



Institution shocks and economic outcomes: Allende's election, Pinochet's coup and the Santiago stock market

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ABSTRACT

To study the effect of political and institutional changes on the economy, we look at share prices in the Santiago exchange during the tumultuous political events that characterized Chile in the early 1970s. We use a transparent empirical strategy, deploying previously unused daily data and exploiting two largely unexpected shocks which involved substantial variation in policies and institutions, providing a rare natural experiment. Allende's election and subsequent socialist experiment decreased share values, while the military coup and dictatorship that replaced him boosted them, in both cases by magnitudes unprecedented in the literature. The most parsimonious interpretation of these share price changes is that they reflected, respectively, the perceived threat to private ownership of the means of production under a socialist government, and its subsequent reversal.

1. Introduction

The importance of institutions as an influence on wealth, growth, distribution and other economic outcomes is now widely recognized (Acemoglu et al., 2005; Simon, 1991; North, 1991). But fundamental institutional changes are typically protracted and associated with other changes affecting economic outcomes, making the identification of causal effects and the mechanisms underlying them difficult.

The election of Salvador Allende's socialist government in Chile in 1970 and its subsequent reversal by a military coup in 1973 provide a curiously unexploited opportunity to study the effect of institution shocks on economic outcomes.¹ Unidad Popular (UP), the left-wing political coalition that supported Allende, promised, and after elected

took steps to implement profound changes to economic institutions and the structure of property rights, towards the final goal of replacing capitalism with some form of socialism. The military coup that ended Allende's socialist experiment promised a return to pro-business policies, but now under authoritarian rule.²

From a research standpoint, the importance of these events lies not only in the large institutional and policy variation involved, but also in the fact that the outcome of the 1970 election was a surprise. Prior to the election, for example, the leading daily *El Mercurio* had published a number of polls showing Jorge Alessandri (a rightwing independent who had been president from 1958 to 1964) leading Allende by a considerable margin (Table 1). We will use data from vote expectation surveys to show that the perceived probability of a socialist victory was

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¹ The epigraph is from a 12:32 pm telephone conversation in Washington. Source: Library of Congress, Manuscript Division, Kissinger Papers, Box 364.

² Major sources on the history of the Allende government and of the military coup are Stallings (1978), Sigmund (1977), Boorstein (1977), Nef (1983) and Larraín and Meller (1991).

Table 1
Voting intention surveys taken before the 1970 Presidential election.

Survey date	Area	n	Tomic	Alessandri	Allende	Undecided	Allende margin
11–13 April	Gran Santiago	1217	26.3%	38.9%	25.0%	9.8%	–15.4
24–27 April	Gran Santiago	1108	28.3	40.6	27.1	4.0	–14.1
24–27 April	Valparaiso-Vina	621	28.4	42.4	25.4	3.8	–17.7
24–27 April	Concepcion-Talcahuano	648	37.1	30.0	23.5	9.4	–15.0
29 May–9 June	National	3711	26.7	32.4	26.3	14.5	–7.1
19–23 June	Gran Santiago	1333	28.1	37.4	31.3	3.2	–6.3
11–14 July	Gran Santiago	1243	21.2	41.9	31.5	5.5	–11.0
11–14 July	Concepcion-Talcahuano	676	32.8	29.6	33.5	4.0	+0.7
8–16 Aug	National	4104	26.8	40.3	29.5	3.4	–11.2
8–11 Aug	Gran Santiago	1296	26.2	39.0	27.3	7.5	–12.6
21–24 Aug	Gran Santiago	1290	26.8	40.3	29.5	3.4	–11.2

Allende margin = Allende share - max(Alessandri share, Tomic share), with shares recalculated after excluding the undecided. Source: p.35 of the Aug 30, 1970 issue of *El Mercurio*.

Table 2
Average price changes of stocks traded in the Santiago Exchange.

	Sep 1970 presidential election				Sep 1973 military coup			
	first trading day (Sep 8)		until Sep 30		first trading day (Sep 17)		until Sep 30	
	n	change	n	change	n	change	n	change
All	32	–40.8%	128	–41.2%	48	85.4%	93	112.3%
Agriculture and fishing	3	–36.2	13	–44.0	8	58.1	15	55.9
Banking and insurance	5	–38.7	17	–43.3	6	141.2	7	194.8
Commerce and transp.	2	–44.5	10	–40.3	4	48.2	7	44.6
Manufacturing	7	–47.0	22	–42.1	8	100.7	18	87.8
Metallurgy	5	–49.0	12	–43.2	3	113.2	8	124.6
Mining	2	–65.4	11	–45.1	1	27.3	8	69.3
Public Utilities	2	–28.7	6	–44.8	3	42.1	5	107.2
R.E. and Construction	1	–47.1	6	–33.7	3	137.9	5	76.0
Textile	1	–7.7	10	–36.9	4	89.0	7	378.6
Food and beverages	3	–20.9	18	–37.4	7	72.4	11	109.7
Others	1	–33.3	3	–37.4	1	18.6	2	10.6

‘First trading day’ refers to the first trading day after the event. ‘Until Sep 30’ refers to the period between the event and the end of the month; n = number of firms which stocks were traded during the period; change = average price change of stocks that were traded during the period (in percentage points). Source: Authors’ calculation from various issues of *El Mercurio*.

indeed rather low, particularly among potential shareholders (Tables 4 and 5).³ Moreover, while an attempt to remove Allende from power was expected by many, an attempted military coup had already failed earlier in the year, so the success of the coup in September 1973 could not have been entirely anticipated.

We use previously unexploited daily aggregate data and newly digitized firm-level data to document the effect of these two shocks on the value of firms listed in the Santiago stock market. As we will show, the reaction to the Allende victory and to the 1973 military coup was dramatic. Share prices decreased by 22 percent in the first trading day after the September 4 1970 election, and in the rest of the month they kept falling, stabilizing at around half their pre-election values. In the first trading day after the 1973 military coup, share prices increased by 80 percentage points. Our event-study estimates, using both conventional inference and a small sample test based on randomization inference, confirm these effect sizes.

Using voting expectation surveys, we show that the ex-ante probability of an Allende victory was perceived to be very low, especially by wealthier individuals, who were more likely to hold stocks. Taking account of the implied modest pre-election internalization of the probability of an Allende victory, the overall effect of the ‘Allende-shock’,

inclusive of anticipation effects, is somewhat larger than the observed effect (–56% according to our estimates).

Firm-level evidence suggests that the impact of the Allende election and of the subsequent coup are both likely to have been driven by factors common to all publicly held firms, while firm- and sector-level factors appear to have played a minor role, if any. For example, we will see that the shares that lost the most value following Allende’s election were not big gainers following the coup; in fact, the extent of a firm’s share value loss associated with Allende’s election is uncorrelated with the extent of the firm’s share value gains associated with Augusto Pinochet’s coup.

Our results are consistent with the view that the changes in share prices following these two events were not primarily moved by growth prospects or expected wage dynamics, which would have impacted firms and sectors differentially. We build measures of sensitivity to aggregate GDP growth and incidence of labor costs at the narrowest possible industrial sector level, and show that these measures do not help predict stock price changes after the two events of interest. Instead the dominant underlying mechanism appears to have been the challenge to private ownership under a socialist government, and the reversal of this challenge with the subsequent advent of a business-friendly and authoritarian regime.

Our paper contributes to two rich and growing strands of literature. The first attempts to identify the effects of institutional changes on economic outcomes. Important advances have been made in studying the long-term effects of arguably exogenous institutional differences among adjacent geographical units – for example Dell (2010) on coerced labor

³ Besides the quantitative evidence that we will provide here, the fact that the Allende victory was largely unexpected is reported also in Sigmund (1977, pp. 106–110), Marash (1988), Navia (2004), Hersh (1983, p. 273) and NSC (1970). According to Bermeo (2003, p. 160), even “a number of prominent left-wing leaders were shocked by Allende’s victory”.

