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ELECTION POLLS, FREE TRADE, AND THE STOCK MARKET: EVIDENCE FROM THE CANADIAN GENERAL ELECTION

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This paper began with my request to Shaun Everest that he do some preliminary analysis of stock market reactions to polls as part of an MBA essay. I thank him for his help. I also thank Diana Whistler for very helpful econometric advice, and Richard Johnston, Principal Investigator for the 1988 Canadian National Election Study, for providing the poll data used in this paper. I also received helpful comments from Iain Cockburn, Espen Eckbo, and Ken White. None of these people bears and responsibility for weaknesses in the paper. Financial support from the Centre for International Business Studies at UBC is gratefully acknowledged. This paper is part of NBER's research programs in International Studies and Financial Markets and Monetary Economics. Any opinions expressed are those of the author not those of the National Bureau of Economic Research.

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ABSTRACT

This paper examines the relationship between the Toronto Stock Exchange (TSE) and election polls during the 1988 Canadian General Election campaign. Two hypotheses are investigated: first, did polls influence the TSE, and secondly, if so, did the nature of the influence suggest that investors were reacting to expectations concerning the effect of the Canada-U.S. Free Trade Agreement (FTA)? I find that the TSE was positively related to Conservative popularity as measured by polls, but that the differential movement of TSE sub-indices does not offer additional support to an FTA based interpretation of events.

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1. Introduction

During the campaign period preceding the 1988 Canadian General Election, considerable attention was focused on the idea that movements in Canadian stock prices seemed highly sensitive to election polls. Following the release of a Gallup Poll on November 7 showing the Liberal Party ahead of the Conservatives, the front-page headline in the Financial Post of November 8 read "Liberal Surge Sends Markets into Tailspin" (Jackson (1988)). In a page 11 story, Horsman (1988) offered the following interpretation.

> European investors, particularly in Britain, were in the market selling Canadian equities yesterday, following the publication of a Gallup poll showing John Turner's Liberal Party with a commanding lead over Prime Minister Mulroney's Conservatives.
> Institutional investors expressed concern that a Liberal victory in Canada might jeopardize the U.S.-Canada Free Trade Agreement...

Even before the events of November 7, the alleged relationship between election polls, free trade, and the stock market was part of the conventional wisdom of the campaign. For example, the Financial Post "Market Digest" of November 1 contained the following statement.

> Toronto share prices were hobbled by uncertainty over the Canada-U.S. free trade pact. Toronto's 300 composite index dropped 9.99 points to 3395.22 after a weekend poll showed the pro free trade Conservatives slipping.

A general perusal of the newpapers indicates that the 1988 Canadian election was fought largely over a single issue: ratification of the Canada-U.S. Free Trade Agreement (FTA). In addition, the campaign period was characterized by significant fluctuations in voter intentions, with the likely outcome being highly uncertain throughout the campaign, and subject to change as new polls were released. Furthermore, stock price movements showed at least a superficial relationship to these poll movements.

One natural interpretation of campaign events is as follows. The Free Trade Agreement would generate gains to the Canadian economy, some of which would accrue to shareholders in firms traded on Canadian stock markets. Stocks would therefore be worth more when the likelihood of FTA ratification rose and worth less when it fell. Since the Progressive Conservative Party unequivocally favoured the FTA, while the other two parties were strongly opposed, stock prices should be correlated with Conservative popularity as indicated by polls.

This line of reasoning embodies two separate steps, which might be regarded as distinct hypotheses. Step 1, the "poll influence" hypothesis, is that stock prices were influenced by poll results reflecting the probability that the Conservative Party would win the election. Step 2, the "trade mechanism" hypothesis, is that assuming the poll influence hypothesis is true, movements in the stock market derived largely from investor expectations of potential gains from freer trade under the FTA, rather than from expectations concerning other aspects of economic management. The objective of this paper is to investigate these two hypotheses.

The poll influence hypothesis should be viewed with caution. Stock markets react to many things, and, as will be shown later in the paper, the Toronto Stock Exchange showed a very similar pattern of movement to the New York Stock Exchange, which, on the basis of economic fundamentals, should not be very sensitive to Canadian election polls. A systematic examination of the evidence suggests that the effect of election polls on stock prices was much less than a casual look at the data (and the newspapers) would indicate. Polls do, however, appear to have had a modest but statistically and economically significant effect on stock prices.

The "trade mechanism" hypothesis is much more difficult to test. A rough

sense of the evidence can be obtained by examining the differential effects of poll movements on industry stock indices that might be expected to perform differentially under the FTA. This approach is very indirect and, as explained later in the paper, is likely to understate the effects of the trade agreement. The evidence I have does not directly support the trade mechanism hypothesis.

This paper draws on several streams of research. First, there is a substantial body of literature in economics and political science linking electoral politics to economic variables, particularly macroeconomic variables such as inflation, unemployment, and economic growth. Much of this literature is reviewed in Hibbs (1987), including a useful survey by Frey (1978). There is also a literature on the pre-election dynamics of voter attitudes. A classic study of this topic using U.S. presidential primary data is Bartels (1988), and an early report on a large-scale study of the 1988 Canadian general election is Johnston et.al. (1989).

