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ANTICIPATING THE STOCK MARKET CRASH OF 1929:
THE VIEW FROM THE FLOOR OF THE STOCK EXCHANGE

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Anticipating the Stock Market Crash of 1929: The View from the Floor of the Stock Exchange
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ABSTRACT

In the months prior to the stock market crash of 1929, the price of a seat on the New York Stock Exchange was abnormally low. Rising stock prices and volume should have driven up seat prices during the boom of 1929; instead there were negative cumulative abnormal returns to seats of approximately 20 percent in the months just before the crash. At the same time, trading nearly ceased in the thin markets for seats on the regional exchanges. Brokers appear thus to have anticipated the October 1929 crash, although investors in the market apparently did not recognize this information.

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On October 3, 1929, John D. Rockefeller sold his right to a quarter of a new seat on the New York Stock Exchange for \$125,000. Only a few days before on September 26, 1929, J. P. Morgan and Junius S. Morgan, Jr. had sold their rights for the same price, which represented the highest real price that would ever be paid for a seat on the exchange.¹ Like other members of the exchange they had received these rights on February 18, 1929 in a plan to expand the capacity of the exchange and meet the flood of orders that flowed from the stock market boom (Davis, Neal and White, 2005). While not active brokers, they, like at least another hundred wealthy men, reserved the option to appear on the floor of the exchange to intervene directly in the market if a merger, proxy fight or perhaps a panic loomed. These titans of industry and finance could have sold their rights at any time beforehand, but they held on to them. Their sales seem to have been extraordinarily well-timed. The Dow Jones had reached its peak on September 3, 1929 and then began a slow decline. Rockefeller and the Morgans sold as the boom deflated and just ahead of the collapses on Black Thursday October 24 and Black Tuesday October 29, 1929 when the market lost 23 percent of its value.

While neither Rockefeller nor the Morgans left any hint of whether their timing was prescient or lucky, their sales raise the question whether the brokers knew something about the state of the market in September and early October 1929 that the investing public did not. Brokers would certainly be classified among the more informed participants in the market. A large literature in finance claims that brokers have valuable

¹ The price of a seat for the purchasers Charles J. Collins and Andrew J. Fox, Jr. who put together four quarter seats was thus \$500,000. Just before the distribution of the quarter rights in the week ending on January 24, 1929, the price of a seat first reached its peak \$625,000; ex-rights, the price would have been \$500,000. The 2005 price of a 1929 \$500,000 seat adjusted by the CPI or the GDP deflator would be \$5.7 million or \$4.7 million respectively, while the highest nominal price attained was \$4 million in December 2005.

private information because they observe order flows, permitting them to profit strategically from timely trading or market making. Did the brokers suspect that there was a bubble in the market that was in danger of collapse? A quick sell-off of rights to a seat and a precipitous fall in the price of a seat on the exchange would be evidence that these insiders knew that trouble loomed ahead, while an “excessively” high seat price in the presence of declining share prices might be an indication that brokers were exhibiting the same mistaken exuberance as their customers.

Examining seat prices and the abnormal returns to seats on the NYSE, the New York Curb Exchange and several regional exchanges, this paper considers the possibility that brokers anticipated the crash. It appears that they became quite cautious by July 1929 and were paying far less for a seat than might otherwise seem justified by the rising volume of trading, higher securities prices and other positive indicators. In the months preceding the crash, qualitative evidence suggests that buyers were increasingly very young and relatively inexperienced. Brokers on the Curb Exchange in New York exhibited a similar disbelief as the prices paid for seats on their exchange fell far short of forecast prices. Regional stock exchanges were also swept up in the 1928-1929 boom; but unfortunately, the seats on the regional exchange were too illiquid to adequately measure the determinants of their prices. Still, the prices of regional seats flattened after mid-1929 and sales were scant, suggestive of a worry that the buoyant market would collapse.

The sobriety of the 1929 brokers stands in contrast to Keim and Madhavan’s (2000) finding that brokers were excessively optimistic in the months before the 1987. For the crash of 2000, inference is more difficult because the number of seats traded has

diminished.² Nevertheless, it appears that brokers during the most recent boom were more like their brethren in 1929 and skeptical of the markets' advance. NYSE seat prices reached a high in August 1999 and then fell 13% before the peak of the Dow Jones Index in December 1999, 25% before the peak of the Nasdaq in March 2000, and 37% before the August 2000 high in S&P500.

However, even though seats on the NYSE in 1929 appear to have signaled brokers' uncertainty about the future course of the market, this phenomenon did not provide the public with enough information to revise its judgment about share prices. Consistent with other studies (Schwert, 1977; Keim and Madhavan, 2000) seat prices do not contain any information that would have allowed investors to forecast the behavior of the stock market. Like other market anomalies, the lack of robust growth in seat prices on all exchanges, as the stock market boom continued after mid-1929, should have given observant investors some second thoughts about pouring more money into the market. Yet, they may have just assumed that relatively low seat prices were caused by the general increase in the number of seats and exchanges. Efforts by existing market institutions to restructure themselves to respond to the huge order flow probably rendered otherwise clear signals opaque. However, the econometric evidence in this paper indicates that, given the prices brokers paid, these men on the floor of these exchanges were not sanguine about the markets continued upwards climb.

² Many seats are owned by large publicly traded companies and there is less turnover than when seats were owned by individual brokers.

Bubbles and the Price of a Seat on the Exchange

The debate over whether there are bubbles in the stock market has spawned a large literature. It has proven extraordinarily difficult to provide a tight case for or against the presence of a bubble in the market because fundamentals are difficult to identify. As Flood and Hodrick (1990) pointed out, any test for a bubble is troubled by the problem that the dynamics of asset prices with a bubble will not appear to differ from the dynamics when there is an omitted factor driving the fundamentals. Studies which purport to find a bubble can be attacked for failing to find some missing fundamental, while results where the conclusion is that there is no bubble are highly sensitive to the choice of parameters (See White, 2006).

While it is generally conceded that boom periods see an influx of new, often younger, and less informed investors, many models employ only a representative agent. Yet, we know that no matter how many optimists poured their money into the market, skeptics were also present and must also have voted with their dollars. Thus, one of the more potentially fruitful approaches is the identification of anomalies that may indicate the presence of a bubble. Avoiding the problem of mis-identifying fundamentals, De Long and Shleifer (1991) examined the prices of closed-end mutual funds, where the fundamental value of a specific fund is simply the current market value of the securities in the fund's portfolio. They found that the median seasoned fund sold for a premium of 37 percent in the first quarter of 1929, rising to 47 percent in the third quarter, before subsiding to 8 percent by December 1929. Contrary to the usual small discount generally observed for closed end mutual funds, this huge premium is astonishing. Instead of buying a fund that was above its fundamentals' price, investors could simply have been

purchased a portfolio of the underlying stocks or entrepreneurs could have created new funds with the same stocks. The only consistent explanation is that investors were excessively optimistic, suggesting the existence of a bubble. Rappoport and White (1994) found evidence in the market for brokers' loans that lenders were very skeptical of the height that the market had attained in late 1929. The extraordinary interest premia and margin demanded on these loans suggest that lenders felt they needed this protection against a potentially huge decline in the market. Casting brokers' loans as options written by the lender and bought by the borrowers, Rappoport and White extracted the volatility implied by the price of these loans as options, revealing the potential for a crash on the order of 25 to 50 percent, well in advance of October 1929.

