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The Long-Term Evolution of the NYSE's Microstructure: Evidence from the Pricing of Seats on the Exchange

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The 1990s witnessed the creation and explosive growth of stock exchanges in emerging markets and their transformation in the developed world. While the microstructures of established contemporary markets have been studied intensively, it is not clear how market rules evolve and perform over long periods of time. Most studies have focused on individual aspects of stock exchange rules---trading systems, listing requirements, access to the market, price disclosure, and settlement---over short relatively periods of time. In this paper, we examine the long-term evolution of the microstructure of the New York Stock Exchange using data on the prices of seats on the exchange to determine what were the key changes from 1879 to 1971.

The seats on an exchange are capital assets whose prices reflect stockbrokers' expected future profits from the special access offered to them by a seat on the exchange. As such they are affected by the volume of activity and the decree of competition between traders on the exchange and between the exchange and the rest of the equity market. Thus, seat prices are influenced by the volume and level of stock prices, technology and the rules that govern trading on the exchange. Following earlier work, we employ a simple time series model to explain changes in seat prices as a function of innovations in volume and equity prices. While this approach yields sensible results, much of the variation in seat prices remains unexplained, pointing to the importance of changes in microstructure, regulation and technology. We examine one important and heretofore neglected episode when the NYSE members, constrained by the exchange's rules, found themselves unable to capture all the benefits of membership themselves and decided to increase the number of seats by 25 percent. However, in general, the effects on seat prices of these complexly evolving factors are more difficult to identify.

1. Seats on the NYSE

Stock exchange seats are assets that represent residual ownership of the assets of the exchange, their supply is relatively constant over time and they are traded in an auction market characterized by relatively small transactions costs. However, seats differ from equities in that the dividends are a function not of the firm's profits but of the owner's use of the rights to the seat on the floor. The market for NYSE seats is an anonymous auction market operated by the Secretary of the NYSE. When a new bid or ask price is made, all members are informed. Presently, current bid and ask prices for seats are posted in prominent locations on the floor of the exchange.

A seat on the NYSE gives the owner access to trading on the floor of the Exchange at a reduced price. The owner may be a specialist (holding inventories in NYSE listed securities), a commission broker (handling transactions for customers of brokerage houses), a floor or two-dollar broker (executing trades for other exchange members for a floor brokerage fee) or floor trader (trading for his personal account) (Schwert 1977a). Whichever activity or activities he pursues, a seat allows the owner to trade on the exchange at reduced transactions costs. Thus, seat prices should reflected the capitalized value of any monopoly rents available to seat holders.

Although research on stock markets fills academic journals and stock price data of every description are the subject of incredibly intense analysis, relatively little attention has been given to the market for seats on the exchange. However, seat prices can provide substantial insights into questions about the technology, rules, and regulations and their relationship to the efficiency of the exchange. As best as we can determine there have been only three studies of the market for stock exchange seats. The first paper, Schwert

(1977a) examined the end-of-month seat prices for the period, 1926-1972 and was primarily concerned with the efficiency of the market. In a similar study, Golbe (1984) used end-of-month data for 1960-1980.[1] Most recently, Keim and Madhavan (1997) employed all bids, offers and sale prices of NYSE seats for 1973-1994.

These studies have been limited both in time period covered and in frequency of the observations. We have collected new data from the archives of the New York Stock exchange. Those data include all transactions in seats over the periods covered. Three volumes of the New York Stock Exchange's Committee on Admission's records -- records registering all transfers of membership are preserved in the archives. The recorded transfers cover the periods from November 28, 1879 to January 8, 1880, followed by a gap and then December 27, 1883 to June 28, 1971. These data represent all seats transferred within these periods. The exact dates of the transfers are not provided until January 1935. Until that time, all trades during a week were reported as of the end of the week.

The total number of seats on the Exchange has undergone relatively few change since 1869. In May 1869, the NYSE, which had 533 members, merged with the Open Board of Brokers, with 354 members, and the Government Bond Department, having 173 members (Steadman, 1905). The resulting enlarged NYSE had 1,060 seats. In 1879, a buoyant market and a demand for more room led the Governing Committee to buy

[1] The infrequent trading of seats was a concern to Schwert (1977) and Golbe (1984) because of the potential the (Lawrence) "Fisher effect." This "Fisher effect" can produce spurious lead and lag relationships between variables if they are contemporaneously correlated but they are not measured at the same point in time.

additional property adjacent to the exchange. That purchase was financed by the sale of an additional 40 new seats; a sale that brought the total to 1,100 seats.[2]

This number held constant until 1929 when a 25 percent "seat dividend" was declared and a right to a quarter-seat was given to all existing seat-owners. Immediately, trading in these dividends began. Transfers of these quarter-seat dividends--dividends that were always recorded when four quarters were converted into a whole seat--occurred between March 14, 1929 and February 18, 1932. Sales of these newly formed seats dominated the year 1929; and relatively few established seats were traded. We treated the bundled four-quarter seats as one seat; and those transactions accounted for 270 of the observations in the data set. The remaining twenty "quarters" were merged into five seats in non-market transactions.

The total number of seats, after this dividend created 275 new seats, was 1,375. The only other change afterwards occurred in 1953, when the NYSE repurchased and retired 9 seats, leaving a total of 1,366 seats outstanding (Schwert, 1977).

Table 1 reports the types of transfers that occurred. There were 42 transfer entries between November 28, 1879 and January 8, 1880. Although this figure is two more than the number reported as sold to enlarge the NYSE (and the prices are different than the reported average), these transactions almost certainly include the disposition of the new seats.

After the recording hiatus, there were 5,829 transfers between December 1883 and June 28, 1971. While there was an active market in seats, there were many transfers that were not apparently arms length transactions. Often transactions gave no price, but

[2] According to one source, the average price realized was $13,000, which was $6,000 more than their price in 1870. (Steadman, 1905, p.290).

were reported as nominal. Most nominal transactions refer to name changes for firms, reflecting turnover of partnerships or other changes. In Table 1, there were 5,045 "market" transactions plus 777 nominal transfers with no price provided and 7 private transactions where no price was given or the price was far from the market price. The first nominal transaction was recorded on July 10, 1884 and the last recorded one on October 28, 1940, after that date which nominal transactions were no longer recorded. There were a limited number of private sales, sales among partners, and estate transfers; these were included with the market transactions when it appears that the reported prices were very close to the prevailing market prices.