There is a large literature in financial economics on stock market reactions to various events, usually to business announcements such as mergers, financial decisions, and accounting changes. Valuable reviews of the methodology used in these "event studies" include Brown and Warner (1980) and Thompson (1985). Event studies have also been used to investigate stock price responses to economic policy changes. An event study with some similarity in spirit to this paper is Langohr and Viallet (1986), in which French stock prices are linked to a series of policy and political events, including the two stages of the 1981 French presidential election.

Within the trade policy literature, there are relatively few papers that use stock market data to assess the impact of trade shocks. Two interesting such papers are Hartigan et.al. (1986) and Grossman and Levinsohn (1987). I

know of no published papers linking election poll data to stock prices.

An outline of the paper is as follows. Section 2 provides some relevant political background. Section 3 describes the main observations to be examined and presents some suggestive graphical evidence to motivate the analysis. Section 4 briefly summarizes the content of the FTA and reviews the relevant economic theory underlying the paper. Section 5 makes some preliminary comments on the philosophy of hypothesis testing, Section 6 is devoted to the central empirical analysis of the paper, and Section 7 contains concluding remarks. An appendix lists all the data used in the paper.

2. Background

After winning a large majority in the House of Commons in 1984, the Conservative government, acting partly on the recommendation of the MacDonald Royal Commission (1985) negotiated the FTA. The Agreement was signed by Prime Minister Mulroney and President Reagan on January 2, 1988, and was to come into effect at the beginning of 1989, subject to being ratified by the U.S. Congress and by the Canadian Parliament within the 1988 calendar year.

The FTA was passed by the U.S. Congress and by the Canadian House of Commons during 1988, but the upper house of parliament, an appointed Senate, was still controlled by Liberal appointees from the 1963-84 period of nearly uninterrupted Liberal government. In an unprecedented and controversial use of its power to delay legislation, the Senate refused to ratify the FTA until after an election on the issue. On October 1, 1988 the Prime Minister called an election for November 21. The Liberal Party leadership agreed that if the Conservatives won a majority of the seats in the House of Commons, then the Senate would ratify the FTA in time for it to come into effect as planned on

January 1, 1989.

Given the existence of three major parties, and the geographical structure of voting patterns, the Conservatives needed a popular vote of 40% or above to have a reasonable chance of forming a majority government. A popular vote in the high 30s would probably have translated into a Conservative minority government, while a Conservative popular vote in the low 30s would probably have allowed the Liberals to form the government. As both the Liberal Party and the New Democratic Party (NDP) were strongly opposed to the FTA, the Conservatives needed a majority victory to ensure ratification. At the time the election was called, the most recent Gallup poll had Conservative popularity at 37%, but in a Gallup poll released on October 3, Conservative popularity had risen to 43%, with the Liberals at 33%, the NDP at 22%, and other parties at 2%.

Conservative popularity fluctuated sharply in the critical range of the low 30s to low 40s over the course of the campaign. The Conservatives finally won the election with 43.7% of the popular vote and received a reduced but still comfortable majority of seats in the House of Commons. The Liberal share of the popular vote in the election was 33.6% and the NDP share was 18.9%. The FTA was ratified before the end of the year and went into effect on January 1.

3. Data Description and Graphical Evidence

The natural measure of stock prices is the Toronto Stock Exchange (TSE) index of 300 companies. The relevant poll question is: "If an election were held tomorrow, which party would you vote for?" The poll variable is the share, among those expressing a preference, who choose the Conservatives.

One complication with the poll data is that there are several major polls. The Gallup poll is the best known and most frequently released poll. Prior to the election call, Gallup released party preference results biweekly, and moved to weekly releases soon after the campaign began. Three other major polls began releasing poll data at irregular intervals after the election call. It would be reasonable to use the Gallup poll as the main poll variable on the grounds that it is regular, widely reported, independent, and better known to investors, particularly foreign investors, than other polls.

A plausible alternative procedure would be to construct an average of the major polls. I constructed an average by taking the most recent value released by each of four major pollsters: Gallup, Angus Reid, Globe-Environics, and Insight-CTV. Until October 5, when the first Angus Reid poll was released, Gallup was the only poll, so its value is the average. From October 5 to October 12 the average includes both Gallup and Angus Reid. The Globe-Environics poll enters the average on October 12, and the Insight-CTV poll enters the average on October 17. September 15 was chosen as the starting point because it was the release date of the last Gallup poll before the election was called. Each trading day is a single observation. The entire period contains 47 trading days.

Figure 1 shows the basic pattern of the data. The vertical axis measures the deviation of the average poll variable from its initial value of 37. Thus on October 3, it rose from 0 to 6, reflecting the rise in Conservative popularity, as measured by Gallup, from 37 to 43. The TSE index is also shown as a deviation from its initial value, and scaled so that it has the same maximum deviation from its base as the poll variable. (This scaling method provides a clear visual representation of whether the TSE and the poll variable

move in similar or different directions.)