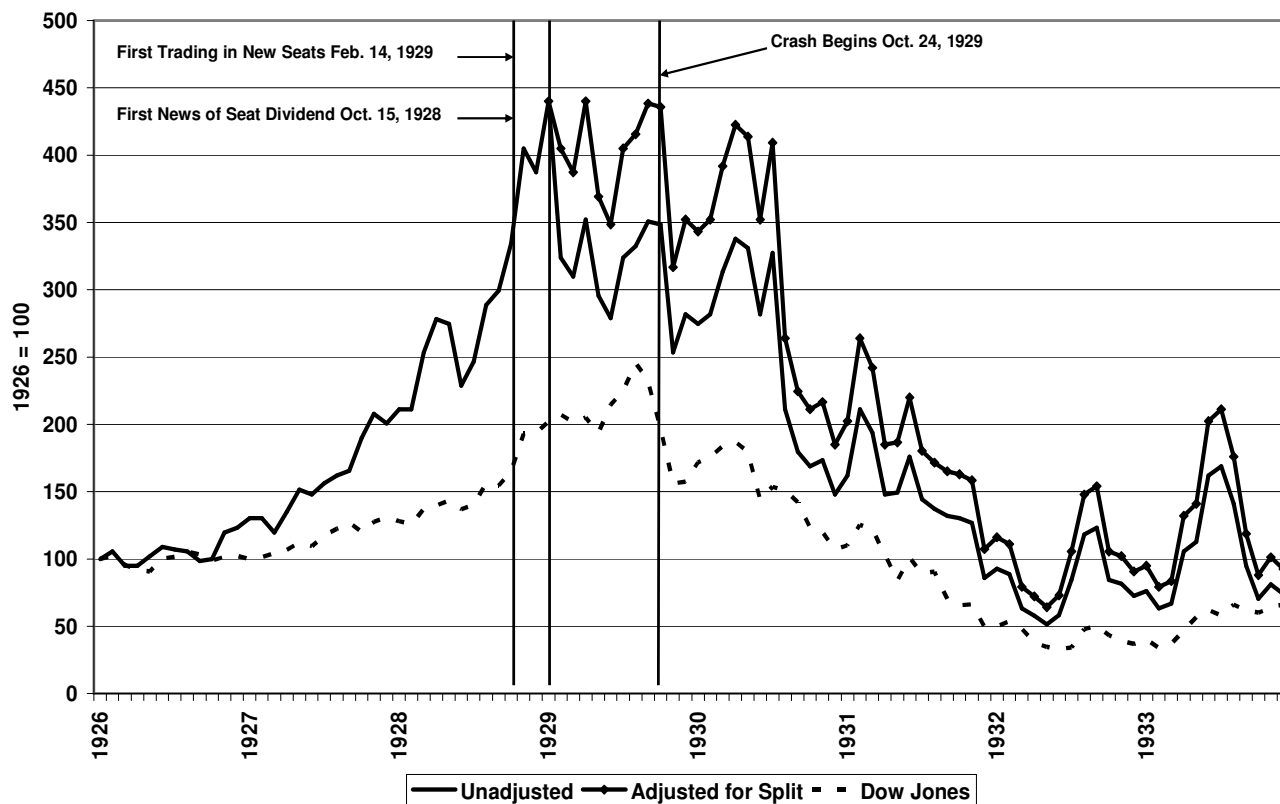
Like brokers' loans that carried high interest rate premia and margins, relatively low prices for seats on a stock exchange when the market was booming is evidence of contrarian expectations from individuals with their hand on the pulse of the market. Seats on the exchange are assets whose prices reflect stockbrokers' expected future profits from the special access to the market provided by a seat. As such, seat prices are influenced by the volume, stock prices, technology, and the rules that govern trading on the exchange. Although seats are capital assets, the number is fixed and they cannot be sold short, making it more likely that a bubble can be observed (Keim and Madhavan, 2000). A rapid run up in the price of a seat may thus reveal the sentiment of the holders regarding their trading for exuberant investors, while a depressed price may be an indicator of a bearish outlook.

What did brokers expect in 1929? Figure 1 shows monthly indices of the Dow Jones Industrial Average and the price of a seat on the New York Stock Exchange.³ The value of a seat on the exchange roughly tracked the movement of stock prices through the mid-1920s. At that point, volume on the exchange began to rise rapidly and seat prices began their rapid ascent. On peak days, the exchange was flooded with orders and bid-ask spreads began to widen. The leadership at the exchange feared that investors would move to other exchanges and offered a modest proposal in 1925 to expand the 1,100 seat exchange by 25 new seats. This plan was rejected by the membership; without any action, the problems became chronic by 1928. On October 15, 1928, the president of the exchange put forward a new proposal to expand the exchange by giving each member a quarter-seat dividend that could be sold and bundled to create 275 new seats, thereby expanding the membership by 25 percent. Davis, Neal and White (2005) have shown that this bold plan eased the capacity constraint on peak load days, minimizing the widening of the bid-ask spread. This fact was appreciated by the membership who saw that the competitiveness of the exchange was thereby improved. In anticipation of sales of these seats, seat prices rose and yielded a cumulative abnormal return to seat holders of approximately 20 percent.

³ There is higher frequency data. The NYSE Committee on Admissions (n.d.) recorded all transfers of membership from 1879 to 1971 for each week ending Thursday, giving the price but not the actual day of the transaction.

Figure 1

Price of a Seat on the NYSE 1919-1933



The publicly reported prices for NYSE seats did not adjust for the stock split and they were reported ex-right. Figure 1 corrects for this added value, showing the original and the adjusted series. Although adjusted prices did not sag as much as ex-right seat prices they do trend downwards from the beginning of seat sales until the end of June 1929. This movement is puzzling. Perhaps brokers did not correctly anticipate the effects of increased competition from a 25 percent increase in the number of brokers or perhaps there was now more competition from the expansion of other exchanges in the United States. The stock market boom was still on and volume was high although the Dow-Jones' rapid rise had moderated, as seen in Figure 1. But beginning in June 1929

and continuing until the beginning of October, the price of a seat recovered all its lost value. Maybe the pessimism of the first half of the year turned into buoyant optimism? A simple model of the pricing of seats provides some insight into this question.

Were NYSE Brokers' Optimistic or Pessimistic?

Seats on the stock exchange are capital assets whose price reflects the brokers' expected future profits from the special access to trading on the floor of the exchange offered to them by a seat. The value of seats on an exchange is determined by the volume of activity on the exchange and the degree of competition among traders on the exchange and between the exchange and the rest of the market. The behavior of returns to a seat on the NYSE and the expectations of brokers before the 1929 crash can be studied by applying a basic capital asset pricing model and examining the cumulative abnormal returns (Schwert 1977; Keim and Madhavan, 2000). Information from trading activity is measured by the current and lagged volume, both over the last thirty days and the change in the daily volume to capture both elements of trend and transitory factors. Keim and Madhavan included additional factors, relative to size and value/growth from Fama and French (1993), to identify the non-diversifiable risk of an asset.⁴ For this period, there are proxies for the former but not the latter factor. I estimated the following regression:

$$(1) \quad R_t - r_{f,t} = \alpha + \sum_{i=0}^k \beta_i (r_{m,t-i} - r_{f,t-i}) + \sum_{i=0}^k \delta_i \text{Vol}_{t-i} + \sum_{i=0}^k \theta_i \text{SizePrem}_{t-i} + \varepsilon_t$$

⁴ They were a size premium, measured as the difference between a small stock return and a large stock return, and a value growth factor, measured, as the difference in a portfolio of high to low book-to-market returns. According to Fama and French (1993) firms that have high book-to-market ratios tend to have lower and persistently lower earnings. They also find that size is related to profitability, as small firms tend to have lower earnings on assets than big firms.

where R_t is the return on a seat on the New York Stock exchange over time t , $r_{f,t}$ is the risk free rate, measured by the 3 to 6-month rate on U.S. Treasury notes and certificates (Board of Governors of the Federal Reserve System, Banking and Monetary Statistics, 1943, p. 460) or the 4 to 6-month commercial paper rate (Banking and Monetary Statistics, 1943, p.450-451). The market return, r_m , is the return on the Dow Jones Industrials. The figures for daily and monthly volume are for the NYSE, and the size premium is the difference in the returns between the Dow Jones index, an unweighted index of 20 and later 30 of the very largest firms, and the Federal Reserve Board's Index (Banking and Monetary Statistics, 1943, pp. 480-481), a weighted stock market index that includes several hundred stocks. It is conjectured that the greater the difference, the greater the return on exchange seats as the business of the exchange focused on larger, more prominent stocks.