Table 1

Transfers of NYSE Seats
1879-1880 and 1883-1971

	Number of Transfers 1879-1880	Number of Transfers 1883-1971
Total recorded entries	42	5829
Market transaction	42	5045
Nominal transfer		777
Private transfer without price recorded		7

Source: New York Stock Exchange's Committee on Admission. Transfers of Membership.

Figure 1
Price of Seats on the New York Stock Exchange
1883-1971

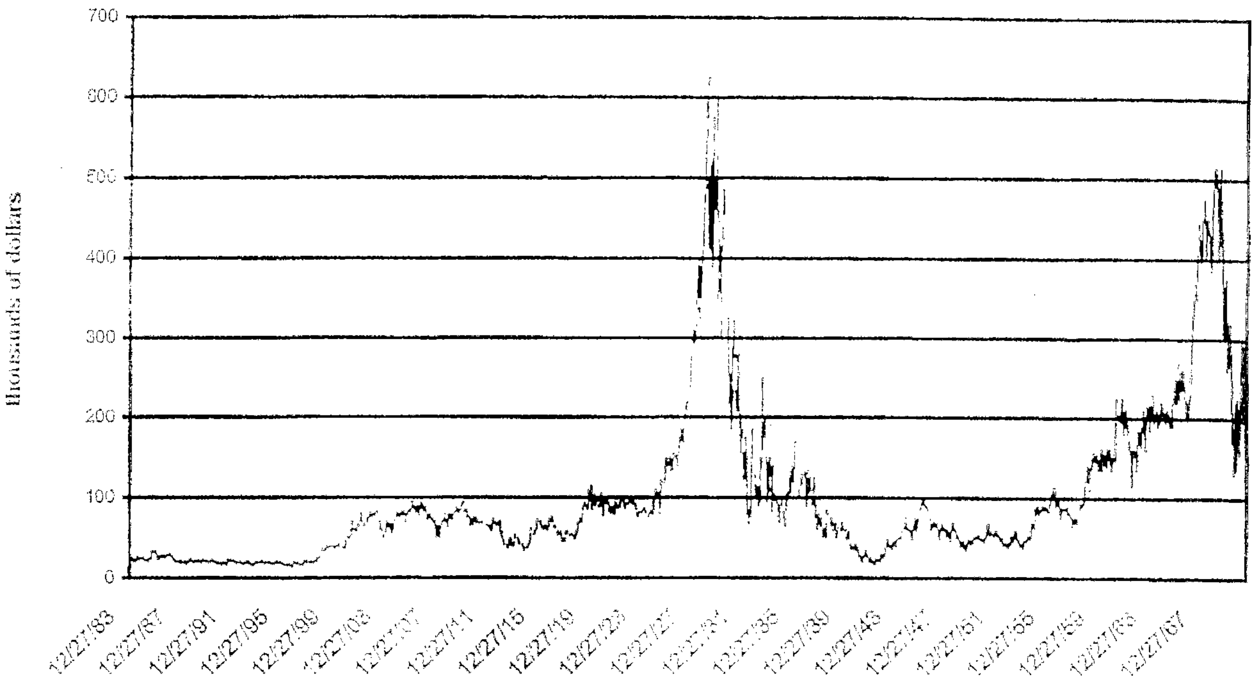


Figure 1 graphs the price of seats on the NYSE from 1883 to 1971 in thousands of current dollars. The broad movements of the market are evident. There was a tremendous run up in the price of seats during the bull market of the 1920s. The boom was followed by a crash in the 1930s, reflecting in part the collapse of the stock market. The market remained depressed for almost twenty years; but prices then rose and, with a surge in the late 1960s, it again approached the heights of late twenties in nominal terms In real terms, prices in 1970 were not much above those of the early thirties.