Table 3
Effect of the ‘Allende-shock’ and of the 1973 coup on the IGPA index (Cumulative abnormal returns at different time-horizons).

	1970 election					1973 Coup				
	(k = 1)	(k = 5)	(k = 10)	(k = 15)	(k = 20)	(k = 1)	(k = 5)	(k = 10)	(k = 15)	(k = 20)
Constant mean return model	-21.99 (0.04)	-36.22 (20.51)	-54.28 (21.83)	-63.50 (23.09)	-65.11 (24.63)	78.39 (0.14)	70.19 (72.59)	50.40 (79.40)	61.07 (80.15)	56.55 (81.79)
Autocorrelation-augmented	[2.65]	[7.68]	[9.52]	[12.93]	[14.94]	[3.55]	[13.24]	[22.31]	[27.04]	[29.43]
	-22.87 (0.24)	-50.67 (25.30)	-64.14 (27.25)	-69.75 (29.73)	-67.96 (31.10)	80.13 (0.32)	72.6 (84.45)	47.11 (83.58)	56.81 (84.83)	52.2 (84.55)
Global market factor-augmented	[2.11]	[7.17]	[10.51]	[14.28]	[16.45]	[2.98]	[8.59]	[12.50]	[16.08]	[18.83]
	-22.0 (0.06)	-36.20 (20.41)	-54.25 (21.74)	-63.22 (22.92)	-64.78 (24.40)	78.39 (0.15)	71.27 (73.18)	51.20 (80.53)	62.38 (81.85)	57.77 (83.24)
Autocorrelation and global market factor	[2.72]	[7.60]	[9.52]	[12.97]	[15.09]	[3.67]	[12.68]	[22.24]	[26.95]	[29.27]
	-22.90 (0.25)	-50.57 (25.15)	-64.14 (27.10)	-69.46 (29.50)	-67.60 (30.78)	80.14 (0.32)	73.34 (84.71)	47.90 (84.36)	58.14 (86.09)	53.55 (85.70)
Obs.	[2.13]	[7.30]	[10.49]	[14.28]	[16.44]	[3.06]	[8.11]	[11.77]	[14.30]	[17.16]
	251	255	260	265	270	251	255	260	265	270

Robust standard errors from the regression method (eq. (1)) in round parentheses. 99% critical values from a small sample test using randomization inference (described in the main text) in square brackets. A cumulative abnormal return larger in absolute value than the 99% critical value implies significance at the 0.01 level according to the small sample test.

in colonial Peru and Banerjee and Iyer (2005) on land tenure in colonial India. Other studies exploiting temporal discontinuities and other temporal comparisons identified effects of women’s suffrage (Miller, 2008) and transitions away from authoritarian rule (Acemoglu et al., forthcoming).

Less cleanly identified but nonetheless informative historical studies of major ‘institution shocks’ include the abolition of slavery in the U.S. (Lindert and Williamson, 2016) and the economic measures adopted by the Japanese emperor in the years immediately prior to and during World War II, including dividend and executive pay caps and a doubling of the marginal tax rate on high income groups (Moriguchi and Saez, 2008).⁴

The second literature to which we contribute studies the effect of political (rather than institutional) shocks on stock market valuations. Herron (2000) uncovered a negative correlation between the odds of a Labor victory and share prices in the 1992 UK parliamentary election, inferring that a Labor victory would have reduced stock valuations by 5–10 percent. Sattler (2013) uses a simple event-study approach and a sample of post-1950 elections in OECD countries, and finds that stock returns tend to be lower by 1.7 percentage points after a Left victory. Snowberg et al. (2007) use betting markets and high frequency data to deal with endogeneity and anticipation effects, showing that the election of a Republican President tends to raise US stock market valuations by 2–3 percent.

Some evidence has been provided also on the stock market effect of regime changes. Dube et al. (2011) use the timing of top-secret coup authorizations to show that the share prices of exposed US firms react positively to US-backed coups and coup authorizations, finding that the average effect of a coup authorization event is around 13 percent for a company with its entire capital stock at stake.⁵ Ferguson and Voth (2008) estimate the value of political connections during an episode of stark institutional change, the rise of the Nazi party to power in Germany, finding that firms connected to the Nazi movement outperformed the rest of the German stock market by 5–8 percent in the aftermath of Hitler’s rise to power. Gonzales and Prem (2017) study Chilean firms with links to the Pinochet administration after the 1988 plebiscite which unexpectedly ended his dictatorship, finding that their share prices decreased relative to non-connected firms, but only temporarily.⁶

Existing studies have thus provided well-identified evidence on the aggregate stock market effect of relatively limited political shocks (e.g. Snowberg et al. (2007)) and on the effect on the valuation of particular firms of more far reaching institutional changes (e.g. Dube et al. (2011), Ferguson and Voth (2008) and Gonzales and Prem (2017)). Our study fills a gap in the literature by providing clear-cut evidence on the effects of a major institutional change, involving substantial variation in the political status of private property rights, on the valuation of listed firms.

By comparison with the existing literature on the value of political connections, which has uncovered significant effects of political events

⁴ Lindert and Williamson (2016) observe: “In both the Japanese and Confederate crises, a polity that had been slow to liberalize had much of this top wealth suddenly confiscated and redistributed to those in the bottom 99 percent”.

⁵ Their sample includes the 1973 military coup in Chile. For that specific case, they find small and non-significant effects of the authorization events they study (top-secret meetings in which US officials approved the allocation of sums of money to supporting anti-Allende activities) on the share prices of US firms which had been expropriated by the socialist Government. However, they do find a relevant and significant effect of the 1973 coup itself. This result is consistent with our view that while a coup attempt was expected, the outcome of the Pinochet coup had not been entirely anticipated.

⁶ Gonzales and Prem (2017) explain the negative effect being only temporary by showing that these firms increased their investment during the 1988–1989 transition period in which Pinochet was still in power, possibly in order to enjoy market power under the new regime.

Table 4

Hamuy's pre-electoral surveys: answers to the questions 'Who would you vote for if the presidential election were to be held next Sunday' and 'Who do you think will win the upcoming presidential election?' – Whole sample.

month	n	voting intention				expected winner			
		Tomic	Alessandri	Allende	no answer	Tomic	Alessandri	Allende	no answer
1/1969	677	18.3%	51.7%	13.3%	16.7%	–	–	–	–
2/1969	853	23.7	43.6	17.9	14.8	–	–	–	–
7/1969	537	22.9	46.2	18.2	12.7	–	–	–	–
3/1970	625	27.8	39.5	19.0	13.6	27.7	46.6	13.0	12.8
3/1970	298	31.2	33.6	24.5	10.7	25.5	43.3	16.4	14.8
5/1970	679	28.7	35.8	26.1	9.4	25.2	43.9	20.6	10.3
6/1970	685	38.5	25.1	25.7	10.7	39.9	25.0	23.2	12
7/1970	473	34.5	33.6	26.4	5.5	27.9	31.7	23.9	16.5
7/1970	886	26.0	35.4	33.2	5.4	23.7	39.3	28.1	8.9
8/1970	721	25.7	33.8	30.2	10.3	28.4	31.9	22.9	16.8
8/1970	349	26.7	37.0	31.5	4.9	26.9	35.0	27.5	10.6

Sample of adult residents of metropolitan Santiago (except for the first July 1970 survey and the June 1970 one, which were both taken in the 'Valparaíso and Vina del Mar' area). Face to face interviews. Source: CEDOP/Hamuy Archive. Datasets downloaded from the Roper Center for Public Opinion Research website.