Table 1**Monthly Returns to a Seat on the New York Stock Exchange**

	(1) 1920-1933 commercial paper	(2) 1920-1933 U.S. 4/6 Mo Bills	(3) 1920-1927 commercial paper	(4) 1920-1927 U.S. 4/6 Mo Bills	(5) 1928-1933 commercial paper	(6) 1928-1933 U.S. 4/6 Mo Bills
Intercept	-0.002	-0.002	0.006	0.004	-0.012	-0.010
	0.008	0.008	0.007	0.007	0.016	0.015
$r_{m,t} - r_{f,t}$	0.973*	0.970*	0.639*	0.717*	0.964*	0.971*
	0.128	0.128	0.203	0.261	0.178	0.179
$r_{m,t-1} - r_{f,t-1}$	-0.312*	-0.336*	0.108	0.167	-0.486*	-0.487*
	0.130	0.129	0.254	0.256	0.181	0.181
Monthly Vol _t	0.051*	0.055*	0.008	0.008	0.085	0.088+
	0.029	0.029	0.033	0.033	0.048	0.048
Monthly Vol _{t-1}	0.063*	0.0677*	0.022	0.025	0.093	0.097*
	0.027	0.027	0.031	0.031	0.044	0.043
Daily Vol _t	0.038*	0.036*	0.003	0.01	0.062	0.056*
	0.016	0.016	0.021	0.021	0.024	0.023
Daily Vol _{t-1}	-0.015	-0.015	0.009	-0.001	-0.026	-0.028
	0.016	0.016	0.021	0.021	0.026	0.025
SizePrem _t	0.339+	0.364+	0.693	0.626	0.234	0.226
	0.205	0.204	0.432	0.429	0.274	0.274
SizePrem _{t-1}	0.104	0.090	0.325	0.385	0.083	0.064
	0.174	0.173	0.367	0.365	0.235	0.234
No. Obs.	166	166	96	96	70	70
Adj. R	0.445	0.447	0.052	0.066	0.628	0.617

The standard errors are reported below the coefficient and * and + indicate significance at the 5 and 10 percent levels.

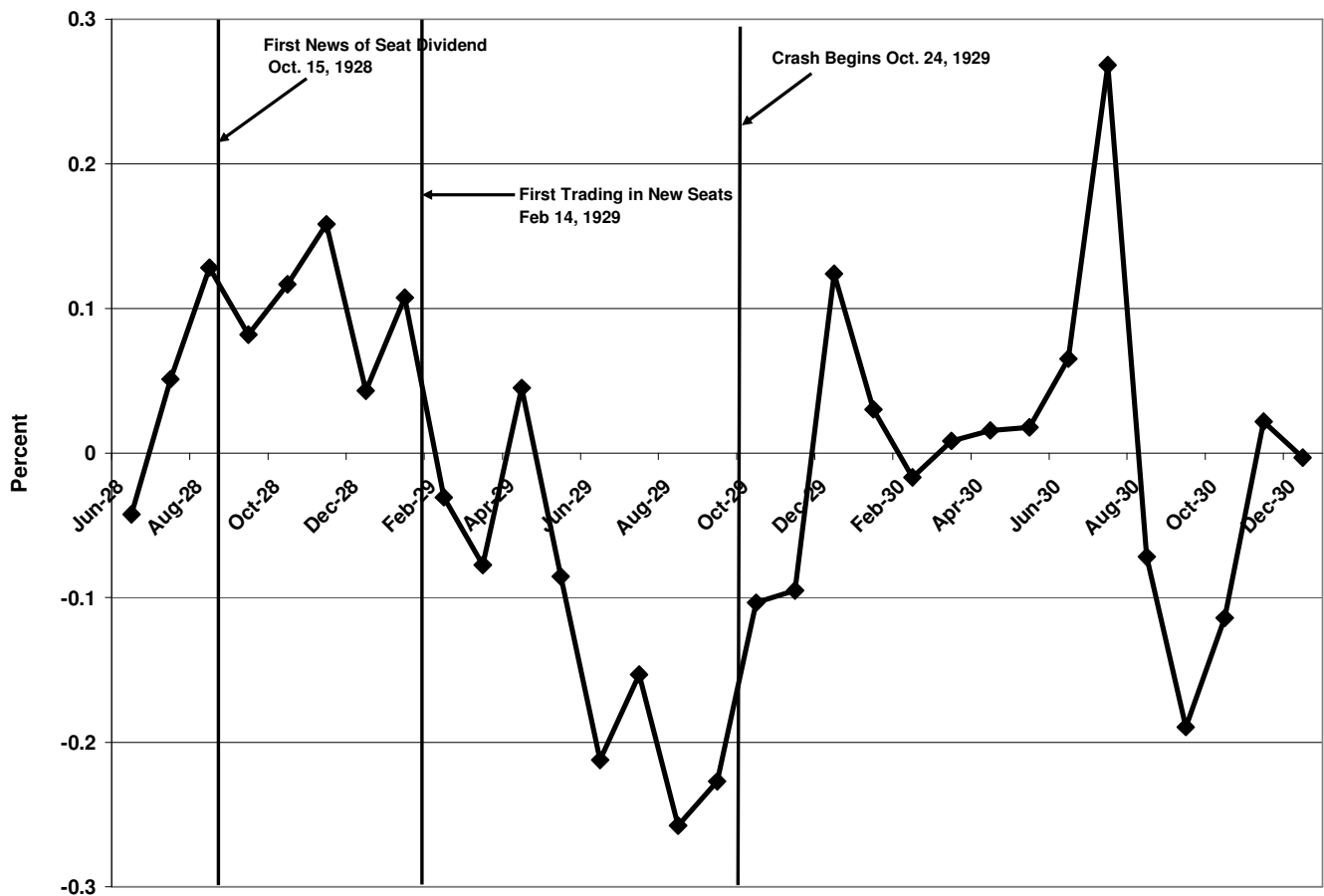
Table 1 reports the monthly results for 1920-1933 and two sub-periods.⁵ Although only one lag is used, the results are quite robust to various lag structures and alternate periods for the purpose of estimating seat prices or abnormal returns. Splitting the sample at the end of 1927 before the boom reveals that seat prices in this period responded to changes in market information as embodied in the Dow Jones quickly but

⁵ Regressions with weekly seat prices, but more limited independent variables, yielded similar results.

not completely, given that β_1 is less than one. After the crash seat returns responded much more quickly. Yet, even in the pre-crash period seat returns are much more sensitive than Keim and Madhavan found for the period 1973 to 1994 and Schwert found for 1926-1972. Recent changes in volume appeared to have information for brokers as seat prices responded to contemporary but not lagged changes in volume. The size factor often has a significant effect of seat returns.

Figure 2

**Cumulative Abnormal Monthly Returns to NYSE Seats
1928-1929**



The cumulative abnormal returns to NYSE seats from the monthly regression in Column 3 of Table 1 are shown in Figure 2, which are measured as the cumulative residuals from the regression.⁶ This figure reveals the rise in the returns for late 1928 and early 1929. In an earlier paper, Davis, Neal and White (2005) argued that the rise in the value of the NYSE that was a consequence of the announcement that the NYSE would increase its capacity by 25 percent. This expansion would help the exchange cope with its declining share of volume on the national market and its capacity constraints that drove up bid-ask spreads and created delays on peak volume days. This optimism appears to have been justified because after the 275 seat increase the bid-ask spread moved much less when volume surged and the exchange regained some market share.

Although observed prices of NYSE seats moved upward in the summer of 1929, Figure 2 reveals that after February 1929, brokers slowly became less optimistic. For the monthly data, the cumulative excess returns turned negative and by the summer of 1929 they totaled over 20 percent, implying that actual prices were far below what would have been expected based on the surge in stock prices and volume. There is no recovery until after the crash in October.