Figure 2
Number of Seats Traded
1883-1971

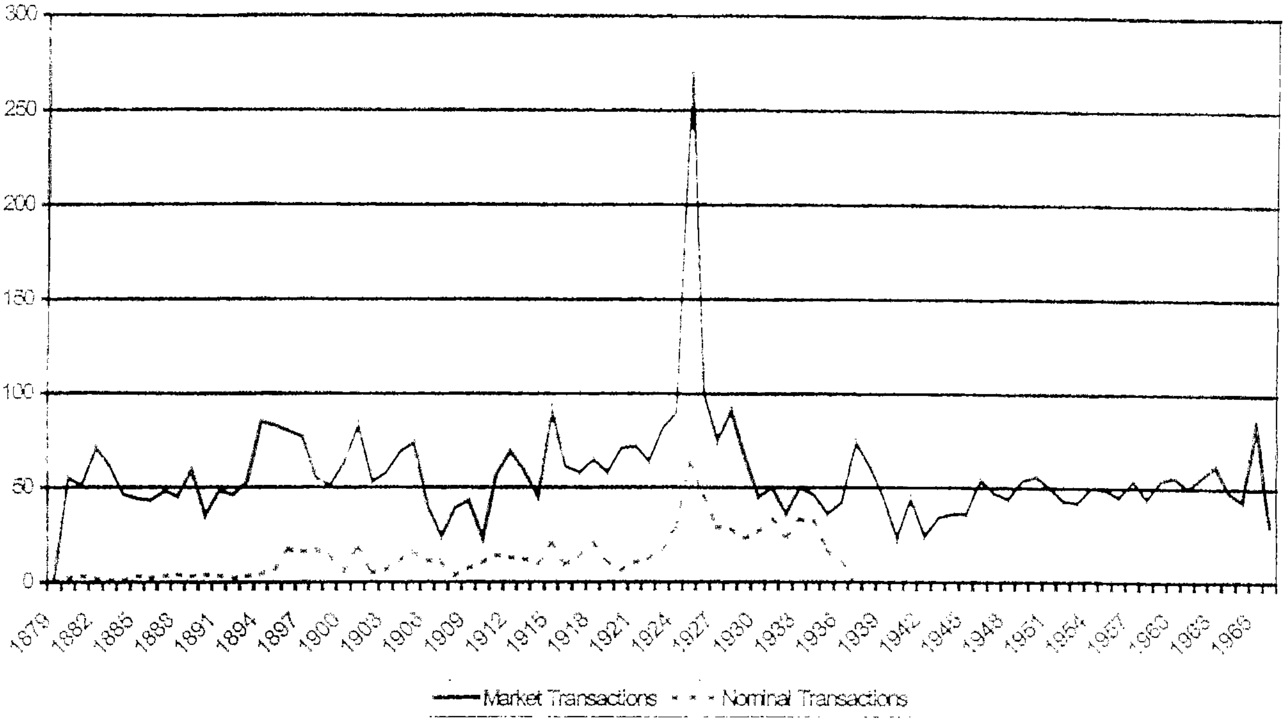
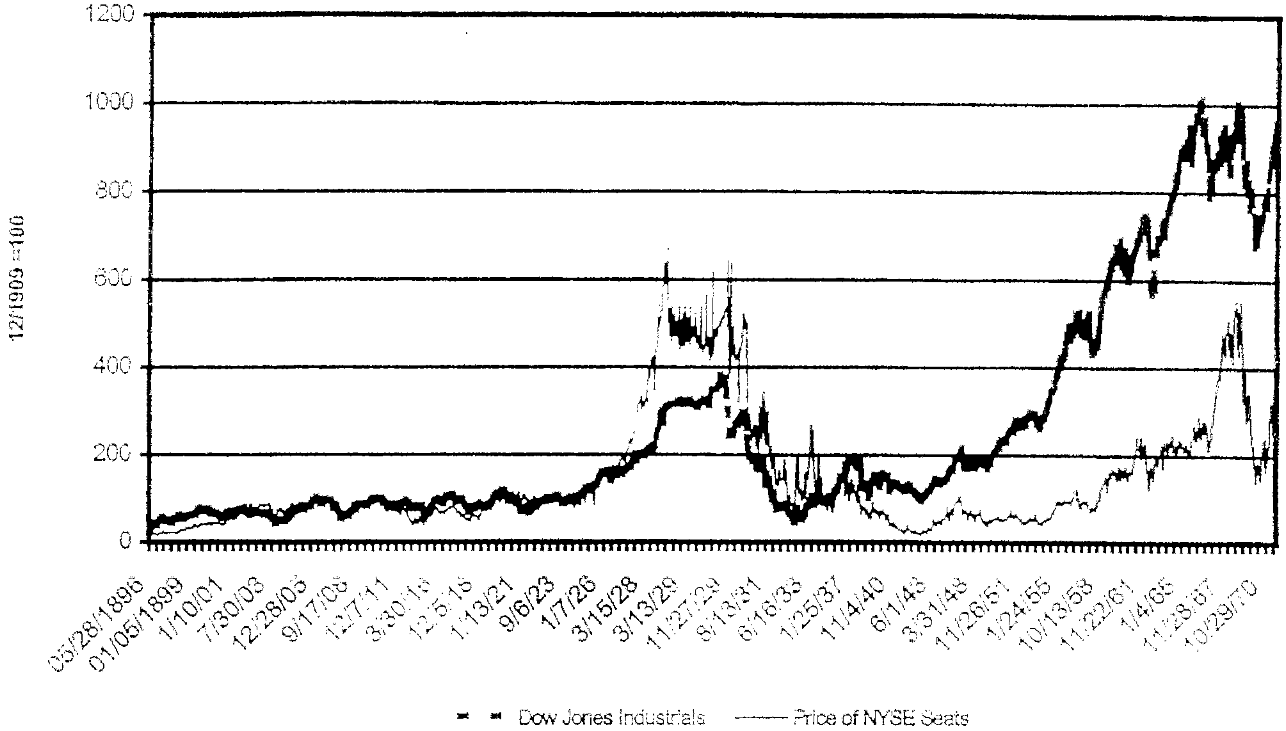


Figure 2 shows the volume of trading for 1883 to 1971, it covers both market and nominal transactions. The number of nominal transactions fluctuated considerably from year to year. Before 1930, they ranged from 2 to 46 percent of the number of market transactions, and averaged 16 percent. However, between the crash and 1940 when the were no longer reported, the averaged 50 percent of market transactions and ranged from 24 to 69 percent of the priced transactions. One striking feature of this graph is the rough constancy of trading in seats with the exception of the bull market of 1928-1929 when the newly created seats came into existence. Even the run up in prices in the late 1960s did not involve such a high turnover.

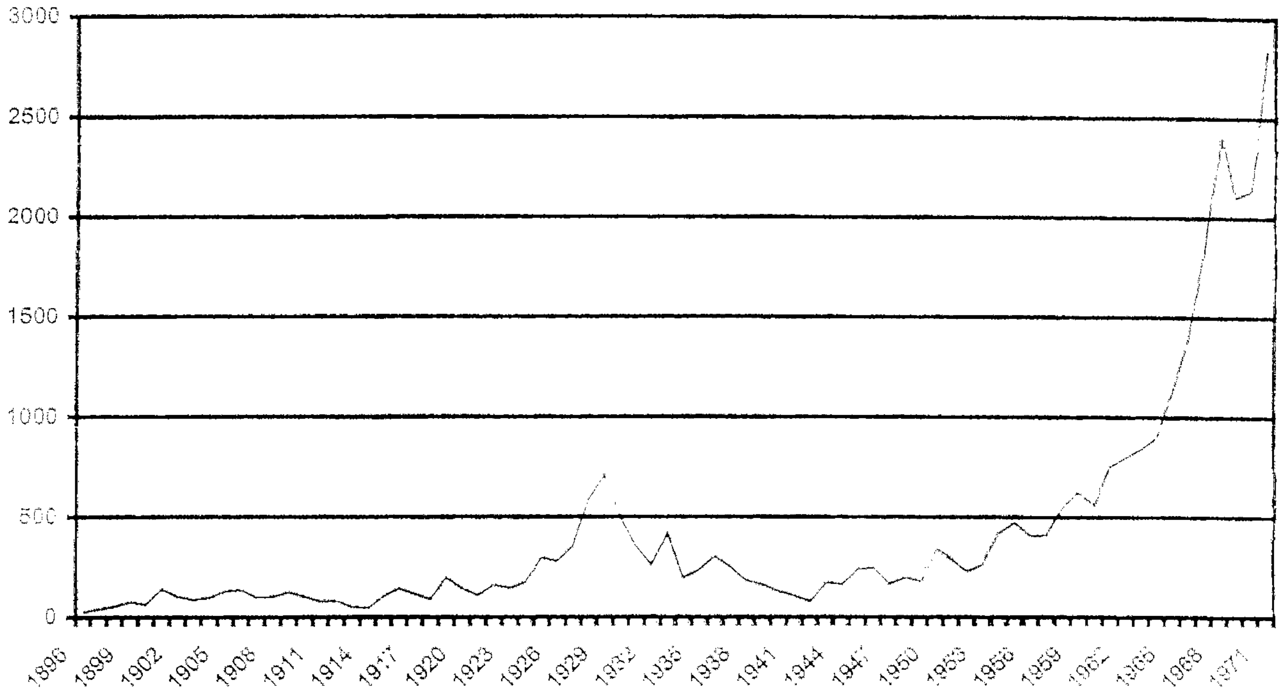
Figure 3
Dow Jones Industrials and Seats on the NYSE
1896-1971



Because two of the fundamental factors driving the price of seats are the level of stock prices and the volume of shares traded, the movements of the market for seat prices are best understood when compared to data from the stock market itself.