Table 5

Hamuy's pre-electoral surveys: share of respondents expecting Allende to win the 1970 presidential election among the wealthy.

month	whole sample	living in upper-middle class home or better	good or very good socio-economic status	very good socio-economic status	income sufficient to save money
3/1970	14.9% (n = 625)	7.9% (n = 103)	9.0% (n = 149)	0% (n = 10)	5.9% (n = 43)
3/1970	19.3 (n = 298)	2.4 (n = 55)	5.3 (n = 70)	5.7 (n = 64)	21.4 (n = 19)
5/1970	23.0 (n = 679)	10.6 (n = 103)	13.9 (n = 126)	6.3 (n = 19)	5.8 (n = 62)
6/1970	26.4 (n = 685)	20.8 (n = 125)	24.9 (n = 199)	11.1 (n = 19)	13.3 (n = 66)
7/1970	28.6 (n = 473)	12.5 (n = 77)	18.4 (n = 123)	11.8 (n = 19)	19.6 (n = 54)
7/1970	30.9 (n = 886)	15.2 (n = 104)	19.3 (n = 182)	7.1 (n = 30)	15.5 (n = 80)
8/1970	27.5 (n = 721)	13.2 (n = 121)	19.6 (n = 183)	14.7 (n = 43)	15.4 (n = 45)
8/1970	30.8 (n = 349)	18.0 (n = 67)	n.a.	n.a.	n.a
tot. 7–8/1970	29.5 (n = 2429)	14.6 (n = 369)	19.2 (n = 488)	11.4 (n = 92)	16.7 (n = 179)

Shares calculated after excluding undecided and no answers. n = size of the subsample (including undecided and no answers). Sample of adult residents of metropolitan Santiago (except for the first July 1970 survey and the June 1970 one, which were both taken in the 'Valparaíso and Vina del Mar' area). Face to face interviews. Source: CEDOP/Hamuy Archive. Datasets downloaded from the Roper Center for Public Opinion Research website.

on the cross-section of firm returns in various contexts (e.g. [Fisman \(2001\)](#) and [Jayachandran \(2006\)](#)), the institutional shocks we study in this paper are characterized by a much larger average impact on share valuations, with strikingly low variance across firms and industrial sectors. The magnitude of the share price effects that we document – unprecedented in the literature – are entirely plausible given the systemic nature of the changes in economic institutions that wealth owners had reason to anticipate first with Allende's election and subsequently with Pinochet's coup.

2. The stock market reaction to the Allende victory and the military coup

2.1. Data

To assess the stock-market reaction to these two shocks we employ daily data on the General Index of Stock Prices (IGPA) calculated by the Santiago exchange, a capitalization-weighted index that includes most listed companies. Historical daily data on the IGPA index is proprietary, and we purchased it from the Santiago exchange. We complement this information with newly digitized data on individual stocks.⁷

[Fig. 1](#) displays the IGPA in a long window around our period of interest. Having risen under Alessandri, stock market valuations had

declined during the presidency of Eduardo Frei Montalva (1964–1970), a Christian Democratic leader who enacted redistributive policies, most notably in the areas of education, land reform and taxation ([Thome, 1971](#); [Kirkendall, 2004](#); [Ffrench-Davis, 1973](#)). They decreased further during Allende's socialist presidency, before experiencing a strong revival after the military coup.

2.2. The Unidad Popular electoral victory

Allende's margin of victory over the runner-up Alessandri in the 1970 election was just 1.34%.⁸ Respecting a longstanding democratic tradition, Allende would later be confirmed as president.

In the first trading day after the election,⁹ the IGPA fell by 22%. This constitutes the largest daily decrease in share prices ever recorded in Santiago in the period for which we have data (1961–2016). Compared with the empirical distribution of daily returns on the IGPA from 1961 (the first year for which daily data exist) until that day, this change is

⁸ Allende 36.61%; Alessandri 35.27%; Tomic (Christian Democratic) 28.11%.

⁹ This was Tuesday September 8: the market was closed the Monday after the election. Although the management of the stock exchange declared that activity had been interrupted because of "technical reasons" ([El Mercurio, 1970b](#)), contemporary observers countered that the stock market had actually been closed in an attempt to mitigate financial panic due to the election outcome. For example, the US magazine *TIME* wrote that "fearful of a stampede of scared investors, the Santiago stock market closed for a day for the first time since 1938". ([TIME, 1970](#)).

⁷ We hand-collected data on the daily prices of all individual stocks listed in the Santiago exchange from copies of the Chilean newspaper *El Mercurio*, which we accessed in microfilm format at Yale University library.

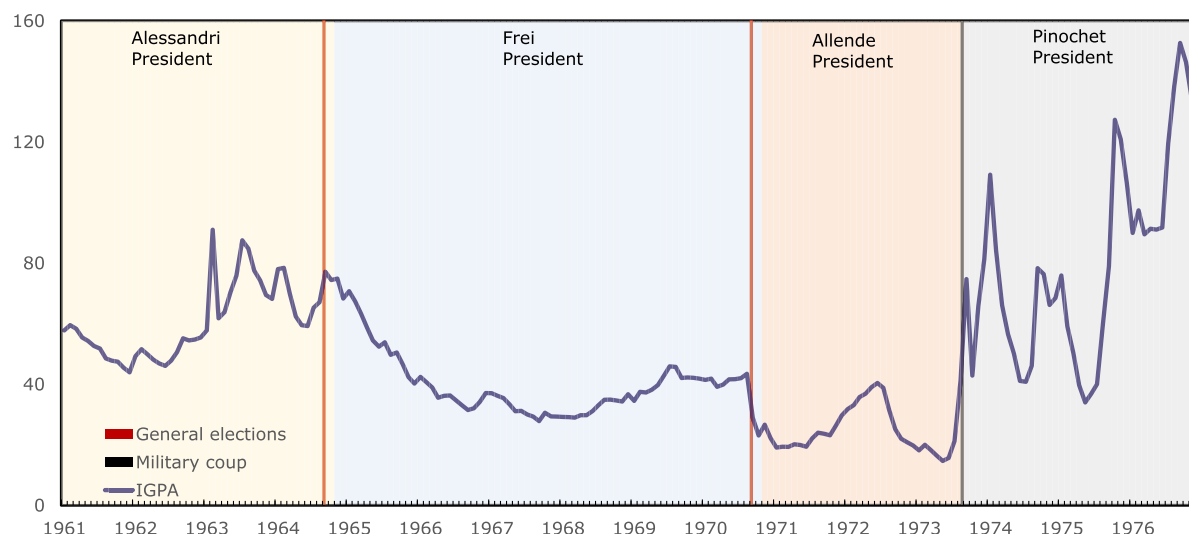


Fig. 1. Deflated IGPA index (monthly, 1976 = 100).

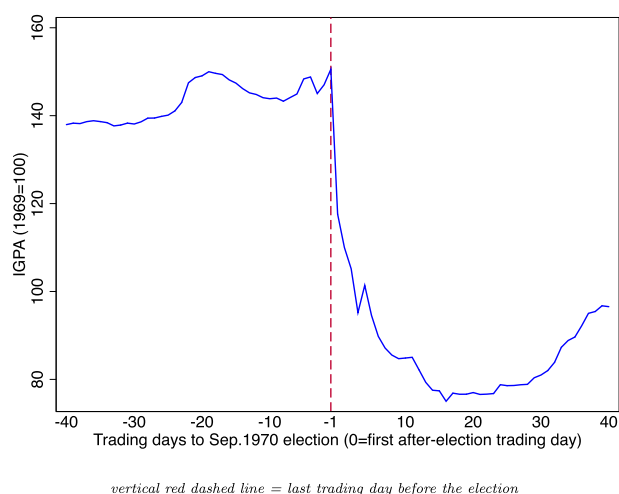


Fig. 2. IGPA index around the September 4 1970 election.