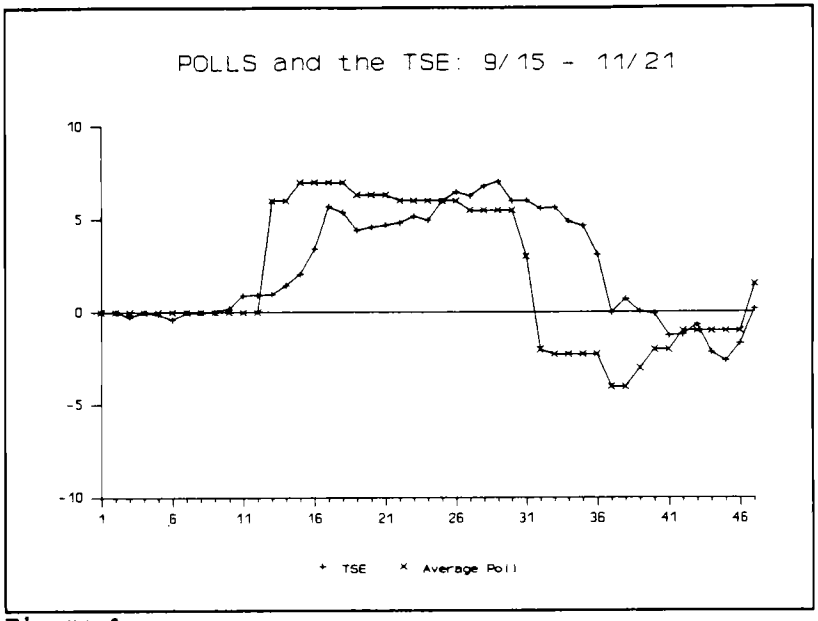

Figure 1:

The apparent visual evidence from Figure 1 is striking. The turning points and relative size of the TSE movements seem to match the turning points and relative size of changes in Conservative popularity remarkably closely. As indicated in the introduction, this was observed by the press, leading to the conventional wisdom that investor expectations were closely aligned with Conservative political fortunes and the FTA.

It is possible, however, that the apparent relationship between polls and the TSE was coincidence. After all, the poll data has a relatively simple shape: Conservative popularity rose early in the campaign, fell in the latter half, then recovered just before the election. Perhaps underlying economic forces that drive stock prices happened to have a similar pattern.

A natural way to check this possibility would be to compare TSE movements with the New York Stock Exchange (NYSE). The NYSE does contain companies whose business is connected to Canada, and a tiny fraction (about 1%) of NYSE firms are also listed on the TSE, but most observers believe that the impact of Canadian politics (including FTA ratification) on the broad population of NYSE firms is very modest. This reflects the small relative size of Canada's economy, and the small share of exports to Canada in U.S. GNP (about 2%). The NYSE should, therefore, be a good proxy for underlying factors, other than Canadian polls, that might affect movements in the TSE. Figure 2 shows the movement of the TSE and NYSE (as measured by Standard and Poor's Index of 500 listed companies) over the September 15 - November 21 period. The graph shows actual movements in the indices scaled to a common starting value of 100.

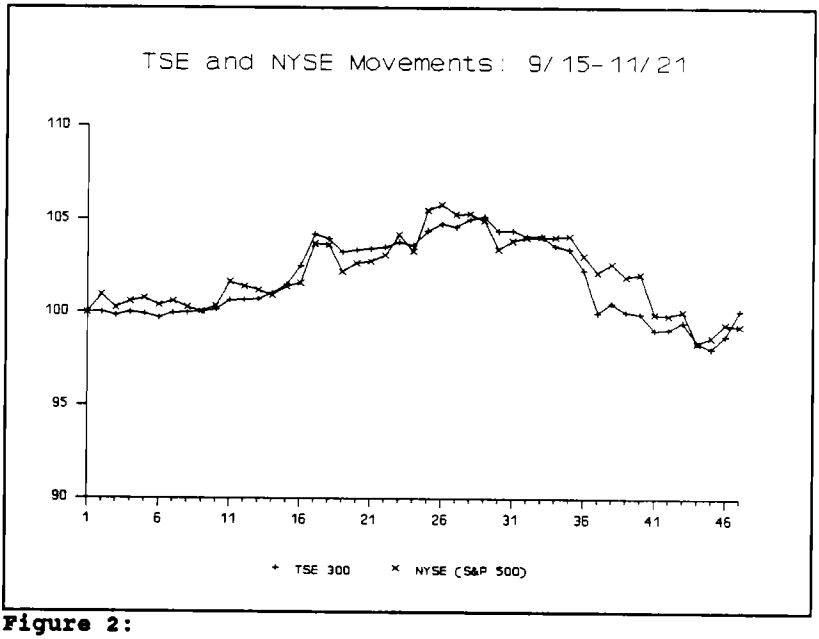

Figure 2:

As is clear from Figure 2, the TSE and NYSE moved very closely over the period. This is not a great surprise, as both exchanges would presumably respond in similar ways to economic forces such as changes in world commodity prices, interest rate movements, macroeconomic activity, etc. It does seem to cast doubt on the hypothesis that polls were influencing the TSE in a major way, unless we also believe the unlikely hypothesis that Canadian election polls were also a major influence on the NYSE.