Figure 3 plots indexes for the price of NYSE seats and for the Dow Jones Industrials, matched to the days when trades in NYSE seats occurred. Figure 4 graphs the annual volume of trading on the exchange. In Figure 3, the index is set equal to 100 for the average of the prices in December 1909, at that date the Dow Jones Industrials index was 98.1 and a seat sold for $93,400. As is readily seen, the Dow Jones and the price of a seat moved together very closely from 1896 up until the stock market boom of the late 1920s. The exhuberance of the stock market in the late 1920s pales in comparison to increase in the price of seats on the NYSE. Although by 1929, the Dow Jones index had increased almost four fold relative to the base year, the increase in seat prices was even more spectacular--it increased five fold and sometimes over six fold. Although seat prices may have risen slightly more than the market index in the late nineteenth than in the early years of the twentieth century, from 1930 to 1926 they moved together quite closely. In 1929 both collapsed; but in the aftermath of the Great Depression and the New Deal, the Dow Jones stocks performed better. Brokers drove up the price of seats

Figure 4
Volume of Shares Sold on NYSE



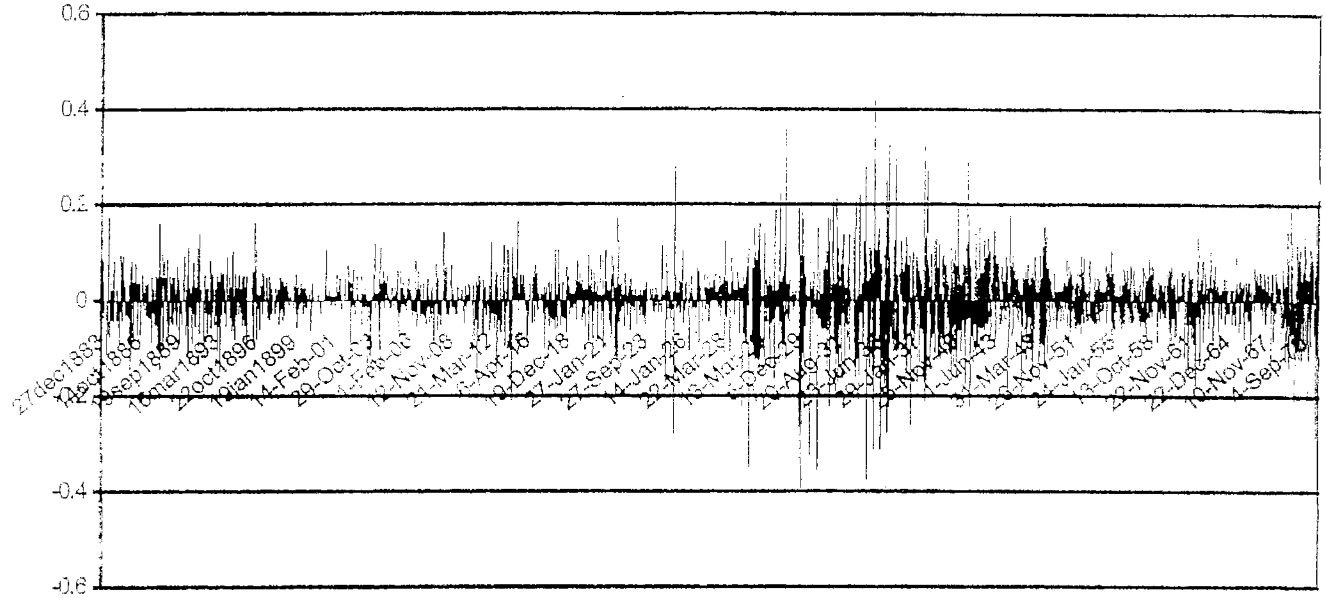
again in the late 1960s; but even before the second collapse, those increases did not come close to matching the increase in the Dow Jones industrials index.

Figure 4 plots an index of the annual volume of shares sold on the NYSE with 1910 as the base year. The volume figure tracks seat prices somewhat more closely than the Dow Jones index during the bull market of the 1920s; the volume rose to six times its

1910 level. Similarly, the volume figure collapses during the 1930s, and it does not attain its previous peak until 1961. However, volume soars far beyond seat prices and even the Dow Jones index in the late 1960s. Although the price and volume of shares traded are crucial to the profitability of a broker holding a seat on the NYSE, the divergence in the movement of seat prices, stock prices and share volume reveal that other factors--microstructure, technology, and regulation--have had a strong influence of seat prices.

As seat prices reflect the capitalized value of membership in the exchange, changes in the value of the seats will be captured by the returns. To measure returns in our analysis here, we use the first difference of the natural logarithm of seat prices, $r_t = \ln(PS_t / PS_{t-1})$, a figure that is the continuously compounded rate of change in seat prices. The returns for 1883-1971 are plotted in Figure 5. It is apparent that there is substantial heteroscedasticity. In previous studies that covered long periods (Schwert, 1977; and Golbe, 1984) changes in variance presented the authors with a series of challenges when they sought to explain the behavior of seat prices by movements in share prices and volume. These shifts are more understandable if changes in regulation and structure of the markets are taken into account.

Figure 5
Returns on NYSE Seats
1883-1971



3. What Moves the Price of a Seat?

To begin our analysis of the determinants of seat prices we need to first examine the univariate time series properties of the data. As Schwert (1977) found for his smaller sample, we find the autocorrelation functions (ACFs) of the logs of the NYSE seat prices and the rates of change in these prices are consistent with the multiplicative random walk model.[3] As is characteristic of the random walk model, ACFs of the logged seat prices are close to unity at a high number of lags and the ACFs for the continuously compounded rates of change in seat prices are small at 15 lags and insignificantly different from zero. This evidence suggests that the underlying model is

[3] In her much shorter sample, Golbe (1984) has some evidence for first-order autocorrelation for the changes in seat prices but not for changes in stock market prices.