25.8 standard deviations below the sample mean (16.1 standard deviations if considering the whole 1961–2016 period), and in absolute value is 2.5 times larger than the previous maximum deviation. Fig. 2 displays trading days before and after the election on the horizontal axis and the IGPA index on the vertical axis.

Stock prices kept falling for around 15 trading days after the event, and stabilized at a much lower level around the end of the month. Between September 3 1970 (the last trading day before the election) and September 30, the IGPA fell by 48.6 percentage points.

The behavior of individual stocks suggests that the continuing substantial decline in share values in the days immediately after the ‘Allende shock’ was partly due to the fact that many stocks were not traded at all in the immediate aftermath of the election. According to the daily commentary of stock-market activity published on *El Mercurio*, the market was partly frozen in the first trading day after the election, with would-be sellers struggling to find buyers (*El Mercurio*, 1970a).

Indeed, out of 167 listed firms that we observe both immediately before and immediately after the election, only 32 were effectively exchanged in the first trading day after the election. Those shares decreased on average by 40.8% that day, and then by a further 17.8% in the rest of the month. For those stocks, therefore, we do observe

substantial delayed adjustment, but the bulk of the decrease happened immediately. The part of the adjustment which was not immediate may be explained by the acquisition of new information in the aftermath of the election – for example the growing certainty that Allende would be confirmed as President by the National Congress – and/or by the fact that it took some time for investors to fully ‘digest’ the consequences of an Allende presidency.

The 96 stocks that were not exchanged in the first trading day after the election, but were then exchanged in the rest of the month, fell on average by 37.1 percentage points between election day and September 30.

Importantly, as shown in Table 2, the fall in share prices was broad, with little differences across industries. Among the eleven industrial sectors in which Table 2 classifies firms, the standard deviation of the percentage change in valuations is just 9.4% of the average change.¹⁰ This suggests that shareholders’ concerns about property rights and profitability in publicly-held firms were pervasive across the whole economy, with sector-specific factors playing little role.

In fact, not only sector-specific factors, but all sources of between-firm variation seem to have played little role in the reaction to the ‘Allende shock’. Among the 128 firms which stocks were traded between election day and the end of the month, the standard deviation of the percentage change in valuations is only 48% of the average change. Also the gap between the 75th and the 25th percentile of after-Allende stock returns (respectively –31% and –55%) is less than half as large as the average change. Only four stocks experienced a non-negative price change between election day and the end of the month,¹¹ while the remaining 124 decreased in value. We thus conclude that the reaction to the ‘Allende shock’ was characterized by a remarkably large average impact, with low variability across firms and sectors.

The 1970 presidential election also coincided with a record increase in dividends paid by firms listed in the Santiago Exchange. A large spike took place in the months of August, September and October 1970, as shown by the dashed line in Fig. 3.¹² We also calculate a 12-months

¹⁰ The industrial sector classification of all firms listed in the Santiago exchange was taken from Salvaj and Lluch (2012). We are grateful to the authors for sharing the list with us.

¹¹ Specifically, one stock (Figalema) was traded at an unchanged price, while three (Colorantes, Margozzini and Shyf) modestly increased.

¹² We digitized historical data on (deflated) monthly dividends paid by firms listed in the Santiago stock exchange from Malamakis (1983).

moving average (the blue line), in order to show that the spike in dividends persists also after netting out seasonal effects. This dividends' boom, that to the best of our knowledge has gone unnoticed in the literature so far, is likely to reflect the desire of many shareholders to take their wealth out of Chilean publicly-held firms.

2.3. The coup d'état

On Tuesday 11 September 1973, a military coup deposed Allende's socialist government and established a military dictatorship. The Santiago exchange remained closed in the four trading days before the coup and for three trading days after.¹³ The market reaction to this event was extraordinary. In the first trading day after the coup (Sep 17), the IGPA rose by almost 80 percentage points – as displayed in Fig. 4. This daily change lies above the sample average registered until that day by 67.1 standard deviations, and is 5.5 times larger than the previous maximum. It remains, to date, the largest daily IGPA increase on record. Although a marked positive trend is visible in the 25 trading days before the coup, which seems to indicate some anticipation effect, the timing and magnitude of the jump is clearly suggestive of a strong positive reaction of share prices to this regime change.

A possible concern about this evidence is that part of this jump may have been a nominal effect due to inflation. Although it is usually safe to assume inflation effects to be negligible when analyzing daily changes, in this case 13 days passed between the last trading day before the event (Sep 4) and the first after (Sep 17), and inflation in Chile was high at the time. Discounting the change in the IGPA index between Sep 4 and Sep 17 on the basis of the officially recorded monthly inflation rate for September 1973, we are still left with a 67% real increase in share prices in one trading day.¹⁴

3. Event-study estimates

It is useful to ask how likely are the sharp market movements that we have documented to reflect just the ordinary sources of variation in stock prices experienced in the Santiago exchange. To this end, Fig. 6 compares the magnitude of the jumps observed after the two events with the overall distribution of IGPA daily changes. Clearly, both the Allende election and the coup coincided with unprecedented deviations from normally observed changes in prices.

We also assess whether regional or global financial/economic shocks may have played some role. Fig. 7 uses major Latin American and other stock markets as a comparison group, showing that the shifts in share prices after our events of interest are not common to other regional stock markets.

To estimate more formally the effect of the 'Allende-shock' and of the 1973 coup on the IGPA index, we employ a standard event-study methodology. We estimate cumulative abnormal returns (CARs) following the two events by regressing returns on the IGPA index on an indicator for the event of interest and a vector of controls. The specification is as follows¹⁵:

$$R_t = \beta X_t + \gamma E_t(k) + \epsilon_t \quad (1)$$

where R is the one-day return on the IGPA index (the percentage change in the index value between trading day $t - 1$ and trading day t); X_t is a

vector of control variables which determine 'normal returns'; $E_t(k)$ is a variable that takes value 1 for a k -day period beginning with the event day and zero otherwise.

Event-studies using a broad market index as the outcome variable of interest typically employ a 'constant mean return' model (MacKinlay, 1997, p. 17), which in terms of our specification above would imply including only a constant in the vector X .¹⁶ We start with a constant mean return model, and augment it with an auto-regressive coefficient and a global market factor. The first is meant to capture momentum in daily returns, and it consists in adding the lag of the dependent variable in the X vector.¹⁷ This is potentially important in our context, given that a preliminary analysis reveals significant autocorrelation in daily IGPA returns in our period of interest. Our global market factor consists in including returns on the US S&P500 index into the X vector, under the assumption that IGPA and S&P500 are both subject to common global market shocks.¹⁸

We estimate eq. (1) in a time-window starting 250 trading days before the event and ending k days after the event, employing robust standard errors. We let k range between 1 and 20 in order to calculate cumulative abnormal returns in a 20-days horizon after the two events. The k -days cumulative abnormal return is equal to $k\gamma$.

A potential drawback of this standard event-study approach is that standard errors may be incorrectly estimated due to possible non-normality in the distribution of CARs and the small number of events. We address this concern by providing a small sample test using randomization inference, in the spirit of Fisher (1937). We estimate cumulative abnormal returns using equation (1), substituting the true event date with a 'placebo' date. We repeat the operation for all possible placebo dates in a large pre-treatment window (500 trading days, ending in the last day of the year before the event). We obtain simulated 95% and 99% critical values from the resulting distribution of CARs. These simulated critical values do not rely on distributional assumptions and do not appeal to asymptotic justifications.