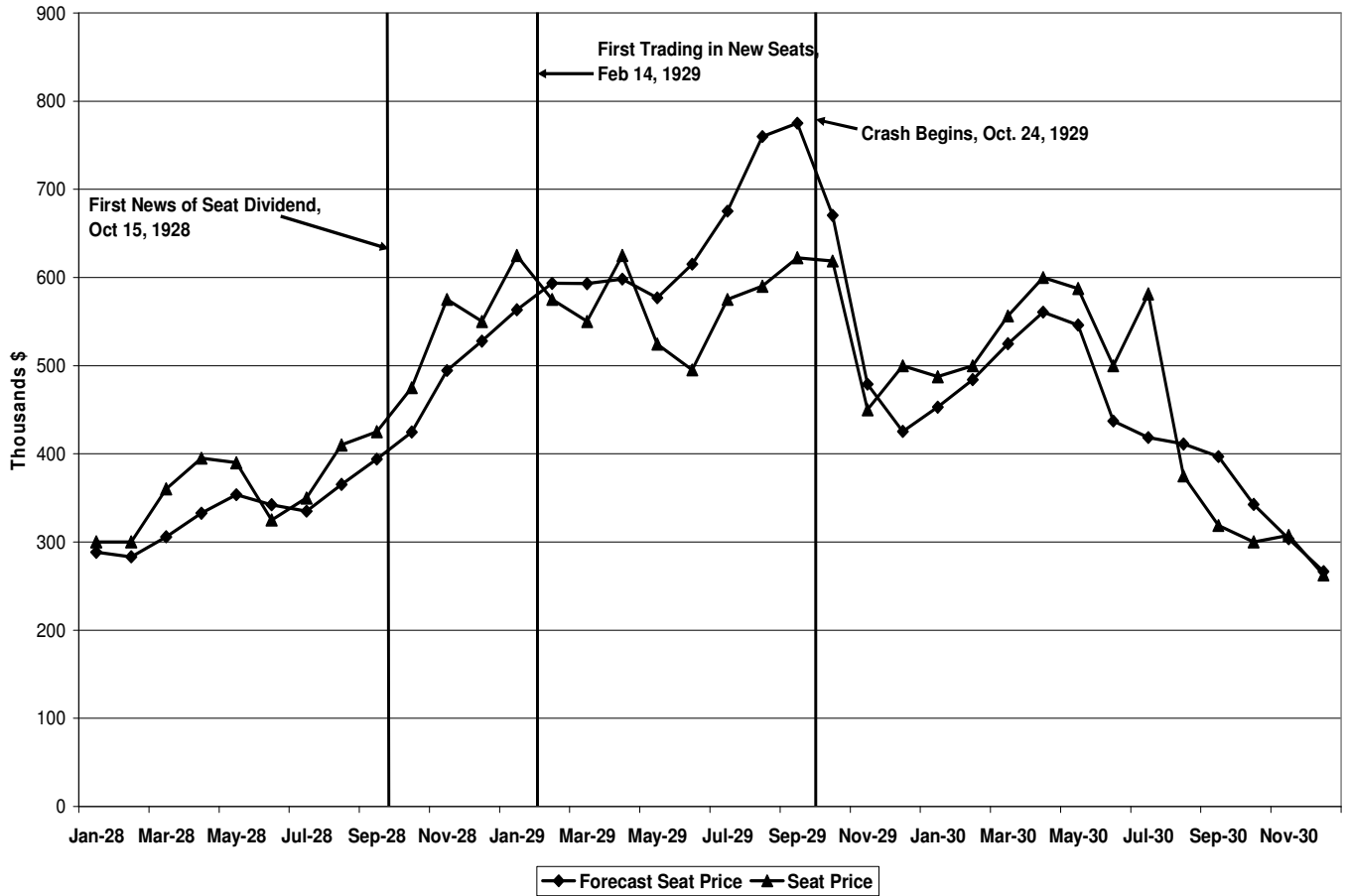
This relative pessimism stands in contrast to Keim and Madhavan's (2000) finding for the period before the Crash of 1987, when they found there were large positive abnormal returns to seats in the 12 months before the crash followed by large negative abnormal returns. They argue that these findings are consistent with the behavioral finance interpretation that seats, which are in limited supply and cannot be sold short, exhibit occasional price bubbles. To take a closer look at 1929, Figure 3 calculates the forecast price of a seat with the actual price, revealing this widening dollar

⁶ Weekly cumulative abnormal monthly returns show similar results.

gap. By July 1929, the high share prices and ever higher volume implied that brokers should have been willing to pay \$675,000 for a seat, when the split-adjusted price was only \$575,000.

Figure 3

Actual and Forecast Monthly NYSE Seat Prices



There are two possible explanations the apparent pessimism in Figures 3. First, brokers might have erred in believing that the expansion of the exchange would increase its aggregate value. The increase in capacity may not have increased business sufficiently to overcome downward pressure on the bid-ask spread. But, based on the

results of Davis, Neal and White (2005), the added increase in volume following the expansion appears to have outweighed the decline in bid-ask spreads. At the mean volume prior to the expansion, the mean percentage bid-ask spread was 0.777 percent; afterwards it was 0.759 percent. Trading was consistently higher month-by-month in 1929 compared to 1928. In July 1928, the market value of shares traded on the NYSE was \$52,903 million and in July 1929, it was \$77,264 million (NYSE, Yearbook 1928-1929, p. 123). In a naïve calculation, the implied profits would have been \$411 million for 1928 and \$586 million for 1929, a greater than 25 percent increase. Thus, higher earnings should have propped up seat prices. The alternative explanation, if their hopes about the increased efficiency of the exchange were not disappointed, is that brokers may have thought that the market was excessively exuberant. This second explanation seems to be more credible as their negative feelings seemed to dissipate just after the crash. It may be hard to read much into later events, but brokers, like other businessmen, also seem to have become more hopeful of a recovery by late 1930.⁷

Could any investor on the street watching the prices of seats on the exchange have read this information, or was brokers' pessimism in the seat market unheeded Cassandra-like signals? It is well known that stock returns have been found to be predicted by a variety of observable market values, including the dividend yield, the Treasury bill yield, the Term Structure and the book-to-market ratio (See: Campbell and Shiller (1988), Fama and French (1988), and Keim and Stambaugh (1986)). Using monthly data, Keim and Madhavan (2000) found that the information embedded in the innovations in the number of seats traded on the NYSE, but not the seat prices themselves, had predictive power for

⁷ See Klug, Landon-Lane and White (2005) for a survey of this literature on expectations of recovery.

the S&P500 returns for 1973-1994. Their approach is employed using the regression model in equation 2:

$$(2) \quad r_{m,t} - r_{f,t} = \alpha + \beta (r_{m,t-1} - r_{f,t-1}) + \sum_{i=1}^3 \theta_i \text{Seat}_{t-i} + \delta_1 \text{SizePrem}_{t-1} + \delta_2 \text{TreasYield}_{t-1} + \delta_3 \text{TermPrem}_{t-1} + \delta_4 \text{CallPrem}_{t-1} + \delta_5 \text{DivYield}_{t-1} + \varepsilon_t$$

Information from the market for seats on the NYSE is measure both as the lagged innovation in the price of a seat and, following Keim and Madhavan, as the residuals from a regression of the number of trades on trades lagged, the log of the last seat price and the absolute seat return. The difference in returns between the Dow-Jones stocks and all stocks traded on the NYSE is used again. In addition the yield on 3 to 6 month U.S. Treasury securities and the term premium, the difference between the long-term yield and the short-term yield are included (NBER Series 13029 and 13033, www.nber.org). Rappoport and White (1993, 1994) find that the premium on brokers' loans compared to bankers' acceptances or commercial paper represents the money market's heightened awareness of the risk in the market during the boom; hence, the difference between the call loan rate and the rate on bankers' acceptances is included in the regression. Lastly, the dividend yield for Dow-Jones stocks is added (Rappoport and White, 1994).

Table 2 reports the results for the regressions for several versions of equation 2. Unlike Keim and Madhavan's findings for the last quarter of the twentieth century, neither changes in seat prices or news of seat trades appear to affect the returns on stocks. These results were robust to increases in the number of lags and curtailing the data at the end of 1927 to avoid the problem of the increase in the number of seats. The only significant variables are the yield on short-term U.S. securities and the call loan premium. The yield on government securities would have signaled tighter monetary policy in 1928

and elevated rate of call loans that stood at an historic 300 basis points for a long period was a signal of the downside risk in the market, but nothing could apparently be gleaned by the public from the trading activity in seats.