(1) $\ln SP_t = \ln \ln SP_{t-1} + a + e_t$

where a is a drift parameter for the random walk and e_t is a serially uncorrelated random variable with mean zero. However, as seen in Figure 5, there is considerable heteroscedasticity in the rates of return indicating distinct subperiods.

Table 2 presents estimates for the various moments of seat prices and the Dow Jones index and volume on the NYSE. The estimates of variance diverge considerably for the selected periods in the table. Furthermore, no matter how one slices the data, the returns on NYSE seats have a much greater variance than the Dow Jones Industrials. Although Table 2 reports all observations, even if one uses only the Dow Jones Index when it is matched with days when there seats traded, it is still less volatile. The results are similar to Schwert's findings. He found that returns on seats were reasonably symmetric but slightly leptokurtic. These fat tails suggest that major events may have moved the market for seats. The univariate time series properties of seats on the NYSE are thus similar to common stock prices. For both, the log of price changes is serially uncorrelated and fat-tailed relative to a normal distribution, with variation in the log rates of change over time.

The two basic easily observable fundamentals that should govern profits for brokers and hence seat prices on the exchange are the level of stock prices and the volume of trading. Analogously, to stock prices, the price of seats on the exchange should be determined by the present discounted value of expected future profits to the owners. Thus, like stock prices, seat prices should only change over time if the expected future profits change. In the simplest model where microstructure, technology and regulation are held constant, profits to brokers should be a function of the level of prices of the stocks traded on the exchange, V_t, and the volume of shares traded, Q_t. When k_t, is the commission rate, profits z_t are:

$$(2) \quad z_t = [k_t (V_t) Q_t (k_t)] - C(Q_t)$$

$$= z[V_t, Q_t]$$

If the discount rate is assumed to be constant over time, the only reason why seat prices would change would be if there were changed expectations of the future share volume and stock prices. If the market for seats is efficient then when new information becomes available, as unexpected changes in volume and stock prices, will there be changes in seat prices.

Table 2
Characteristics of Returns

Return on		NYSE Seat				
Period	1883-1971	1883-1900	1900-1920	1920-1940	1940-1960	1960-1971
Obs	5043	874	1165	1514	911	581
Mean	0.0004	0.0004	0.0007	-0.0007	0.0017	0.0005
Std. Dev.	0.0536	0.0378	0.0323	0.0736	0.0490	0.0532
Variance	0.0029	0.0014	0.0010	0.0054	0.0024	0.0028
Skewness	-0.2644	-0.1641	-0.5321	-0.2564	0.0327	-0.1002
Kurtosis	15.7998	6.6021	9.5209	12.4336	7.7520	8.4892

Return on		Dow Jones Industrials				
Period	1883-1971		1897-1920	1920-1940	1940-1960	1960-1971
Obs	22857		5840	4799	4306	2106
Mean	0.0005		0.0003	0.0007	0.0006	0.0005
Std. Dev.	0.0103		0.0102	0.0146	0.0064	0.0065
Variance	0.0001		0.0001	0.0002	0.0000	0.0000
Skewness	0.0433		-0.4453	0.2057	-0.2998	0.4371
Kurtosis	14.3017		8.0444	12.5314	6.0482	7.2669

To examine how new information from volume and equity prices affects seat prices, we examined the time series properties of the continuously compounded rates of change for seat prices, stock prices as measured by the Dow Jones Industrials average, and volume on the NYSE. These all appeared to be stationary series. Using the Dickey-Fuller tests, we easily reject the hypotheses that there are unit roots in these time series. The test statistics are -69.5, -58.0 and -53.3 for seat prices, the Dow Jones and volume when the one percent critical value is -3.43. Our results differ from Schwert's who found that the ACFs of the continuously compounded rates of change for volume displayed significant autocorrelation. This characteristic does not hold for our measure of volume, whose ACFs are close to zero at all lags.

To discover how new information on trading and equities prices drive movements in seat prices, ARIMA models for the three variables were estimated and the residuals obtained from them. Schwert examined several variants of the model to explain movements in seat prices using contemporary and lagged residuals of changes in share prices and volume. Our estimations of these variants are presented in Table 3. It should be noted that the simplest regression, Equation 1, produces a slope coefficient that can be used to infer the riskiness of stock exchange seats relative to the Dow Jones index using the capital asset prices model. Schwert estimated that beta for NYSE seat prices relative to the market index was between 0.9018 and 1.138. Using a 3-factor model to calculate a beta, Keim and Madhavan estimated a coefficient of 1.19, while Golbe found a lower beta of .85. Our simple estimate of is lower than these studies, implying that seats, whose coefficient is significantly less than one, are "less risky" than the market index.

Table 3
The Effects of News on Share Prices and Volume
On Seat Prices

Variable	*Eq.1*	*Eq. 2*	*Eq.3*	*Eq.4*
Dow Jones t	0.6936	0.5679	0.6566	0.5514
	17.362	12.104	16.468	11.761
Dow Jones t-1		0.3558		0.3198
		7.353		6.584
Volume t			0.06929	0.0547
			8.456	5.404
Volume t-1				0.0196
				1.946
Constant	0.0029	0.0027	0.0027	0.0025
	2.646	2.343	2.433	2.129
Numberof Obs	3844	3411	3838	3404
F Statistic	301.45	173.05	187.43	101.87
Adjusted R-Sq	0.0725	0.0922	0.0886	0.106

Note: Numbers below the coefficient estimates are t-statistics.

However, what is perhaps most striking is the small amount of variation in the innovations in seat prices that is explained by innovations in the volume and equity prices. In the earlier studies, these allegedly key fundamentals explained a similarly small amount of variation in seat prices. As these regressions are based on very restrictive assumptions about the constancy of microstructure, technology, regulation, the low explanatory power is not surprising. However, the regressions underscore the fact that these "fundamentals" do a poor job in explaining seat price movements and, thus, point to the role of other fundamentals in changing the value of access to the exchange.