Results are summarized in Table 3, which reports four alternative specifications: constant mean return model; augmented with autocorrelation-factor; augmented with 'global market' factor; augmented with both auto-correlation and global market factors. The table reports both conventional (heteroskedasticity-robust) standard errors and simulated critical values from the small sample test. The estimated cumulative abnormal returns are virtually unchanged across these specifications.

The abnormal returns in the first trading day after the Allende shock and the military coup are both highly significant and close to the unconditional changes observed after the events (−21.88% and +79.20%, respectively). Consistent with the descriptive evidence presented in the sections above, cumulative abnormal returns decrease further and remain statistically significant after the Allende election, stabilizing below −60% after 15 trading days, while the coup is followed, after the striking jump of the first trading day, by remarkable volatility,

¹³ Immediately after the coup, the exchange was closed – like most other trading activities – because of civil unrest. It is tempting to speculate that the closing of the stock market between September 5 and 10 (that is, in the days leading to the coup) was related to the forthcoming regime change, but we were unable to find any direct evidence to this effect.

¹⁴ The officially recorded monthly CPI inflation rate for September 1973 is taken from Malamakis (1983). Using the CPI series provided by the OECD Main Economic Indicators (accessed in July 2017) yields an identical figure.

¹⁵ Our specification follows quite closely, but adapts to our aggregate time-series data, the specification employed by Dube et al. (2011).

¹⁶ Examples are Bernanke and Kuttner (2005, pp. 1225–1226) and Ehrmann and Fratzscher (2004). Haitsma et al. (2016) and Fausch and Sigonius (2017), instead, use a constant mean return model augmented with a global market factor, similarly to what we do here. Pantzalis et al. (2000) use both the simple constant mean return model and the 'global market factor'-augmented model in order to study the behavior of 33 major stock markets around national elections.

¹⁷ The choice to include only one lag is based on the BIC criterion.

¹⁸ Ideally, we would control for a world (or Latin America) index excluding Chile. However, such indexes are not available at a daily frequency for the early 1970s (the MSCI World index, the most widely adopted global index, is available at a daily frequency only since 1976). We thus use the S&P500 as a proxy for global dynamics. In a robustness test, we have employed the Argentinian stock market index (Buenos Aires SE General Index - IVBNG) in lieu of the S&P500. Results (not reported here for reasons of space but available upon request) are virtually identical, in terms of both coefficients and significance levels.

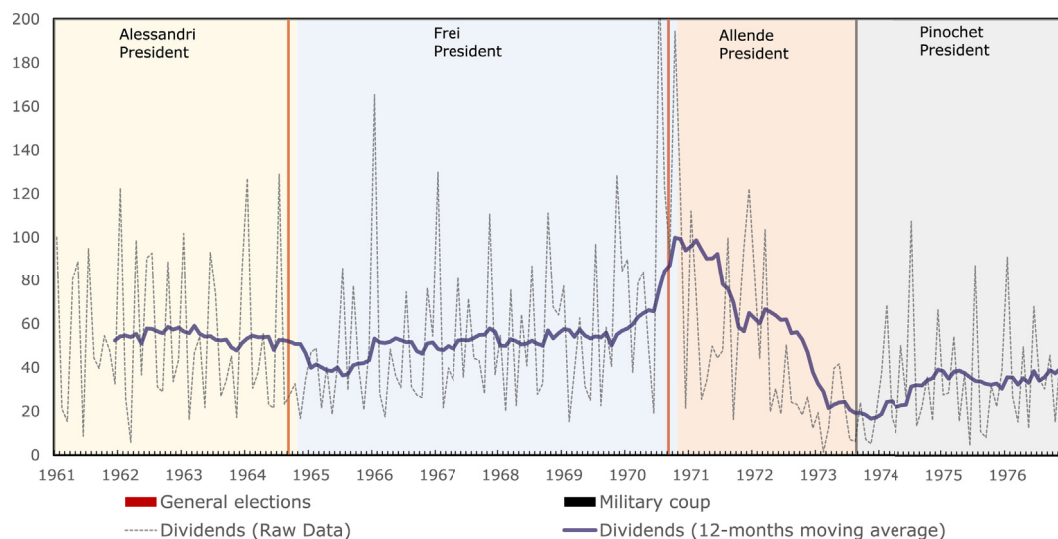


Fig. 3. Monthly real dividends paid by firms listed in Santiago.

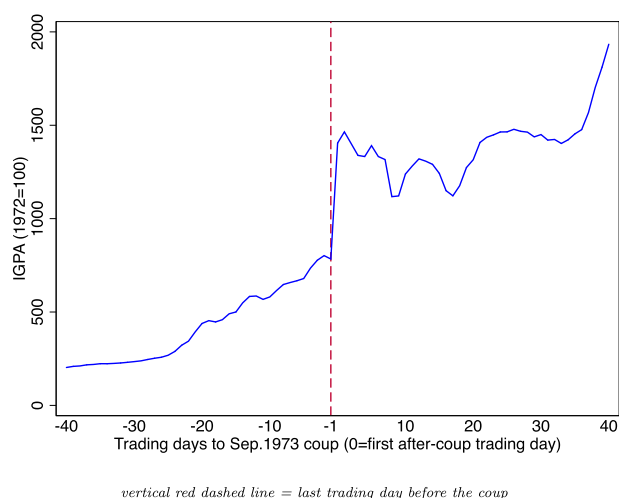


Fig. 4. IGPA index around the September 11 1973 coup.

with cumulative abnormal returns remaining consistently positive and large, but more imprecisely estimated.

4. Gauging anticipation effects

Our exercise exploits the fact that the Allende election came as a surprise, and that the success (if not the occurrence) of the Pinochet coup could not have been entirely anticipated. Given the substantial surprise constituted by these events, we use them to study the underlying effects of interest. These are, in the case of the 1970 election, the impact of the certainty of an Allende government, relative to a weighted average of an Alessandri and a Tomic government¹⁹; in the case of the 1973 coup, the effect of a business-friendly military dictatorship relative to a continuation of the Socialist government (for another 3 years, followed by new elections).

Of course, the changes in stock market valuations that provide the basis for our analysis are bound to provide underestimates of these

underlying effects of interest: market valuations before the election must have had already internalized some non-zero probability of a socialist victory; similarly, before the 1973 coup some anticipation effect may have been due to awareness of the increasing possibility of an event of this type, given the political and economic context, or to private information.

Unfortunately, there is no information allowing quantification of the extent of the anticipation effect in the case of the military coup. However, surveys conducted before the 1970 election allow some quantification with respect to the ‘Allende shock’. In what follows, we use data from vote expectation surveys to obtain a measure of the perceived probability of a socialist victory. We focus on the wealthy individuals that were likelier to hold shares. We then use this information to recover an approximate estimate of the overall effect of the ‘Allende shock’. We show in Appendix A that voting intentions surveys, while clearly inferior to vote expectation data for our purposes, yield similar estimates.

4.1. Voting expectations and perceived probability of Allende victory

The value of the IGPA in the day before the 1970 election can be seen as a weighted average of expected valuations conditional on the three possible election outcomes, with weights given by perceived probabilities.²⁰ As a result, we can recover an estimate of the overall effect as the observed price change divided by the estimated surprise (defined as one minus the ex-ante perceived probability of the event). We use the vote expectation surveys conducted by Eduardo Hamuy, founder in 1957 of an innovative public opinion research program at the University of Santiago (Cordero, 2009, pp. 75–76), to obtain an approximate measure of the ‘surprise’.