A close inspection of Figure 2 does indicate, however, that there were some differences in the pattern of movement between the TSE and NYSE. From September 15 and September 30, the NYSE showed some upward movement, while the TSE was flat. In the aftermath of the October 3 Gallup poll showing strong Conservative popularity, the TSE outperformed the NYSE, then it fell more sharply in the aftermath of the sharp Conservative decline in the polls late in the campaign.

Figure 3 compares the average poll deviation from its starting value with the TSE-NYSE deviation. The stock price deviation variable is simply the difference between the TSE and NYSE as represented by the vertical distance between the two lines in Figure 2, multiplied by a scaling factor so that the maximum absolute deviation from 0 is the same as for the poll variable. As can be seen from Figure 3, there appears to be some relationship between these deviations and poll results, but this relationship is less than transparent. It seems, therefore, that undertaking more formal analysis of the relationship between poll movements and the stock price movements is a useful next step.

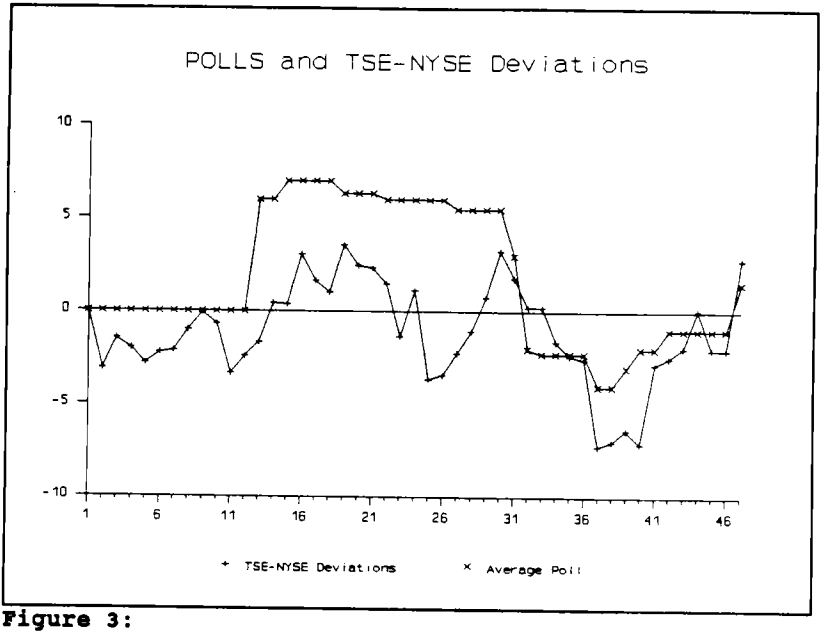

Figure 3:

4. Economic Analysis and the FTA

There are two major principles in the FTA: trade liberalization and "national treatment". The agreement eliminates essentially all tariffs on goods (with more than 50% Canadian and American value-added) flowing between the two countries. Most quantitative restrictions are eliminated, and other trade barriers, including preferential government procurement and administrative barriers of various types, are substantially reduced. The national treatment provisions are intended to ensure that firms based in the other country are, with only a few exceptions, treated just like "national" firms by domestic policy.

The agreement includes various industry specific provisions, particulary

in agriculture, automobiles, banking, brewing, energy, and forest products, and is intended to apply, in principle, to service industries as well as to manufactured and resource products. A final important aspect of the FTA is that it establishes a bilateral dispute-resolution mechanism with much stronger powers of enforcement than exist in the General Agreement on Tariffs and Trade (GATT).

Economic analysis as formalized in empirically based modelling deals mainly with the trade liberalization aspect of international trade arrangements, not the "national treatment" aspects, so we cannot turn to existing formal models for a full analysis of the impact of the FTA. Even on the narrower issue of the effects of trade liberalization, formal models give remarkably different assessments of the likely effect of the FTA. Much of the empirical assessment of the effects of a Canada-U.S. free trade agreement is reviewed in Whalley (1985).

The central modelling issue, as I see it, concerns whether the model stays within the "neoclassical" tradition of perfect competition and constant returns to scale, or whether it incorporates imperfect competition and economies of scale in a serious way. The latter view was argued by Wonnacott and Wonnacott (1967) and was embodied in the work of Harris and Cox. (See Harris (1984a, 1984b) and Cox and Harris (1985, 1986).) This approach tends to provide large estimates of the gains to Canada from liberalization, typically in the range of 3%-8% of GNP.