Table 2
Predictability of Stock Market Returns
Monthly Data 1920.01 – 1928.06

	(1)	(2)	(3)	(4)
Intercept	0.063*	.059*	0.047	0.068
	0.023	0.033	0.041	0.069
$r_{m, t-1} - r_{f, t-1}$	-0.176	-0.207	-0.129	-0.151
	0.160	0.167	0.156	0.162
Seat Return $t-1$	0.071	0.077		
	0.064	0.067		
Seat Trade News $t-1$			0.003	0.000
			0.004	0.006
U.S. Bond Yield $t-1$	-0.008	-0.021*	-0.008	-0.024*
	0.008	0.012	0.007	0.013
Term Premium t		-0.004		-0.009
		0.016		0.019
Call Premium $t-1$	-0.027*		-0.029*	
	0.014		0.013	
Dividend Yield $t-1$	-0.092	0.535	-0.086	0.606
	0.580	0.677	0.594	0.690
SizePrem $t-1$	-0.263	-0.320	-0.222	-0.275
	0.222	0.226	0.221	0.224
No. Obs.	98	98	98	98
Adj. R	0.112	0.074	0.104	0.061

The standard errors are reported below the coefficient and * and + indicate significance at the 5 and 10 percent levels.

These results confirm the findings for the post-World War II period of Schwert (1977) and Keim and Madhavan (2000) that seat returns did not predict market returns, although the latter found that seat activity does have information. Specifically, they

found that lagged innovations of trading volumes in the seat market predict the monthly excess returns of the S&P500 after controlling for the dividend yield and book-to-market ratio. Whether the information contained in the number of seats traded in the 1920s is different, is not clear, as it may have been clouded by the big increase in the number of seats.

Who Bought the NYSE Seats?

Even with 1,110 members, the brokers on the exchange constituted a large old boys' club. Although anyone could buy a seat, a prospective member had to be presented by one of the existing members. The Committee on Admissions took a close and hard look at their character, rejecting those judged unfit by a blackballing process. Moser (2006) has presented evidence that this process was sufficiently restrictive to permit some ethnic discrimination and effectively raise the price to those affected groups, especially during World War I when Germans and German-Americans were treated with great suspicion.

The expansion of the exchange by an additional 275 seats began in February 1929, and although many seats were quickly formed from the quarter-seat rights, it was unfinished by the time of the crash and dragged on through the early 1930s. Part of this delay is attributable to members holding on to their seats, hoping for a higher price; but there also may have been a relative dearth of qualified members who would not have been blackballed. It is unlikely that the expansion of the exchange did not lower the experience and quality of the brokers and reduce discrimination, introducing brokers perhaps more inclined to "irrational exuberance." Many of the new brokers were able to

get on the exchange sooner than they had expected, being already experienced workers on the exchange or with partnerships whose members were active brokers.

Reports in the newspapers give a fairly detailed picture of some of the new members, even if they are impressionistic. The boom in the stock market was drawing in some men who appear to have had little or no experience. Just before the seat dividend in January 1929, Lee-Adam Gimbel, 32 years old, resigned as vice president of Gimbel Brothers, Inc and bought a seat for \$575,000; and though he remained a director of the department store, he became an unaffiliated floor trader. (New York Times January 5, 1929, p. 15). As a floor broker, Gimbel traded on his own account, no doubt, hoping to quickly make a fortune.⁸ Floor traders who had been in short supply (Davis, Neal, and White 2005) were the most adventurous as they had to hustle on the floor, risking their own capital, by matching incoming orders brought by other brokers, usually within the bid-ask spread set by the market maker at the post. Two cousins Laurence C. Leeds and Robert L. Leeds, both directors of the Manhattan Shirt Company, bought seats. (New York Times January 12, 1929, p. 14.) to become independent floor traders. Others like Frederic L. Yeager obtained a seat to become a floor trader for the firm of Sutro Brothers & Co, a rapidly expanding Pacific Coast brokerage house with seats on the San Francisco and Los Angeles Stock Exchanges as well as seats on the curb exchanges of those cities. Seeking to get in on the booming New York market, Sutro Brothers bought the business of Robinson & Co. in New York and transferred that firms' membership on the exchange to its New York representatives. (New York Times, January 18, 1929, p. 38).

⁸ Later, in July 1929, he was joined floor by Louis S. Gimbel Jr., also a director for Gimbel Brothers, Inc. in acquiring a seat.

The seat dividend in February 1929 allowed more young men to move onto the floor of the exchange. George F. Hawkins, a telephone clerk became one of the youngest members of the exchange at the age of 22 when he was “rewarded” with a seat by his employer, Ira Haupt & Co. (New York Times February 26, 1929, p. 42). Others came from off the exchange. The New York Times (February 22, 1929) noted that James Russell Lowell, a great-grandson of the poet bought four rights and became a member of Wrenn Brothers.

In the next several months, newspaper reports highlighted the arrival of young men on the floor of the exchange. Telephone clerks, William C. Pressman bought a seat, (New York Times, July 12, 1929, p. 35), as did George Dolan of Maxwell & Co. Similarly, John Dempsey, a telephone clerk for Hoge Underhill & Co, put together a seat in March 1929. Thomas F. Kelly had been a page on the floor of the NYSE for fourteen years when he was able to buy four “rights” acquire a seat in July 1929 and become a partner in the firm, Joseph & Co. that he had served. At the same time, Strother B. Purdy a telephone clerk, James L. Slee an advertising salesman, and Paul Pryibil, a customer’s man with F. B. Keech acquired seats. George C. Donelon who had been a specialist’s clerk for only six months and was only 22 years old bought a seat in September 1929 (New York Times, September 23, 1929, p. 50). However, there were some older men who took the risk of buying a seat, and Justin A. Morrissey a tube man on the floor of the NYSE since 1911 bought a membership in September 1929

Members of brokerages also moved onto the floor, as did Harry C. Schaack of Harris, Winthrop & Co (New York Times September 13, 1929, p. 43). Some new members of the NYSE had previously served as brokers on the New York Curb. David

H. McDermott, a member of the New York Curb firm of Peter P. McDermott & Co., obtained a seat (New York Times March 23, 1929, p. 32). Similarly, in July 1929, Harry W. Asher Jr. a member of the New York Curb Exchange put together a seat from the quarter-seat rights. Out-of-town brokerages used the seat-dividend to gain direct access to the floor. For example, William H. Bixby of George H. Walker & Co. of St. Louis. and John F. Betts a member of John F. Betts & Co. of St. Louis acquired seats. Other new brokers often came from non-brokerage firms, including Frederick T. Sutton and Harold W. Jennys, who were investment bankers. (New York Times July 26, 1929, p. 31).

Older members of the exchange may have been happy to relinquish their seats and quarter-seat rights to more optimistic outsiders. If some members believed that they observed a bubble in the market, this would have caused a downward shift in each broker's ask price. Even if potential buyers did become more exuberant, such a shift would result in more trades with brokers who had a lower reservation bid price. Moving down the schedule of bid prices one would encounter potential brokers who placed a lower value on their human capital. Consequently, we would expect to observe younger men buying seats if there was a bubble perceived by established brokers. While there is no data compiled on the age and experience of brokers, the limited journalistic evidence suggests an inflow of new and inexperienced younger men to the floor of the exchange.