Hamuy’s surveys asked (mostly) residents of the Santiago metropolitan area, among other questions, “who do you think will win the upcoming presidential election?”.²¹ Results are reported in

¹⁹ Obviously, neither executive would be expected to remain permanently in power, but to be followed by new elections in six years, possibly with some probability of a coup or a revolution.

²⁰ As usual in the literature, in this discussion we are abstracting from risk aversion, as we have no measure of the degree of risk aversion of investors in the Santiago stock market in that period.

²¹ Our translation. The original question in Spanish was: “En su opinión, cuál de los candidatos cree usted que ganará la próxima elección presidencial?”. In some of the surveys the wording is slightly different: “En este momento, ¿cuál cree usted que es el candidato que tiene mejores posibilidades de triunfo?”.

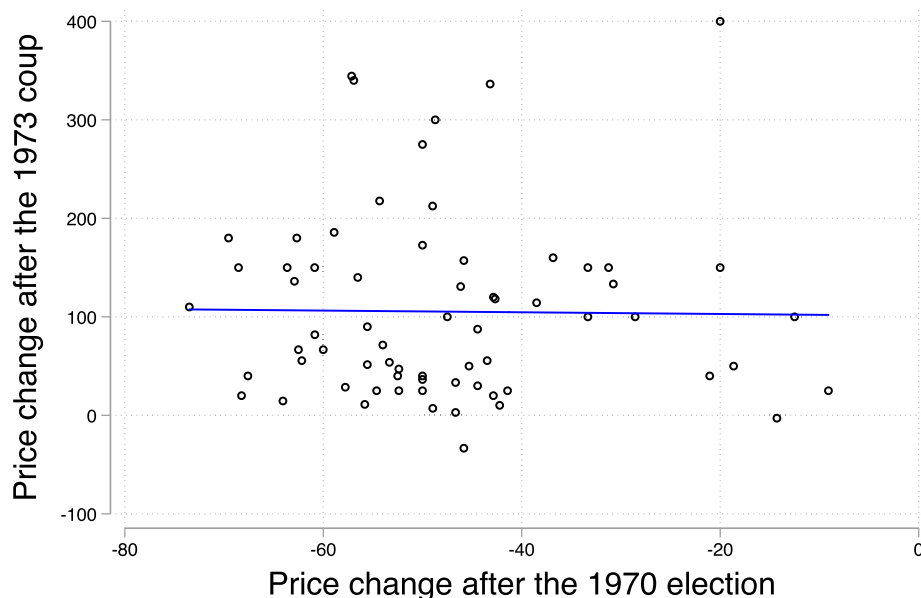


Fig. 5. Returns for those stocks that were traded both after the 1970 election and after the 1973 coup.

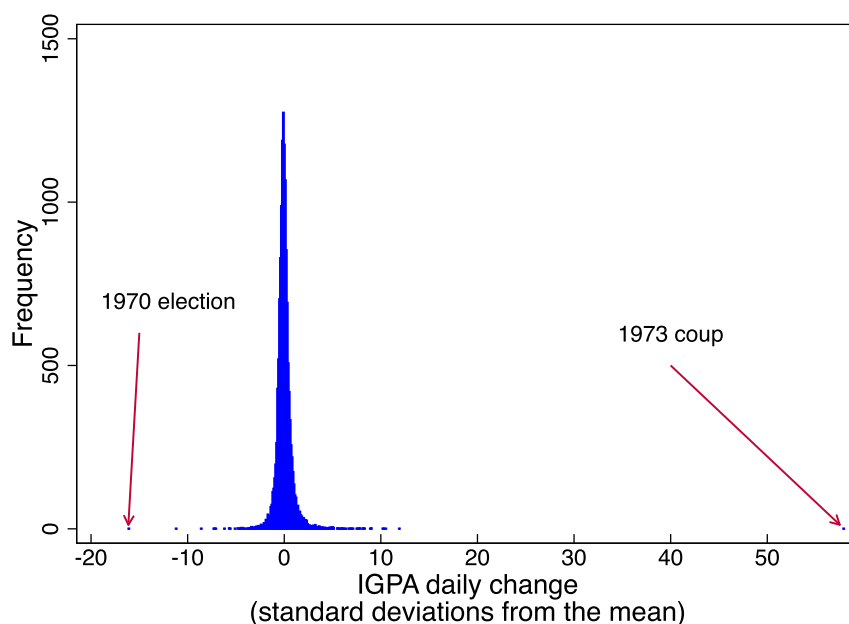


Fig. 6. Empirical distribution of IGPA daily percentage changes (1961–2016, bin width 0.10).

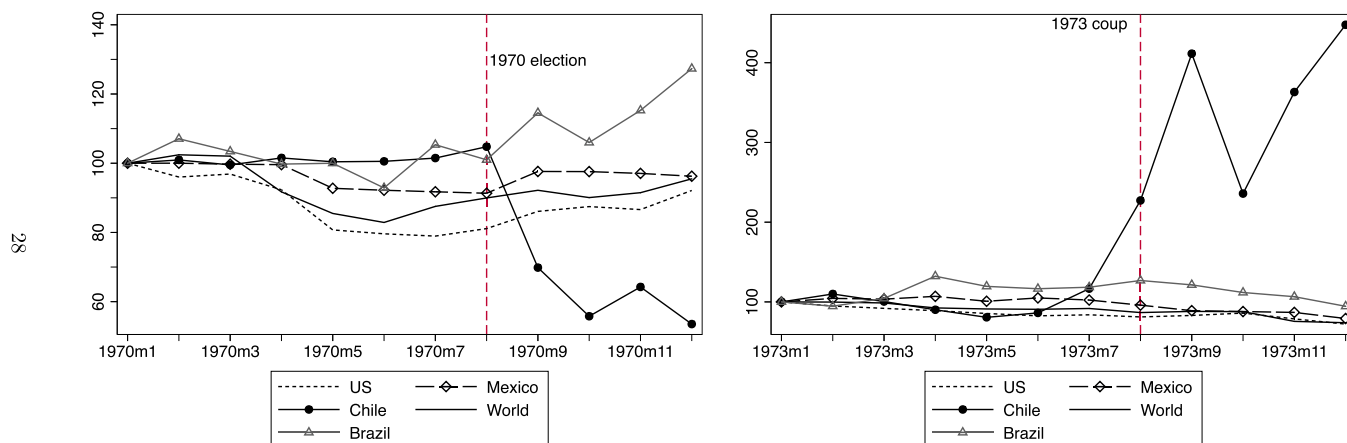
Tables 4 and 5.²² In the two months before the election, the share of responders predicting an Allende victory has been stable and near 30%

²² We downloaded Hamuy's datasets from the online archive of the Roper Center for Public Opinion Research (Cornell University). Hamuy's surveys have been used in a number of studies on public opinion trends in Chile, including Bermeo (2003), Navia and Osorio (2017, 2015) and Prothro and Chaparro (1974). See Navia and Osorio (2015, pp. 122–126) for a discussion of the methodology and accuracy of Hamuy's surveys.

overall (second column of Table 5).²³

Importantly, the share predicting an Allende victory is significantly lower among the wealthier individuals who were much more likely to hold shares in the Santiago stock market. This is shown in Table 5, where we use four alternative proxies for wealth, based on the information contained in Hamuy's surveys. In the third column, we define as wealthy an individual who reports living in a 'luxury mansion', 'luxury

²³ Graefe (2014) shows that vote expectation surveys are among the best predictors of electoral outcomes, and that their role is comparable to that of prediction markets. Favorable results on the predictive power of voting expectation surveys are found also by Rothschild and Wolfers (2012).



vertical red dashed line = last monthly observation before the event

Fig. 7. Deflated Stock Indices.

Table 6

Estimated growth sensitivity.