There are many representative models of the neoclassical approach. See, in particular, Boadway and Treddenick (1978) and Hamilton and Whalley (1985). In these models the gains from liberalization are very modest, typically less than 1% of GNP. Nevertheless, in the actual election debate, most international

economists presented a notably uniform positive view of the FTA, with the number 3% emerging as a frequently cited estimate of the expected GNP gains from the trade liberalization aspect of the agreement.

Moving from this consensus to the implied effect on stock market values is far from straightforward. Stock market valuations include the present value of the normal return to capital and any pure profits (or losses) that might be earned. Within the neoclassical framework, any pure profit gains are purely transitory and do not even appear in the model, although the implied adjustment would involve short run excess returns to industries in areas of comparative advantage.

In models incorporating imperfect competition, firms may earn pure profits, but much of the large implied gain from liberalization in such models comes from pro-competitive aspects, which tend to reduce profits. On the other hand, the "rationalization effect", involving realization of economies of scale, tends to raise profits,[1] and conventional comparative advantage effects tend to raise returns to fixed factors in areas of comparative advantage and lower returns to previously protected fixed factors in areas of comparative disadvantage. In principle, stock market values could rise or fall.

If, however, there are substantial gains from liberalization, they have to show up somewhere. If the two economies are relatively similar in factor endowments, as is true of Canada and the U.S., then, as shown by Krugman (1981), those gains are likely to accrue to all factors of production, including in the return to capital. We would generally expect, therefore, that the value of Canadian stocks would rise as a result of the FTA, although we

[1]The trade-off between these effects is identified in, for example, Brander (1981) and discussed in Chapter 7 of Brander (1988).

have to accept that this rests in part on empirical judgements, rather being a pure deduction from received trade theory.

5. Epistemology and Hypothesis Testing

As indicated in the introduction, there are two separate hypotheses to be considered: the poll influence hypothesis and the trade mechanism hypothesis. Before examining these hypotheses, I would like to clarify my own views about the methodology of "hypothesis testing".

Popper (1934) had a major impact on methodology by arguing that falsification or refutation of hypotheses is the defining characteristic of scientific methodology. This was in sharp contrast to the general epistemological view of the time that science was involved largely in validation and verification of hypotheses. Popper argued that verification is essentially impossible, because any finite set of observations is consistent with any number of alternative theories. The best that can be said of a theory is, according to Popper, that it has survived many powerful opportunities for rejection. These views became particularly influential in economics, largely as a result of Friedman (1953), who made essentially the same arguments.[2]

Modern philosophers have pointed out, however, that falsification is just as problematic as verification. Suppose we hypothesize that y is positively related to x, then we run a regression that yields a statistically significant negative coefficient on x. Do we "reject" the hypothesis? Not necessarily. We are more inclined to wonder if the functional form of the regression equation is wrong, or if important variables have been omitted, or to question

[2]Friedman also went further than Popper by making the remarkable claim that the "realism" of assumptions does not matter. This claim has been strongly and, in my view, convincingly, rebutted by many philosophers and economists. See, for example, Coddington (1972).

any number of auxiliary maintained hypotheses. Researchers will often keep modifying the auxiliary hypothesis until an estimated coefficient with the "correct" sign is finally obtained.

In fact, we cannot confidently reject our hypothesis unless we can be sure that our auxiliary hypotheses (such as the functional form of the regression equation) are correct. But we cannot be sure that these auxiliary hypotheses are correct for the same reason, pointed out by Popper, that we cannot verify any hypothesis. There is also the classic issue of what "rejection" or "refutation" means in a stochastic environment. Statistical rejection is just a rule we follow because it has good properties on average, but we can never be sure that the hypothesis we statistically reject is in fact false.

My interpretation of modern epistemology is that verification and falsification are essentially symmetric: we cannot do either absolutely. In formal hypothesis testing, all we ever do is find evidence in favour of a hypothesis, or evidence against a hypothesis. It is, therefore, perfectly reasonable to focus on whether a hypothesis is "confirmed" by evidence, as long as we understand that this does not imply actual verification, but simply that the evidence is consistent with the hypothesis.

6. Empirical Analysis

Theoretical econometricians usually advocate pre-specification of a theoretical and statistical model, acquisition of data, and subsequent estimation and/or hypothesis testing within the original specification. Thus the general model to be estimated and hypotheses to be tested are specified before the data is examined. In practice, however, it is common for applied

researchers to engage in "data-mining": allowing the model specification process and hypotheses to be "data-driven". An extreme (and highly questionable) version of this method would be to keep making specification changes (adding regressors, altering functional form, etc.) until the model results match the investigator's prior beliefs.

More careful methods of data-driven (or "ad hoc") specification searching do, however, have value. They are useful, for example, when it is difficult to specify a general model broad enough to encompass all relevant contingencies but parsimonious enough to actually be estimated with modest data sets. As argued persuasively by Leamer (1978), data-driven specification searches are readily defensible in disciplines that rely heavily on scarce non-experimental data. It is, however, not defensible to undertake intensive data-driven specification searches, then report the results of the final model as though it had been specified ex ante or at least nested within an explicit prior "general" model. One should report the model selection process accurately. In this paper, I undertake a mixture of prior and data-driven specification.