The New York Curb and the Regional Exchanges

The New York Stock Exchange was by far the most active market for securities in the U.S. and had the largest number of brokers. However, the sheer growth of trading in

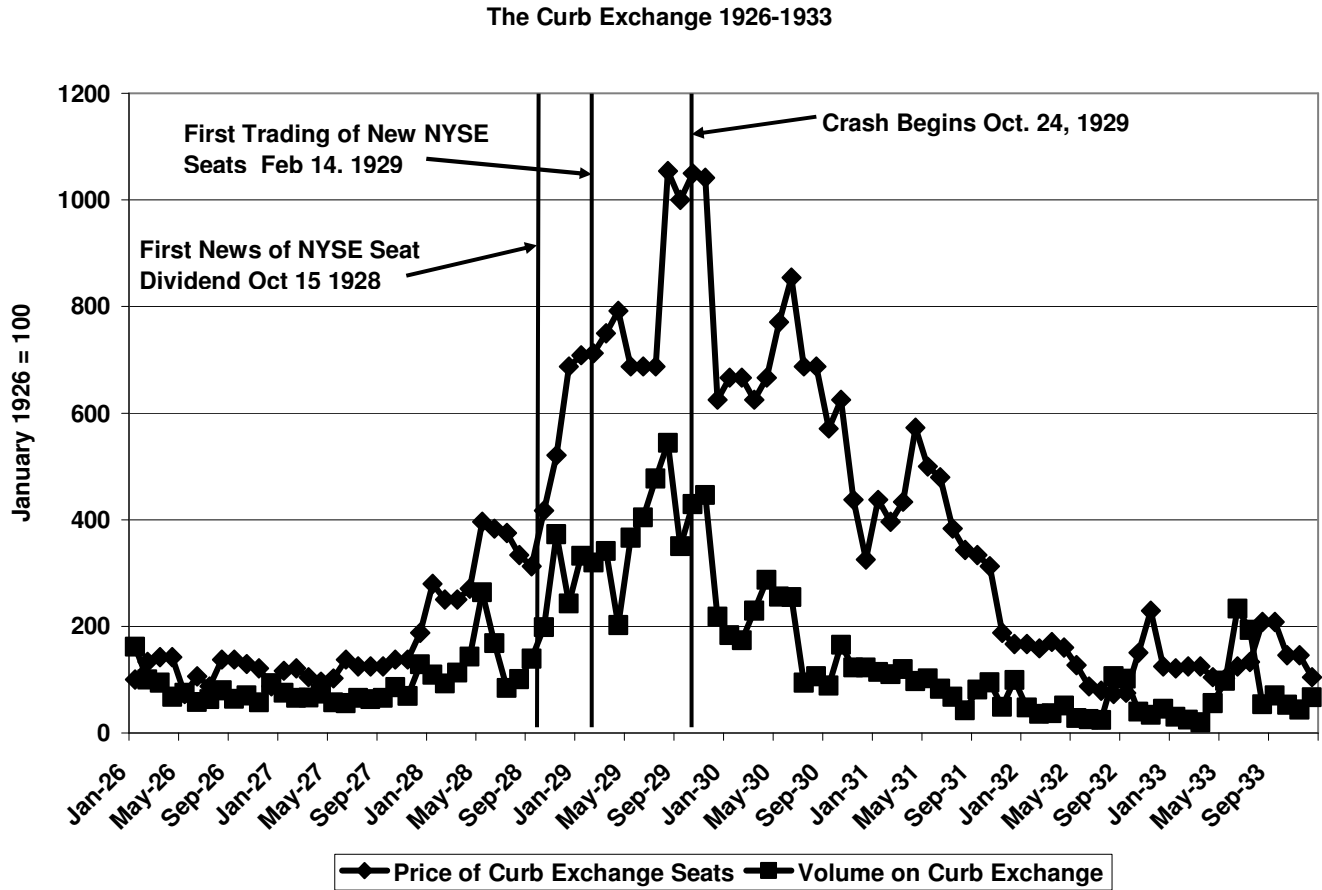
the late 1920s threatened the NYSE's dominance. It struggled to handle the soaring volume of orders and lost market share until it increased its capacity from 1,100 to 1,375 brokers in 1929 (Davis, Neal and White, 2005). The other exchanges eagerly expanded to capture orders for regional stocks and NYSE-listed securities.

The New York Curb Exchange, which later became the American Stock Exchange, was the second largest market. Its 550 brokers traded many securities that were not listed on the NYSE. The Curb brokers did not usually compete with the NYSE but cooperated and served as a market for non-NYSE listed securities, with NYSE members placing orders for unlisted stocks with Curb brokers. Thus, the Curb primarily complemented rather than competed with the NYSE. Regional exchanges, on the other hand, specialized in local stocks and competed for business with the New York exchanges in its listed securities. The Curb exchange's volume was only a fraction of the volume on the NYSE; its aggregate value (the total value of its seats) was at most 10 percent of the NYSE's aggregate value. Trading volume was even lower on regional exchanges; taken all together their total volume approximated the volume on the New York Curb. The smaller number of seats and the lower level of activity on the regional exchanges and the Curb led to much less frequent trading in seats.

The Commercial and Financial Chronicle provides data on the last traded seat prices for the Curb and regional exchanges. Because of infrequent trading, some printed regional exchange prices were very stale, as they could have been transacted months before. The Chronicle sometimes also reported the bid-ask spread on the seats (information not available for the NYSE in this period). Figure 4 displays indices of

volume and seat prices for the Curb Exchange and Figure 5 the seat prices for the six most active regional exchanges in the late 1920s with those for the Curb and the NYSE.

Figure 4



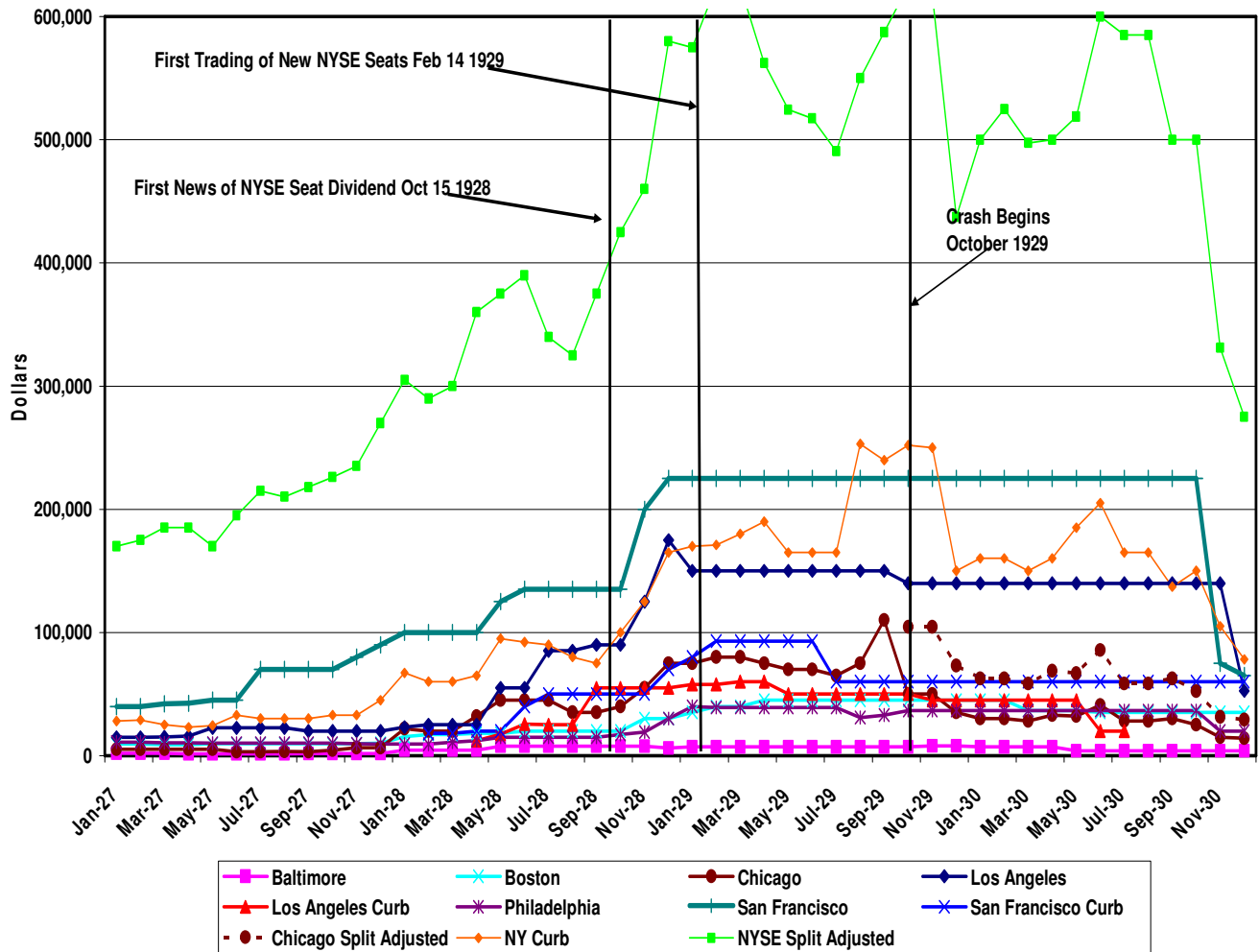
Paralleling the NYSE, the Curb market also experienced a meteoric rise in the price its seats. Through the early 1920s and well into 1928, the prices of seats generally followed the movement of volume on the Curb, as seen in Figure 4. Again resembling the NYSE, seat prices begin to rapidly outpace volume growth by late 1928, jumping in 1929. Indeed, Figure 4 suggests that the Curb market might have benefited from its complementary role by the expansion of the NYSE. The NYSE's increase in the number of brokers primarily served to manage the rise in orders, to which new listings