Sector	Growth Sensitivity
Shipping	.457
Textiles	.827
Mining	.901
Banks and Finance	1.266
Insurance	1.418
Industrials	1.685
Metallurgy	1.730
Utilities	1.759
Agriculture and Fishing	1.775

The 'growth sensitivity' of a sector is the estimated coefficient from a OLS regression of sectoral returns on GDP growth, using yearly data for the 1940–1968 period. Deflated sectoral returns retrieved from Global Financial Data; Real GDP growth calculated from Penn World Tables 9.0 (for the 1951–1968 period) and Malamakis (1978) (for the 1940–1950 period, for which Penn World Tables data are not available).

apartment' or 'upper-middle class home' (the remaining categories are 'lower-middle class', 'modest', 'poor' and 'very poor'). In the fourth column, we look at socio-economic status (as assessed by the interviewer), including those who are classified as displaying a 'very good' or 'good' socio-economic level (other categories are 'regular', 'bad' and 'very bad'). In the fifth column we use a more restrictive classification, including only those with 'very good' socio-economic level. Finally, in the last column we consider those who declare that their income 'is well sufficient and allows them to save some money' (excluded categories are 'sufficient, no difficulties'; 'not sufficient, some hardship'; 'not sufficient, great hardship').

The fact that wealthier individuals were less likely to predict an Allende victory clearly holds across different surveys and different proxies for wealth. In surveys performed in the last two months before the election, during which time figures appear rather stable, the share predicting an Allende victory among the wealthy varies between 11.4% and 19.2% depending on the proxy employed for wealth, with a simple average of 15.5%.

We employ a logit model to estimate the predicted probability of expecting an Allende victory for an individual with an upper-middle

Table 7

Estimated overall and direct labor costs per unit of output.

Sector	Overall wage costs	Direct wage costs
Chemicals	.202	.088
Agriculture	.204	.111
Commerce	.210	.127
Food Drink and Tobacco	.224	.081
Textiles	.279	.132
Utilities	.287	.176
Paper and Printing	.298	.150
Fishery	.298	.164
Equipment	.331	.202
Mining	.332	.227
Basic Manufactures and Metallurgy	.354	.178
Transport and Communications	.356	.245
Banks and Finance	.374	.307
Construction	.379	.230
Hotels and Restaurants	.438	.321
Health Services	.471	.400
Education	.870	.826

Overall wage costs are direct and indirect labor costs per unit of output (see text for details); direct wage costs are wage payments as a share of sectoral output. Authors' calculations from the 1977 input-output table for the Chilean economy (Venegas Morales, 1994).

class or luxury home and a salary sufficient to accumulate savings.²⁴ The resulting estimate is 13.7%. We interpret this as the ex-ante probability of an Allende victory perceived by potential investors.²⁵ Combined with the observed 48.6% cumulative fall in share prices in the aftermath of the election, this suggests that the overall effect – defined as the difference in valuations between an Allende government and a

²⁴ Estimates from the logit model – not reported here for reasons of space but available upon request – indicate that the socio-economic status as assessed by the interviewer provides no significant explanatory power, after controlling for house type and salary (the p-value on the socio-economic status variable is 0.94, while coefficients on the house type and salary variables are negative and significant with $p < 0.01$, with standard errors clustered by survey wave).

²⁵ Of course, the assumption that the average perceived probability of the event among respondents is equal to the share of respondents 'expecting' the event is a crude one. However, a more sophisticated approach would require information on the shape of the distribution of underlying perceived probabilities, which is not available.

Table 8

Effect of ‘growth-sensitivity’ and overall wage costs on share price changes after the two events.

	1970 election			1973 coup			1973 coup (wins.)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variable: percentage change in share prices									
Growth sensitivity	–0.03 (0.06)		–0.04 (0.05)	–0.21 (0.23)		–0.22 (0.25)	–0.15 (0.24)		–0.14 (0.25)
Labor costs		–0.01 (0.06)	–0.04 (0.07)		0.05 (0.11)	–0.06 (0.16)		0.12 (0.15)	0.04 (0.19)
Obs.	120	126	120	87	91	87	87	91	87

For the 1970 election, the dependent variable is the share price change between September 4 1970 and the end of the month; for the 1973 coup, the dependent variable is the share price change between Sep 11 1973 and the end of the month; standardized coefficients; standard errors clustered by industrial sector in parenthesis; wins. = largest and smallest values winsorized to test robustness to outliers; see text for the definition of growth sensitivity and labor costs.

probability-weighted average of a Tomic and an Alessandri government – is around 56%.

The marked increase in stock prices prior to the coup may reflect an analogous internalization of some positive likelihood of a regime change. If this is the case, the difference in stock market valuations associated with the two regimes is considerably greater than the observed 80 percent one-day change in stock prices.

5. Discussion and potential mechanisms

The effects we have found are remarkably large – a full order of magnitude larger than those found by previous studies (cited in the introduction) on the stock market effect of political changes. Why did the Allende election and the subsequent coup have such an enormous impact on stock market valuations?

5.1. Potential mechanisms: uncertainty, growth prospects, wage policy and property rights

An explanation based on uncertainty alone would not be plausible. According to this hypothesis, the institutional shocks we are studying would have caused changes in the variance (but not the mean) of expected stock returns. With risk-averse investors, these fluctuations in uncertainty would cause changes in average share prices. Specifically, the election of Allende – the first socialist President in the country’s history – would have caused a fall in share prices just by increasing the uncertainty surrounding business conditions; symmetrically, the 1973 coup would have caused shares prices to rebound just by restoring a more predictable, ‘business as usual’ framework. We consider this explanation implausible for two main reasons.

First, it is hard to imagine that the conditions introduced by a military coup – a rupture with long standing democratic and constitutional traditions in Chile – would be substantially less uncertain than those brought about by an experiment in socialism under a democratically elected constitutional government.²⁶

Second, even confining attention to the effects of the Allende victory alone, an implausible extent of risk aversion and anticipated uncertainty would be required to explain the magnitude of the fall in asset values by this route. Lack of information alone can hardly explain our results.

These institution shocks must therefore have had an impact on (the present value of) the expected stream of future profits, not just their

variance. In order to organize our thinking about possible channels, suppose that wealth-owners used a simple heuristic to assess the value of owning a share of the capital stock of firm i in the Santiago stock market, one which will abstract from temporal dimensions and just consider a single period: $V = \frac{y\Pi}{K}(1 - c)$, where V is the price of a share of firm i , y is value added, Π is the share of capital in value added, K is the capital stock and c is the probability of nationalization (assuming for simplicity no compensation). The impact of the two events may have worked through changes in growth prospects (expectations about y), in the expected share of capital (Π) or the probability of nationalization (c).

Three factors may thus contribute to explaining our results. First, investors had reasons to expect a significant challenge to private property rights under an Allende government, given its commitment to nationalization, seen as a first step towards socialist transformation. Second, they may have expected massive redistribution through wage policy.²⁷ Third, investors may have expected a large difference in growth prospects between a socialist and a conservative government, due to either poor economic management by the socialists or economically disruptive opposition by capital owners and foreign powers.