6.1 The Poll Influence Hypothesis

The starting point for the regression specification used here is the idea that asset prices should fluctuate randomly if markets are competitive and past information is incorporated in current prices. (The classic proof of this point is in Samuelson (1965).) Using T (for TSE) to represent the asset price, this suggests the following algebraic form:

$$T_i = R + T_{i-1} + e_i \qquad (1)$$

where i represents the period, R is a drift or trend parameter, and e is an unsystematic error representing the random arrival of new information. If, however, there are major new identifiable pieces of information, we should

treat them separately instead of implicitly incorporating them in e. In our case, the realization of election polls is one such variable.

Furthermore, we know that many important influences on the TSE, such as world oil prices and interest rates, also affect the New York Stock Exchange (NYSE), while Canadian polls should have very little impact on the NYSE. I therefore introduce the NYSE (represented by Standard and Poor's 500 index) as a proxy for both unsystematic and trend variables that affect the TSE.

In addition, we would not necessarily want to impose the restriction implied by expression (1) that the coefficient on the lagged value of the TSE is equal to 1. We can allow a general coefficient and estimate its value. Using P to represent the poll variable and N to represent the NYSE, this prior framework implies the following equation

$$T_i = aT_{i-1} + f(P_i,N) + e_i \qquad (2)$$

where f should be increasing in both its arguments. Unfortunately, this is about as far as prior theory can take us. We do not know the appropriate functional form for f, nor do we know the error process, apart from the maintained assumption that it is unsystematic (i.e. has mean zero). My approach is to estimate a linear functional specification of (2), then examine regression diagnostics as a guide to further specification adjustment. The empirical starting point of the paper is, therefore, to estimate the following equation using OLS[3]

$$T_i = C + aT_{i-1} + bP_i + dN_i + e_i \qquad (3)$$

where C is a constant and a, b, and d are coefficients to be estimated.

The implicit assumption in using OLS to estimate this equation is that

[3] All regressions reported in the paper were done using version 6.1 of Shazam as described in White (1978, 1988).

the errors should, in addition to having zero mean, be independent and identically distributed (in other words, that the stochastic error process is "white noise"). Also, for proper interpretation of various significance tests, the errors should be normal.

Scaling the NYSE variable so that it has the same general magnitude as the TSE, an OLS regression using the average poll as the poll variable yields estimates of .50, 3.8, and .42 for a, b, and d, respectively, with associated t-statistics of 6.6, 5.9, and 5.2. The adjusted R^2 is .96. Various tests (see White et. al. (1988)) of normality and homoscedasticity of the residuals provide no evidence of either non-normality or heteroscedasticity.

To check the functional form, I tried a corresponding log-log specification (effectively assuming linearity in percentages rather than in absolute levels) and obtained very similar results. I also tried a general Box-Cox regression and found that the estimated transformation was insignificantly different from the linear form. (The estimated power was .96, whereas the linear form corresponds to a power of 1, and the results were nearly identical to the linear regression.)

The only real problem arising from estimation of (3) is autocorrelation in the residuals. When a lagged dependent variable is included in the regression, the DW statistic is biased toward 2. In this case DW = 1.20, indicating likely autocorrelation in the errors. A good test of autocorrelation in the presence of a lagged dependent variable is Durbin's h statistic, which is asymptotically normal under the null hypothesis of serial independence. In this case it is 3.03, indicating a signifincant departure from the null at the .01 significance level. The presence of serial dependence in the errors means that the significance tests on the coefficients may be invalid and that the OLS

coefficient estimates are no longer consistent.

The next step, therefore, is to allow the error term to be a first order autoregressive (AR1) process. The Shazam "auto" command allows easy estimation of this structure, using either maximum likelihood or least squares methods for the estimation of the autoregressive parameter. (They give essentially identical results in this case.) The estimated equation is:

$$T_i = C + aT_{i-1} + bP_i + aN_i + re_{i-1} + u_i \qquad (4)$$

where r is the autocorrelation coefficient on the error and u is normal white noise.

Table 1 shows summary statistics for the data used in this regression.

Table 1: Summary Statistics

Variable	Mean	St.Dev.	Min.	Max.
TSE	3316	69.9	3199	3430
NYSE	273	5.3	264	284
Poll Av.	38.8	3.69	33	44
Gallup	37.9	3.49	31	43

number of observations = 47

Table 2 displays the regression results. Two regressions are reported, one using the average poll and one using the Gallup poll. The table lists coefficient estimates, standard errors, and t-statistics for each independent variable, and for the autocorrelation coefficient. The elasticity of the dependent variable with respect to the independent variable at the mean of the data is also reported, as is the (adjusted) R^2, the DW statistic, and a chi-square goodness of fit statistic (GF) for normality of the residuals. (Its critical values are 9.49 and 13.28 for the .05 and .01 levels of significance respectively.) The NYSE variable was normalized so as to have the same magnitude as the TSE.