contributed modestly. In contrast, the Curb, as well as the regional exchanges, added many new stocks to their boards during 1929; with the expectation of future trading from these issues. Unfortunately, there is no monthly data on listings to adequately track these changes.

Business on the regional exchanges was also booming. The fastest growing exchanges were Chicago, San Francisco and Los Angeles; and the two California exchanges created their own curb exchanges to handle new start-up companies and less seasoned stocks. Chicago had 225 seats, raised to 470 in October 1929; consequently, its adjusted seat price is also reported in Figure 5. San Francisco had 70 seats and its Curb had 100 seats. Los Angeles and its Curb each had 70 seats, increasing to 75 and 87 in 1929. The venerable Philadelphia exchange had 206 seats, and Baltimore and Boston had 87 and 139 respectively. The markets for these seats were very thin, where trades were relatively rare. It is thus much more difficult to determine what the expectations of the brokers were in these markets given their illiquidity. This feature is reflected in the bid-ask spreads that were quite wide. For example, the bid-ask spread measured from mid-quote or the last transaction was 17 percent for Boston and Chicago and 25 percent for the New York Curb.

Figure 5

Regional Exchanges 1927-1930



Except for Baltimore, seat prices rose on all the regional exchanges in 1929. However, the strong bulls were Chicago and the West Coast exchanges and their new curb markets. Although Figure 5 displays rising prices on the regional exchanges, it also shows the illiquidity of seats on these smaller exchanges, with few transactions for many months before and after the crash. In addition, Figure 5 strongly suggests that the bloom was off the rose by early 1929 for most brokers, as prices failed to rise or even fell. For the NYSE, as already seen, split-adjusted prices fell in the second quarter and then

rebounded in the third. This recovery after a considerable period of pessimism is mirrored in the behavior of the Curb's seat prices. All the regionals appear to have been similarly affected by this pessimism, even though their prices did not decline. As in other thin asset markets, seat owners held on to their seats and waited for an improvement in price rather than try to sell them for a loss. The regionals' pessimism may also have reflected the fact that prices for smaller stocks had peaked in the first quarter of 1929 and the boom only continued in the larger stocks.⁹ The only exception to this development was the Chicago market where seat prices rose to a new high just prior to the increase in the number of seats on that exchange in October 1929.

To examine whether the Curb or regional brokers may have exhibited excessive optimism or pessimism, the model of seat returns from equation (1) was applied to the New York Curb Exchange and the Chicago and Philadelphia exchanges and estimates are shown in Tables 3 and 4. Chicago and Philadelphia were selected because of the relatively large number of seats, which were traded more frequently than other regional seats. Volume data was available for the Chicago and Philadelphia exchanges from the Commercial and Financial Chronicle, and for the Curb Exchange from the New York Times; but there was no stock price index available for any of these exchanges. In its place the excess returns to holding the Federal Reserve's stock index was used.

⁹ The Fisher (1966) index of stocks, which is equally weighted, began to fall in February 1929, while the Dow Jones, composed only of large stocks, and the Federal Reserve index weighted by capitalization, continued to rise.

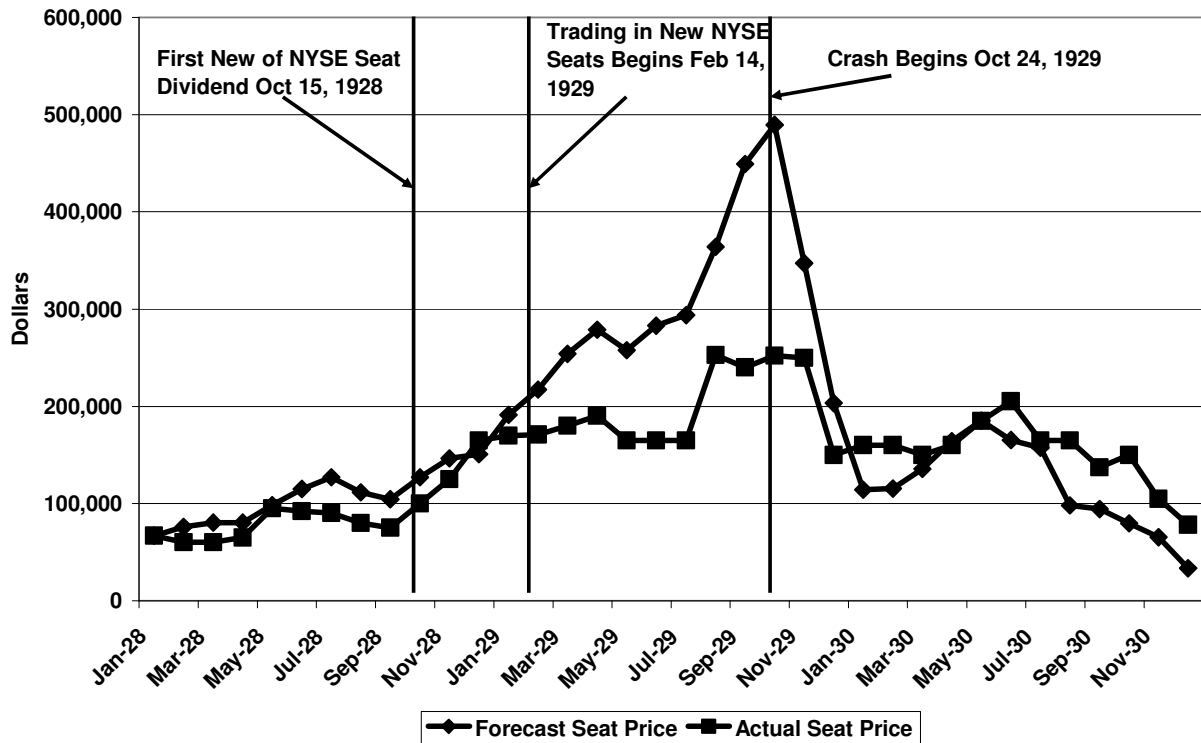
Table 3
Monthly Returns to a Seat on the New York Curb Exchange

	(1) NY Curb U.S. 4/6 Mo Bills 1923-1933	(2) NY Curb U.S. 4/6 Mo Bills 1923-1927	(3) NY Curb U.S. 4/6 Mo Bills 1928-1933
Intercept	0.028	0.021	0.024
	0.185	0.031	0.025
$r_{m,t} - r_{f,t}$	0.066	1.371	-0.035
	0.270	1.540	0.277
$r_{m,t-1} - r_{f,t-1}$	0.386	0.827	0.441
	0.287	1.662	0.291
$r_{m,t-2} - r_{f,t-2}$	1.499*	-0.613	1.497*
	0.271	0.071	0.277
Monthly Vol _t	-0.016	-0.061	0.099
	0.037	0.071	0.043
Monthly Vol _{t-1}	-0.23	0.023	-0.054
	0.038	0.075	0.046
Monthly Vol _{t-2}	0.043	0.036	0.045
	0.037	0.074	0.043
SizePrem _t	-0.675	-0.136	-0.697
	0.338+	1.196	0.345
SizePrem _{t-1}	-0.220	1.346	-0.344
	0.397	1.128	0.409
SizePrem _{t-2}	-0.622	-0.030	-0.617+
	0.361+	1.131	0.372
No. Obs.	126	54	72
Adj. R	0.319	0.066	0.442

The standard errors are reported below the coefficient and * and + indicate significance at the 5 and 10 percent levels.

