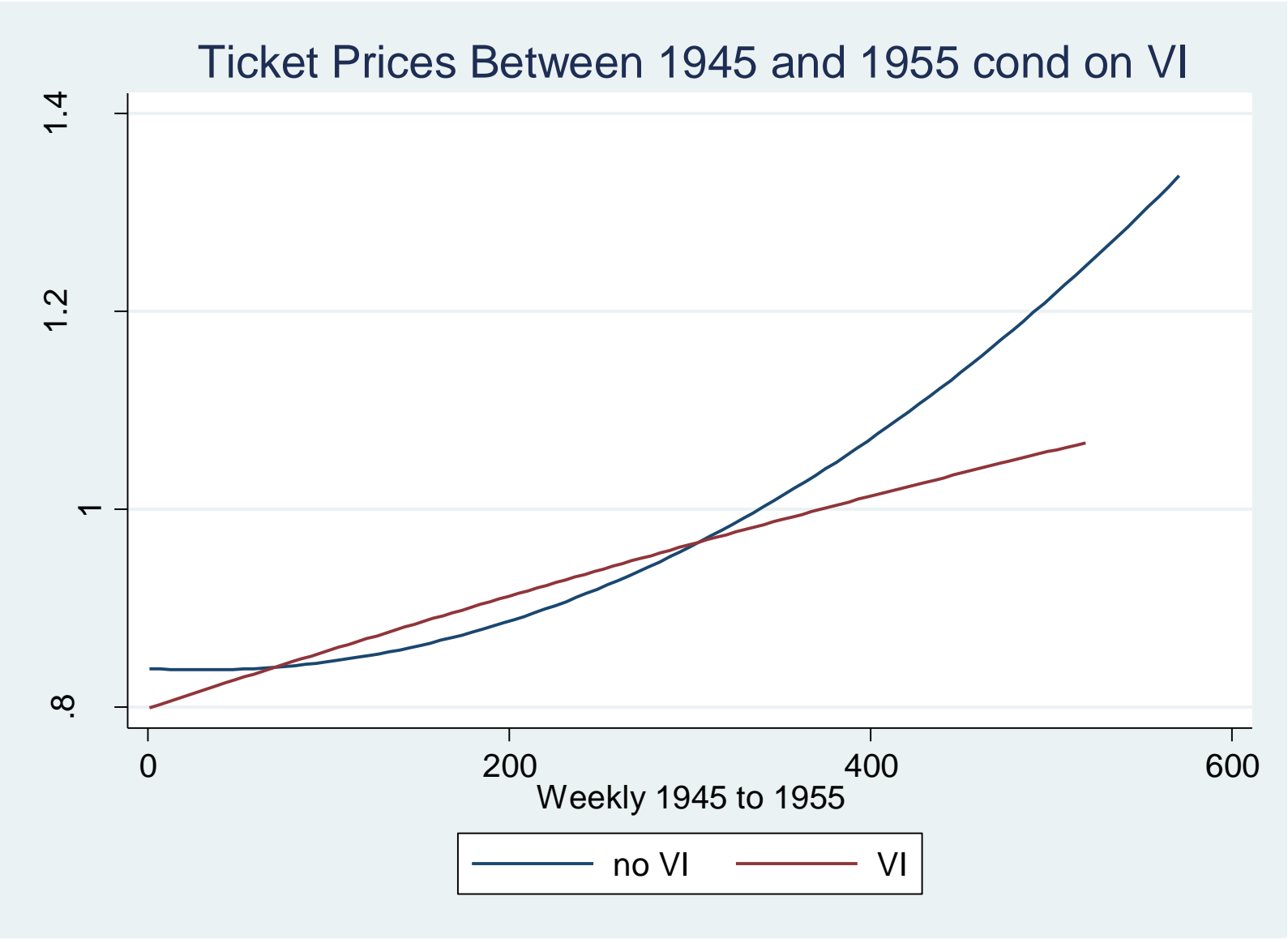
Variable	Mean	Std. Dev.	VI Ever?		Difference (==0) - (==1)	VI?/VI Ever?==1		Difference (==0) - (==1)
			==0	==1		==0	==1	
VI Ever?	0.616	0.486						
VI?	0.347	0.476						
VI Ever, Studio Movie?	0.187	0.390						
VI, Studio Movie?	0.155	0.362						
Movie Big Five?	0.525	0.499	0.459 0.002	0.566 0.002	-0.108*** 0.003	0.528 0.003	0.596 0.002	-0.069*** 0.003
Movie Little Three?	0.306	0.461	0.341 0.002	0.284 0.002	0.056*** 0.002	0.296 0.002	0.275 0.002	0.021*** 0.003

Note: This table provides summary statistics of vertical-integration-related variables at the theater/movie level (143200 observations). The second part of the table shows differences in propensity to show movies from the big five studios (MGM, WB, Paramount, RKO, and Fox) and the three smaller studios (Universal, Columbia, and United Artists) conditional on being a theater that was ever integrated, and conditional on being integrated if the theater had ever been integrated. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

# Ticket Prices Between 1945 and 1955 cond on VI



Linear fit



Quadratic fit

# Univariate regression

$$highprice_{it} = \beta_0 + \beta_1 vi_{it} + \varepsilon_{it}$$

variable	nobs	mean	sd	min	max
highprice	2685	1.004	0.401	0.284	3.600
vi	2685	0.323	0.464	0.000	1.000

# Panel data

Freq.	Percent	cum%	pattern
148	37.66	37.66	111111111111
13	3.31	40.97	.....1
10	2.54	43.51	..1.....
9	2.29	45.8	.....1....
9	2.29	48.09	.....11111
9	2.29	50.38	11111.....
8	2.04	52.42	.....1111
8	2.04	54.45	.1.....
7	1.78	56.23	.....11
172	43.77	100	(other patterns)
393	100		XXXXXXXXXXXX

# Univariate regression

Variable	(1)	(2)	
vi	-0.147	-0.170	coefficient
	0.025	0.017	standard error
	0.000	0.000	p-value
const	1.052	1.059	
	0.021	0.014	
	0.000	0.000	
city FE	NO	YES	
N	2685	2685	Number of obs.
r2	0.029	0.400	

# Univariate regression

Variable	(1)	(2)
vi	-0.147***	-0.170***
const	1.052***	1.059***
city FE	NO	YES
N	2685	2685
r2	0.029	0.400

legend: \* p<.1; \*\* p<.05; \*\*\* p<.01