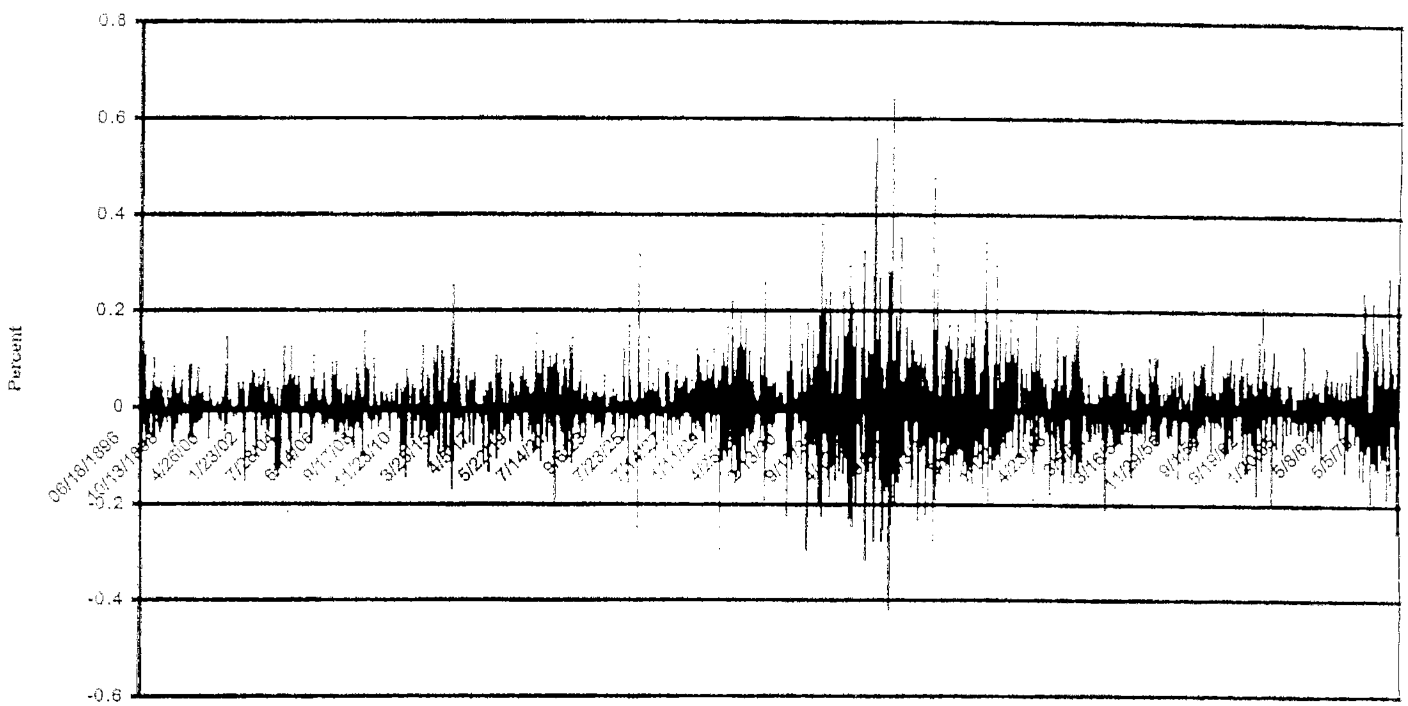
To determine how much the stock price values and volume fundamentals played in the determination of seat prices, equation (1) was used to forecast seat prices, adding in the logs of the Dow Jones and share volume. The result was

$$\underset{}{\ln SP_t} = \underset{(-3.85)}{-0.115} + \underset{(508.35)}{.9912\ln \ln SP_{t-1}} - \underset{(-2.094)}{.0043\ln DJ_t} + \underset{(4.094)}{0.0101\ln VOL_t}$$

Adjusted R-squared = 0.9958

This is an extraordinarily good fit, and therefore helps to pin point when there were large changes that these fundamentals do not forecast. Figure 6 shows the difference between the actual seat price and the forecast seat price. The pattern is somewhat similar to the pattern of the returns of seat prices, suggesting that a great deal of the movement in the returns is attributable to something other than changes in equity prices and share volume.

Figure 6
Seat Price Forecast Error



Although little importance is attached to it in histories of the exchange or earlier studies of seat prices, the effect of the microstructure for the efficiency of the exchange is revealed by a large increase in the number of seats in 1929. The year 1928 had been a boom year, and the price of a seat had risen from $300,000 to $560,000. On January 24, 1929, on a vote of 31 to 1, the Governing Committee of the Stock Exchanged recommended that each member receive a 25 percent dividend in the form of rights to a new seat. Members would have three years to transfer this proportionate share of membership to an applicant approved by the Committee of Admissions who could only apply when he had contracted to purchase four quarter seats. The new members would pay the usual initial fee and contribution to the gratuity fund. On February 18, 1929, the NYSE members voted to accept this proposal.

Booming business was the alleged reason for increasing the number of members. The value of a seat had climbed even further from $560,000 on December 28, 1928 to $625,000 on January 24, 1929. Certainly, the volume and price of shares on the exchange were increasing but increasing the number of seats was not necessarily the optimal response. Why could not members have simply captured the benefits of the booming market by trading more shares themselves. The answer would appear to lie in the numerous restrictions, both large and small, on membership. Among those restrictions was the prohibition on corporate memberships. Under existing arrangements, higher errors from higher trading volumes exposed members to more potential lawsuits. Instead of trying to expand their own activities, members chose to sell off part of those rights to membership in the Exchange.

The response to the vote by the membership was immediate. The prices between the announcement of the vote and February 20, 1929 fell first to $500,000 and then $439,000. For the rest of the month, they fluctuated between $420,000 and $500,000. The gains realized by members from this operation can be measured by examining what happened to the aggregate value of seats. Assuming the announcement of the General Committee's vote nudged prices upward, it is reasonable to postulate that the pre-announcement seat prices were ranging between $560,000 and $600,000. These prices would imply an aggregate value of between $616 to $660 million. Shortly after the membership voted, prices varied between $440,000 and $480,000, yielding an aggregate value of between $605,000 and $660,000. As these estimates have about the same range, it would seem that members gained little. However information may have leaked out earlier. If seat prices value before any discussion of a dividend were at their October 1928 level of about $450,000, the aggregate pre-announcement value would have been $495 million and there would have been a grand gain.