Table 2: TSE Regression Results

Indep. Var.	Coeff.	st.err.	t-stat	elas.	
Ave. Poll	4.10	1.063	3.86	.048	R^2 = .97
NYSE	.57	.072	7.93	.576	DW = 1.82
lag	.32	.083	3.90		GF = 6.73
auto	.59	.137	4.27		
constant	171	201	.84		
Gallup	4.40	.94	4.67	.050	R^2 = .97
NYSE	.57	.071	8.08	.574	DW = 1.66
lag	.32	.079	4.10		GF = 6.02
auto	.53	.142	3.74		
constant	170	178	.96		

The regression diagnostics suggest that these are "good" regressions. The adjusted R^2 is high, the DW statistic is not far from 2, and various tests of normality, including the GF test, provide no evidence against normality of the residuals. As before, however, the DW statistic is biased toward 2 because of the presence of a lagged dependent variable and may fail to diagnose additional serial dependence. A good way to handle this is to estimate a second order autoregressive process and check for significance of the second order coefficient.[4] It was insignificant.

The regressors in both regressions show high levels of statistical significance. The Gallup poll version provides a higher significance level and a slightly larger point estimate for the poll coefficient, suggesting that investors may have been more responsive to the Gallup poll than to other polls. Probably the best guide to the economic importance of the effects is the elasticity column. For example, in the Gallup regression, a 1% movement in the poll variable is associated with a .05% movement in the TSE. The average poll regression is similar.

[4] I thank Ken White for pointing this out to me.

The range of the data for the average poll is 11 points, just covering the range from a clear loss (for the Conservatives) (33%) to a clear win (44%). If we take an 11 point change as representing the difference between a clear loss and a clear win, and we take the estimated effect of a 1 point poll movement from the average poll regression in Table 2, then the implied total effect on the TSE is 11 times 4.10 or about 45 points, corresponding to a 1.4% increase in TSE value, just about half of the 3% widely quoted as a likely overall gain from the FTA. If the FTA were the driving force behind TSE reactions to polls, this would be a modest but reasonable number, suggesting that shareholders would get about half of the gains from the FTA.

It is useful to compare these results with what might be referred to as the "newspaper" specification: regressing the TSE on just a constant and the poll variable. Using OLS for this regression,[5] the coefficient on the average poll variable is 11.6 with a t-statistic of 5.2. The DW statistic, however, is only .17, indicating gross misspecification. Correcting the specification to account for other variables and the apparent dynamic structure of the model, as provided by expression (4), substantially reduces the implied economic effect of changing Conservative popularity, although it remains significant.

Equation (4) is my suggested statistical model of events. As indicated, using an AR(1) process to model the error term is data-generated rather than an implication of prior theory, as is acceptance of the linear functional form. The choice of regressors and the inclusion of a lagged dependent variable, are, however, part of the prior theoretical specification. The basic conclusion is that poll movements had a small but statistically significant and economically

[5] The OLS regression in which the TSE is regressed just on the Gallup poll and a constant forms the main focus of the empirical work reported in Everest (1989).

meaningful effect on TSE movements. However, most of the movement in the TSE is due to whatever common factors also cause movements in the NYSE.

6.2 The Trade Mechanism Hypothesis

To address the trade mechanism hypothesis I applied appropriately modified versions[6] of equation (3) or (4) to four sub-indices of the TSE: industrials, forest and paper products, energy, and real estate. The basic procedure is to estimate equation (3), then correct for autocorrelation if Durbin's (asymptotically normal) h statistic clearly indicates autocorrelation. If h were exactly normal, then a 99% confidence interval would be (-2.576, 2.576). I took values outside the range (-3.0,3.0) as indicating clear autocorrelation. This requires correcting the average poll version of the forest products regression and the Gallup version of the energy regression.

The energy index would seem to be the most likely on prior grounds to be positively affected by the FTA: it is an area where Canada is thought to have clear comparative advantage, where the firms own substantial specific factors (reserves, drilling rigs, etc.), and where the pro-competitive effect associated with U.S. competition should be small. In addition, the FTA deals explicitly with energy and removes several actual or potential profit-reducing barriers to trade. Energy producers strongly supported the FTA.

Forest products are interesting because of the trade-sensitivity of the sector, although the FTA did not change the status quo very much. Industrials are important as the major affected sector, and real estate is interesting

[6] One could impose a model of asset pricing such as the Capital Asset Pricing Model, and regress abnormal returns, corrected for risk and the market's general movement, on the poll variable. This would be a poor procedure in the current situation. First, using the corresponding U.S. stock price already comes very close to correcting for general movements in the market. Secondly, "correcting" for the market covariance structure only makes sense if this structure in unaffected by the events in question, which is almost certainly not true here. See Brown and Warner (1980) for further discussion along these lines.

because it is non-traded and therefore should not be very sensitive to the FTA directly, but is very sensitive to general economic management. The basic idea is that the trade mechanism hypothesis should, if true, be reflected in a stronger than average poll coefficient in the energy regressions and a weaker impact on the real estate sector.