Figure 6

Actual and Forecast Monthly Curb Seat Prices 1928-1930



The fit of the model for the Curb Exchange is somewhat weaker than it was for the NYSE, perhaps reflecting some of the data compromises and the fact that there is no volume data before February 1923. Two lagged values of the independent variables are required here to capture their influence. Again the model is at its weakest for the period just before the stock market boom when there are fewer observations. Nevertheless, the estimation for the first period, 1923-1927 was employed to forecast seat prices out-of-sample, as was done for the NYSE. Both cumulative abnormal returns and forecast seat prices were constructed, and the latter are shown in Figure 6. The fit of the model is fairly good for 1928, and the expansion of the NYSE does not appear to be viewed as having any positive or negative effects on the business of the Curb, as the forecast

remains on track when the information about the seat dividend on the NYSE was released. However, early in 1929, the forecast for seat prices moves well ahead of actual prices on the Curb exchange. Like their brethren on the NYSE, the Curb brokers appear to have become very skeptical about the rising market. Only after the crash do actual and forecast prices realign themselves, and the fit of the model improves.

Table 4
Monthly Returns to a Seat on the Chicago and Philadelphia Exchanges

	(1) Chicago U.S. 4/6 Mo. Bills 1920-1933	(2) Chicago U.S. 4/6 Mo. Bills 1920-1927	(3) Chicago U.S. 4/6 Mo. Bills 1928-1933	(4) Philadelphia U.S. 4/6 Mo. Bills 1920-1933	(5) Philadelphia U.S. 4/6 Mo. Bills 1920-1927	(6) Philadelphia U.S. 4/6 Mo. Bills 1928-1933
Intercept	0.036	0.011	0.080	0.012	0.007	0.014
	0.022	0.016	0.051	0.016	0.012	0.016
$r_{m,t} - r_{f,t}$	0.022	0.166	-0.008	-1.227*	-0.371	-1.226*
	0.387	0.565	0.623	0.241	0.425	0.244
$r_{m,t-1} - r_{f,t-1}$	0.637+	-0.531	1.059+	0.640*	0.107	0.635*
	0.384	0.538	0.623	0.244	0.414	0.243
Monthly Vol _t	-0.060	-0.067	-0.062	-0.400*	-0.016	-0.041*
	0.054	0.048	0.095	0.020	0.013	0.019
Monthly Vol _{t-1}	-0.041*	0.011	-0.093	-0.002	0.000	-0.002
	0.054	0.049	0.098	0.020	0.013	0.020
SizePrem _t	1.099+	1.275	0.965	-1.286*	0.102	0.206
	0.619	0.949	0.969	0.409	0.691	0.319
SizePrem _{t-1}	1.057*	0.590	1.213	0.521	0.308	-0.114
	0.523	0.774	0.824	0.337	0.576	0.337
No. Obs.	167	95	72	167	95	72
Adj. R	0.037	0.045	0.011	0.146	0.000	0.182

The standard errors are reported below the coefficient and * and + indicate significance at the 5 and 10 percent levels.

Estimation of the determinants of seat prices on the regional exchanges in Table 4 fares less well. There is comparatively little movement in regional seat prices and the Federal Reserve's stock market index may not accurately reflect events on these

exchanges, dominated many local issues. Philadelphia's poor fit is perhaps not surprising as there were few transactions in the face of huge movements by the market. Nevertheless, even the more active market for Chicago's seats does not yield an informative fit. Given the poor fit of these equations, attempts to extract abnormal returns to measure brokers' optimism or pessimism failed, as predicted seat price values scarcely moved.

As the stock market soared to new heights, was brokers' anxiety a generalized phenomenon or were the Curb and the regional exchanges influenced by the market for seats on the NYSE? Any excessive pessimism or optimism from New York, the dominant exchange, may have spilled over. To test this possibility, news from New York is extracted from the residuals obtained by differences between the actual and predicted prices for NYSE seats, using the coefficients for 1920-1927 in Table 1. This information contributes modestly to explaining the behavior of the returns for seats on the Curb and the regionals. For Philadelphia, it appears that good news for the NYSE, a positive residual was initially taken as bad news for this exchange given the negative coefficient on the first lagged residual. However, this opinion was subsequently overturned, as indicated by the subsequent coefficient of reserve sign and nearly equal value. For the Curb and the Chicago exchange, news in the form of changes in the price of a seat on the NYSE had little effect on the determination of their seat prices. Overall, the data does not suggest that optimism or pessimism from the New York market spread to other exchanges. If there was a feeling among brokers that the investing public was excessively exuberant, it appears to have been widespread.

Table 5
News From the NYSE and
Monthly Returns to Seats on the Curb and Regionals

	(1) Chicago U.S. 4/6 Mo Bills 1920-1933	(2) Philadelphia U.S. 4/6 Mo Bills 1920-1927	(3) NY Curb U.S. 4/6 Mo Bills 1923-1933
Intercept	-0.081	-0.055	0.016
	0.108	0.075	0.104
$r_{m,t} - r_{f,t}$	0.091	-1.096*	0.037
	0.404	0.247	0.312
$r_{m,t-1} - r_{f,t-1}$	0.537	0.492*	0.982*
	0.401	0.247	0.310
Monthly Vol _t	-0.071	-0.042*	-0.061
	0.055	0.020	0.042
Monthly Vol _{t-1}	-0.032	-0.012	-0.025
	0.055	0.020	0.042
SizePrem _t	1.292+	-0.982	-0.074
	0.663	0.430*	0.390
SizePrem _{t-1}	0.974+	-0.197	0.355
	0.553	0.348	0.408
NYSE Resid _t	0.012	-0.024*	-0.000
	0.016	0.011	0.013
NYSE Resid _{t-1}	-0.009	0.001	-0.011
	0.015	0.011	0.012
NYSE Resid _{t-2}	0.011	0.031*	0.014
	0.017	0.012	0.014
No. Obs.	166	166	127
Adj. R	0.033	0.176	0.092

The standard errors are reported and * and + indicate significance at the 5 and 10 percent levels.

Wise Brokers?

Spotting a bubble during the rise of a market or econometrically measuring it after a collapse is a hazardous enterprise because of the difficulty of properly identifying the fundamentals. Established brokers, familiar with their customers and the flow of orders onto the floor of the exchange might be thought to have a better view of the market than the average investor. There were enormous stakes for the brokers; while volume may surge during a boom and crash, it collapsed in the aftermath, driving down profits. Members of the NYSE found their exchange's dominance threatened by the mid-1920s. It could no longer absorb more volume on peak days without higher costs arising in the form of greater bid-ask spreads and delays in processing orders. By expanding the exchange by 25 percent, the NYSE apparently eased the constraints while maintaining profits. Yet by the third quarter of 1929, the burgeoning market appears to have worried them and the prices of seats were well below what would have been expected. This concern also seems to have taken grip of the Curb and the regional markets. Furthermore, there is some journalistic evidence that younger men sought out NYSE seats and the quarter-seat rights to form new seats, as the older and perhaps wiser men abandoned the exchange. Other market anomalies corroborate brokers' anticipation of a crash. The willingness of investors to pay unprecedented premia on closed-end mutual funds is evidence of a rush by new investors into a bubble market. The extraordinarily heightened risk premia and margin on brokers' loans also reveals that lenders to the market were apprehensive and thought a big drop was imminent. Unfortunately, for the common investor this information was not appreciated and they continued to pay share prices that would, in retrospect, seem absurdly high

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