To cull out some of the key dates where important changes in microstructure or regulation may have driven seat prices, we follow the approach of Cutler, Poterba and Summers (1989). They sought to answer the perennial question of what moves the stock market with a simple agnostic approach. First, they looked at a century's returns to see where the biggest positive and negative innovations in a stock index occurred and found that many large changes could not be associated with any particular news. Secondly, they identified large political and economic events and looked at the contemporary movement in the stock prices. They discovered that not all seemingly important news had an effect on the market.

In Table 4, we look which shows one hundred largest positive and negative percentage errors in forecasting seat prices. They are ordered chronologically, to allow events to be more easily identified. This exercise resembles an event study in that we are looking at the abnormal returns; but we have not pre-identified the events.[4] To find news on changes in the microstructure, we have read through the minutes of the various committees of the NYSE and followed the changes in the rules. The results of this exercise are very similar to Cutler, Poterba and Summers' results for the equities market. Sometimes it is very difficult to identify movements in the market with news and sometimes seemingly important news does not move the market. Furthermore, news is not always easy to identify and its dissemination is uncertain. It is hard to believe that in such a tight club as the NYSE that some decisions were not a foregone conclusion before votes were taken.

Table 4
One Hundred Largest Positive and Negative
Forecast Errors of NYSE Seats

	Date	Seat Price	Error	Date	Seat Price	Error
1	5/23/01	60	-0.1512096	10/08/1896	16.5	0.134932
2	6/11/03	70	-0.1300109	11/15/00	46.5	0.144153
3	7/30/03	60	-0.1432093	12/24/03	57.5	0.124254
4	10/8/03	52.5	-0.1256869	5/19/04	67	0.124831
5	6/2/04	56	-0.1251676	3/19/08	60	0.155405
6	7/14/10	65	-0.1430932	4/18/12	70	0.125985
7	12/5/12	62	-0.1235853	8/21/13	46	0.126
8	4/15/15	50	-0.1679985	4/15/15	59	0.176229
9	5/31/17	53	-0.1333783	4/22/15	63	0.252446
10	12/23/20	77.5	-0.1940114	11/13/19	110	0.151545
11	12/24/24	85	-0.1550042	12/1/21	90	0.126098
12	5/28/25	80	-0.247801	12/15/21	96	0.14261
13	2/20/29	439	-0.2934244	12/24/24	100	0.167876
14	2/28/29	430	-0.1352953	6/4/25	106	0.31715
15	3/5/29	418	-0.1424426	11/19/25	150	0.14343
16	3/8/29	419.5	-0.1241389	2/26/29	500	0.166163
17	3/13/29	425.5	-0.1444981	2/28/29	500	0.218158
18	6/6/29	422	-0.1916036	2/28/29	480	0.147351
19	12/5/29	350	-0.2215491	3/5/29	490	0.12351
20	1/2/30	400	-0.1258514	3/8/29	490	0.131862
21	9/25/30	400	-0.1405481	3/13/29	500	0.194942
22	10/2/30	325	-0.2941374	3/13/29	480	0.126183
23	10/2/30	255	-0.1469248	3/21/29	500	0.16113
24	12/31/30	200	-0.1992255	6/6/29	525	0.257639
25	2/5/31	194	-0.2227163	12/19/29	452.5	0.187516
26	2/5/31	250	-0.1353784	4/10/30	480	0.130806
27	6/12/31	235	-0.1440887	9/25/30	465	0.172971

[4] See Campbell, Lo, and MacKinlay (1998) for a discussion of the literature on event studies.

28	6/26/31	212	-0.1828963	11/6/30	255	0.156885
29	10/1/31	160	-0.1493734	12/31/30	250	0.190499
30	12/10/31	157	-0.1289986	1/22/31	290	0.38112
31	1/14/32	132	-0.1347427	2/5/31	232	0.197639
32	2/18/32	135	-0.228369	3/5/31	275	0.22346
33	2/18/32	135	-0.1566926	6/19/31	260	0.237274
34	2/18/32	135	-0.1352617	7/16/31	268	0.190718
35	3/10/32	126	-0.2176052	11/5/31	185	0.144798
36	3/24/32	117	-0.245533	1/14/32	152	0.238968
37	4/7/32	101	-0.1396446	1/28/32	152	0.145899
38	4/21/32	81	-0.1949347	2/18/32	175	0.293684
39	12/1/32	120	-0.314665	2/18/32	160	0.182797
40	2/23/33	100	-0.1305205	2/18/32	156	0.153227
41	4/13/33	95	-0.1443111	3/3/32	161	0.190069
42	5/4/33	95	-0.2741485	3/24/32	155	0.216642
43	5/11/33	125	-0.1738008	3/24/32	132	0.124867
44	6/23/33	215	-0.1479783	4/14/32	100	0.167635
45	8/24/33	175	-0.2756813	8/25/32	120	0.325079
46	10/19/33	150	-0.2509008	9/1/32	150	0.23755
47	11/2/33	115	-0.1513935	5/4/33	145	0.511873
48	11/16/33	100	-0.1702769	5/11/33	150	0.559162
49	1/18/34	105	-0.1615954	5/11/33	150	0.185551
50	3/29/34	110	-0.4195053	6/16/33	189	0.138562
51	3/29/34	83	-0.1724605	6/23/33	250	0.267389
52	5/10/34	85	-0.2425677	2/1/34	135	0.280665
53	6/14/34	100	-0.2015259	2/8/34	150	0.186803
54	9/13/34	76	-0.1963286	3/29/34	190	0.259856
55	10/18/34	76	-0.1525738	4/12/34	105	0.259247
56	11/1/34	76	-0.1530361	5/17/34	140	0.64084
57	12/27/34	70	-0.1340259	9/13/34	90	0.187316
58	10/22/35	105	-0.1627161	10/11/34	90	0.157136
59	12/23/35	120	-0.1470012	12/27/34	51	0.158036
60	5/13/36	150	-0.1390141	12/31/34	95	0.351938
61	5/14/36	130	-0.1324757	5/11/35	85	0.164462
62	6/25/36	100	-0.2311701	9/7/35	125	0.133748
63	2/6/37	105	-0.2195377	10/23/35	120	0.138297
64	4/8/37	110	-0.1232711	7/14/37	125	0.477498
65	7/20/37	90	-0.2745588	7/21/37	105	0.172096
66	7/30/37	91	-0.1290509	9/15/37	93	0.152355
67	9/11/37	81	-0.1863874	11/27/37	80	0.296372
68	9/24/37	75	-0.1899222	5/3/38	59	0.127963
69	11/10/37	61	-0.1594658	7/5/38	58	0.138198
70	2/14/38	65	-0.1360232	8/22/38	80	0.169962
71	11/18/38	68	-0.150876	6/9/39	60	0.170417
72	6/6/40	60	-0.1409274	5/14/40	59	0.1319
73	6/18/40	43	-0.1487706	9/26/40	40	0.145948
74	12/2/40	34	-0.1550388	12/24/40	40	0.205656
75	5/5/41	21	-0.1636497	5/1/41	25	0.129481
76	9/6/41	28	-0.2033657	6/2/41	27	0.342573