On the basis of our reading of the historical record and the empirical evidence presented below, we see the first factor – the anticipation of a significant attack on private property rights – as the most important. Widespread confiscation of the private capital stock was a cornerstone of the Unidad Popular economic platform in the 1970 election. Its economic program stated “as a first step” its intention to nationalize “all those activities that have a strong influence over the nation’s social and economic development”.²⁸ According to one of the most popular accounts of the economics of the UP government, “the scope of the nationalization program is striking, as it encompasses all firms of significance” (Larrain and Meller, 1991, p. 192). Allende’s government did indeed nationalize a substantial portion of the non-farm economy of the country, including by 1973, firms accounting for well over two-thirds of the output in mining, utilities, transport, communications, and the financial sector. At the time of the coup 39 percent of the output of the Chilean non-farm economy originated in nationalized firms. Conversely, the military junta that took power in September 1973 made it immediately clear that re-privatization of nationalized firms was one of its main policy goals. “Defeating Marxism” and restoring a capitalist economy was the main justification brought forward by the military

²⁶ The first months of the military regime, before the beginning in 1975 of what Silva (1996) calls the ‘radical neoliberal policy’ phase (1975–82), were characterized by lack of a clear economic strategy, other than a strong pro-capitalist stance, and indecision about the economic policies to implement. According to Cavallo (2008, p. 34), “in the days following the coup, economics had become an area of chaos” in the newly installed military government.

²⁷ The main channel through which the Allende government could (and in fact did) affect Π is wage policy. Redistribution through tax changes was unlikely, because any change in the tax code would have needed the approval of the opposition-controlled Congress, and indeed the Allende government exerted little control over tax policy (as emphasized for example by (Boorstein, 1977, pp.116–118, 187 and 200)).

²⁸ *El Programa de la Unidad popular*, cited in Boorstein (1977, p. 127) and Larrain and Meller (1991, p. 192).

junta for its coup d'état. In our view, it was this unfavorable institutional environment for private property and its replacement in 1973 by a regime dedicated to the aggressive defense of private property (unhampered by liberal democratic constraints) that explain the two large share price movements.

Of course we do not have direct evidence for the complex considerations that informed shareholders' behavior, but two pieces of indirect evidence weigh in favor of our hypothesis. First, if the fall in share prices after the socialist victory was driven by a large differential in growth prospects or expected wage dynamics, one would anticipate that some sectors would be more impacted than others based on whether they are oriented towards the domestic market, generally sensitive to output growth, or labor-intensive. Table 2 demonstrates, however, that the share price falls were extraordinarily uniform across sectors. Even more telling against an interpretation stressing factors that would exert heterogeneous effects across listed firms and sectors, is the fact that for the 68 stocks that were traded both in the aftermath of the 1970 election and after the 1973 coup, a larger share price fall after the Allende election does *not* predict a larger increase after the military coup. This is shown in Fig. 5. This is consistent with the idea that sector-level and firm-specific factors did not play a major role, and that the impacts were instead driven by factors common to all privately owned firms (or at least those whose shares were publicly traded on the Santiago stock market.)

5.2. Empirical tests of potential mechanisms

Not surprisingly, in light of the evidence just mentioned, a firm-level empirical analysis provides no support for the idea that expectations about growth prospects and wage dynamics played the most important role. We have estimated measures of sensitivity to changes in real output growth and to changes in wages at the narrowest possible industrial sector level. We have then tested whether these measures help predict stock price changes after the two events of interest, finding very little explanatory power.

Our measure of 'growth-sensitivity' was built as follows. We have used sectoral stock market indexes²⁹ in order to estimate the sensitivity of different stocks to changes in GDP growth. Specifically, we define the 'growth-sensitivity' of a sector as the β of the sectoral stock price index with output growth, estimated from a regression of real yearly sectoral returns on the time-series of real GDP growth in the 1940–1968 period. Table 6 reports estimated growth sensitivities.

Our measure of sensitivity to wage dynamics is based on the incidence of (direct and indirect) labor costs. We have employed the 1977 input-output table for the Chilean economy (Venegas Morales, 1994, p. 10), which features 19 sectors, in order to calculate total labor requirements per peso³⁰ of output, according to the formula $\ell(I_n - A)^{-1}$, where ℓ is a vector of direct labor costs per unit of output, and $(I_n - A)^{-1}$ is the Leontief inverse matrix. We thus take into account not only the labor costs directly incurred by firms, but also those indirectly incurred through the purchase of labor-intensive intermediate goods. Table 7 reports both overall and direct labor costs per unit of output. We then attributed to each stock the 'wage sensitivity' of its industrial sector.

The idea behind the test is that if the fall in prices after the 1970 election and/or the boom after the 1973 coup reflected poor growth prospects, stocks in more growth-sensitive sectors should have changed by a larger extent. Similarly, if the impacts were driven by expectations regarding wage dynamics, the sectors with higher incidence of labor costs should display larger changes.

Table 8 reports results from regressions of the share price changes

after the two events on the two measures, both separately and in the same regression. The analysis of the stock price changes after the 1973 coup is likely to be influenced by an outlier (a single stock which value increased by around 1400%), so we present results also from a specification that reduces the influence of that observation by winsorizing the data (eliminating extreme values).

The results reported in Table 8 indicate that share price changes after the Allende election are unrelated to both growth sensitivity and overall wage costs, with standardized coefficients near zero and very far from statistical significance. This is unsurprising, given the strikingly small cross-sectoral differences in the impact of the 1970 election (Table 2). Share price changes after the 1973 coup display somehow more variation across sector. However they are, if anything, negatively correlated with growth sensitivity, with a standardized coefficient around -0.20 (-0.15 when winsorizing the data) but non statistically significant. A negative effect of growth sensitivity in the aftermath of the 1973 coup may derive from expectations of austerity and deflationary measures under the new military government. The incidence of labor costs is positively related to the share price changes after the 1973 coup, but the coefficient is rather small and varies in size across specifications (between 0.04 and 0.12 in the specifications which control for outliers) and is not statistically significant.³¹

While these tests are not conclusive, their results are consistent with our hypothesis that growth prospects and wage dynamics were not the central issues driving the massive share price changes observed after the two events, and that the most important factor was instead a weakening of private property rights, mainly due to the threat of nationalization of all large private firms.

6. Conclusions

Natural experiments allowing convincing identification of the effect of sharp changes in economic institutions on growth, distribution, and other economic outcomes seldom arise. As a result of Hotelling-Downs pressures for platform convergence (Downs, 1957; Hotelling, 1929), in closely contested elections with uncertain outcomes party programs are rarely radically different when it comes to fundamental economic institutions. Non-electoral institutional shocks, such as those arising from a revolutionary transfer of power, are rarely unanticipated and are typically associated with other relevant changes that confound the pure 'institution shock' effect, making identification virtually impossible.

As a result, the literature on institutions and their effects on economic outcomes is composed for the most part of either well identified studies of more limited institutional changes or less well identified studies of major institutional variations. By providing a well-identified analysis of a truly systemic change in economic institutions, our study of daily movements of share prices on the Santiago stock exchange at the time of two cataclysmic political events – the election of a socialist president and his subsequent removal by a coup that promised to usher in pro-business policies under authoritarian rule – is a contribution to filling a gap in the literature.

We have found that systemic changes in institutions were associated with extraordinary changes in share prices. Even without taking account of the likely partial internalization of some probability of both events, the stock price changes we have observed are of a different order of magnitude than those found in the previous literature, which mostly focused on US elections, arguably reflecting much larger policy divergence in the events we study. Stock market effects of this magnitude are consistent with the view that institutional/political regime changes

²⁹ Sectoral stock market indexes for the Santiago stock market were published monthly by the Chilean Central Bank. We retrieved these indexes from Global Financial Data (<https://www.globalfinancialdata.com/>).

³⁰ The peso is the official currency in Chile since 1975, therefore the 1977 I/O Tables already report values in pesos.

³¹ In robustness tests not presented in the paper but available upon request, we have tried to use direct labor costs per unit of output or the wage share as the measure of sensitivity to wage dynamics, in lieu of total labor requirements per unit of output. Results were practically unchanged.

can have very substantial impacts on investment, wealth inequality, and other determinants of growth and distribution.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.jdevco.2018.04.005>.

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