77	11/12/41	22	-0.1247504	7/31/41	32	0.177054
78	3/1/45	60	-0.1881853	1/8/42	25	0.295035
79	11/1/46	62	-0.1766938	3/17/42	21	0.160262
80	3/8/48	52	-0.1343699	6/20/42	25	0.133734
81	3/25/48	50	-0.1515481	10/22/42	25	0.181765
82	11/16/48	50	-0.1514594	5/17/43	44	0.144365
83	6/8/49	41	-0.1299898	5/7/45	60	0.194753
84	6/21/49	36	-0.1260011	7/11/47	62	0.146262
85	8/8/49	35	-0.1280095	6/1/49	47	0.170128
86	5/7/51	54	-0.2090039	8/17/49	40	0.138589
87	7/10/53	50	-0.1399902	4/3/59	125	0.132417
88	10/25/56	80	-0.1412119	7/20/62	160	0.138221
89	11/15/61	195	-0.1293964	12/20/62	164	0.210518
90	6/19/62	125	-0.1771611	9/22/65	215	0.131234
91	12/5/62	140	-0.1246001	5/2/69	450	0.123919
92	8/22/63	160	-0.1984331	9/19/69	350	0.161021
93	4/10/68	400	-0.1296403	12/9/69	375	0.241487
94	7/30/69	410	-0.1376005	2/17/70	320	0.222486
95	12/9/69	300	-0.1463401	4/9/70	300	0.124766
96	5/13/70	215	-0.1934374	6/29/70	210	0.220441
97	8/10/70	150	-0.1259235	7/17/70	150	0.140884
98	11/25/70	165	-0.183496	9/4/70	160	0.172613
99	1/20/71	180	-0.1521838	12/24/70	200	0.274166
100	6/4/71	195	-0.2578577	6/7/71	250	0.26607

The regression does filter out many of the movements in seat prices generated by movements in the stock market. There were large declines in the prices of seats during stock market crashes. In the rich man's panic of 1903, seat prices on the exchange fell from $70,000 in July to $52,500 at the beginning of November. The panic of 1907 sent them down from $70,000 in September to $51,000 in October. Trading in seats almost disappeared during the crash of 1929, but the few seats that were exchanged fell in price from $500,000 in early October to $360,000 by the end of November.

Yet, none of these events shows up in the largest 100 percentage increases and decreases in the residuals from the regression on seat prices. Not one transaction for the momentous month of October 1929 remains. One exception to this sweeping conclusion is a 12.5 percent decline on October 8, 1903, but this may be attributable to apprehension of a decision by the Committee on Admissions. On October 14, 1903, it was announced "that in the opinion of said committee, no institution or corporation is eligible to membership either as a general or special partner in a firm registered in the Exchange." This decision limited the ability of brokers to expand their operations.

Some events are easier to identify than others. On April 1, 1915, the rules instituted when World War I broke out were abandoned and normal and unrestricted trading privileges were restored. Then on April 14, 1915, the Committee on Admissions was given authority to disapprove of offers by members or their firms to buy or sell listed securities outside the exchange. The result of these important changes was apparently an unpredicted 17.6 percent rise in the price of a seat during the week ending April 15, 1915.

It is difficult to pinpoint the effects of the hearings in Congress after the 1929 Crash. Yet, the steady unexpected declines in late 1930 of 14 percent in the week ending September 25, of 29 percent and 15 percent for the week ending October 2, and 20 percent for the week ending December 31 suggest grave apprehension. The extraordinarily large number of forecast errors in 1931, 1932, 1933 and then 1934 speaks to the considerable uncertainty about the regulatory changes moving through Congress, the defalcation of the Exchange president, and the implementation of the rules by the Securities and Exchange Commission. In one event study, Schwert (1975) found that seat prices fell unexpectedly by about 50 percent in the month when the Securities and Exchange Act of 1934 was introduced into Congress. He claims that the capital loss from this event was never recovered by the brokers.

At the very end of our data, there is a striking decline in seat prices tied to microstructure, regulation and technology. Seat prices climbed in the late 1960s, driven by rising stock prices and volume. The market retreated in and volume fell off briefly then recovered but the prices of seats remained relatively depressed. From a peak of $515,000 early 1969, our series ends in June 1971 with seat prices at $200,000. The large number of abnormal returns in Table 4 identify this as a disturbed period. Although the NYSE was the dominant equities market, there was a rapid growth in the Over-the-Counter market (OTC). Specialists found it difficult to execute large trades and institutional investors moved to the OTC. The NYSE lost business because its fixed brokerage commissions offered to flexibility for large-volume discounts. Ownership of a seat by any publicly traded corporation remained prohibited and Rule 394 (later Rule 390) adopted in 1955 prohibited NYSE members from engaging in transactions in NYSE listed securities with nonmembers (White, 2000).

Finally, a backroom crisis erupted in 1968-1970 when members were unable to accurately process the fast-growing piles of paper produced by the rising volume of trading. The number of failures to deliver securities by the official settlement dates climbed. Pressure was relieved by the 1969-1970 slump in the market, but over one hundred broker-dealer firms were forced into liquidation. In response to customer losses, Congress passed the Securities Investor Protection Act in 1970, creating government insurance for customer accounts. Declines from these problems were further aggravated by the beginnings of deregulation. Golbe (1984) found that price and structural deregulation plus technological change that reduced the cost of trading on other markets had a negative impact on the price of NYSE seats.

Conclusion

The pricing of seats on the NYSE offers a window, albeit sometimes a cloudy one, on how microstructure effects the benefits of membership on the exchange. While the fundamentals derived from stock prices and volume do drive seat prices, they only explain a small portion of the total movement. Rules determined by government regulation and the exchange itself, coupled with technology, appear to be much more important, although measurement of their impact is less precise.

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