One difficulty is that the NYSE is not subdivided in the same way as the TSE. Therefore, it is not obvious how to correct for the other factors as represented in U.S. stock price movements. There is an NYSE industrial index. For the other sectors I used the price of the appropriate Fidelity Mutual Fund as the "correction" variable. Fidelity has broad based mutual funds for real estate, energy, and forest and paper products.

Table 3 reports summary statistics for all the data used in the sub-index regressions. The abbreviations are: Ind = TSE industrial index, PFP = TSE paper and forest products, EN = TSE energy, RE = TSE real estate, NYI = NYSE industrials, FFP = Fidelity Forest Products, FEN = Fidelity energy, and FRE = Fidelity real estate.

Table 3: Summary Statistics

Variable	Mean	St.Dev.	Min.	Max.
Ind.	1957	59.2	1844	2050
PFP	3718	82.7	3597	3850
EN	3527	113.5	3281	3657
RE	14298	290.8	13481	14602
NYI	315	6.4	303	327
FFP	1165	31.8	1099	1216
FEN	1226	19.7	1187	1263
FRE	908	6.2	892	916
Poll Av.	38.8	3.69	33	44
Gallup	37.9	3.49	31	43

number of observations = 47

Tables 4, 5, 6 and 7 show the regression results for the versions of expression (3) or (4) corresponding to each sub-index. The U.S. stock price variables were all scaled so as to have the same magnitude as the corresponding TSE sub-index. As before, each table reports results for two regressions: one using the average poll and the other using the Gallup poll. I report the DW statistic for regressions using an autoregressive error specification, and Durbin's h statistic for regressions with a lagged dependent variable but without an autoregressive error structure.

Table 4: TSE Industrials

Indep. Var.	Coeff.	st.err.	t-stat	elas.	
Ave. Poll	3.70	.965	3.83	.073	R^2 = .92
NYSE-Industrials	.14	.095	1.45	.141	H = .546
lag	.73	.082	8.87		GF = 6.77
constant	110	127	.86		
Gallup	4.96	1.235	4.02	.096	R^2 = .92
NYSE-Industrials	.24	.102	2.38	.249	H = 2.05
lag	.61	.101	6.02		GF = 1.92
constant	87	125	.70		

Table 5: TSE Paper and Forest Products

Indep. Var.	Coeff.	st.err.	t-stat	elas.	
Ave. Poll	1.80	.873	2.06	.019	R^2 = .92
FFP	.05	.035	1.40	.047	DW = 2.09
lag	.98	.029	33.88		GF = 12.26
auto	-.49	.129	-3.82		
constant	-149	170	-.88		
Gallup	.85	1.731	.49	.009	R^2 = .90
FFP	.08	.065	1.16	.072	H = -2.96
lag	.95	.050	18.95		GF = 5.92
constant	-121	303	- .40		

Table 6: TSE Energy Index

Indep. Var.	Coeff.	st.err.	t-stat	elas.	
Ave. Poll	2.00	.923	2.16	.022	R^2 = .96
FEN	.15	.086	1.69	.150	H = 2.78
lag	.92	.046	20.05		GF = 12.84
constant	-347	215	-1.61		
Gallup	1.36	1.388	.98	.015	R^2 = .98
FEN	.72	.106	6.81	.736	DW = 1.39
lag	.33	.098	3.35		GF = 13.07
auto	.95	.047	20.10		
constant	-275	427	-.65		

Table 7: TSE Real Estate Index

Indep. Var.	Coeff.	st.err.	t-stat	elas.	
Ave. Poll	5.75	4.674	1.23	.016	R^2 = .92
FRE	.33	.325	1.02	.337	H = -2.25
lag	.88	.099	8.88		GF = 10.66
constant	-3376	3422	-.98		
Gallup	8.89	4.487	1.98	.024	R^2 = .93
FRE	.40	.263	1.53	.406	H = -1.67
lag	.83	.090	9.21		GF = 6.07
constant	-3677	2807	-1.31		

The sub-index regressions do not provide much supporting evidence for the trade mechanism hypothesis. The industrials index makes up most of the TSE, and it behaves much the same as the overall TSE. In fact, although the statistical significance of the poll coefficient is very similar in the industrials and TSE regressions, the economic significance of the poll is greater for the industrials, as can be seen by comparing the elasticities. The value of a Conservative win as measured by a movement from 33% to 44% in the average poll would add about 2% to the value of the TSE industrials index, based on the average poll regression, and about 3% based on the Gallup regression.

The forest products regression shows that this index is very nearly a

random walk, although the average poll has a marginally significant coefficient. The poll variable is also marginally significant in one of the energy regressions, and in one of the real estate regressions. The implied economic importance of the poll variable in both of the energy regressions is very small. If the relative strength of the poll effect in energy is an indicator of the relative importance of FTA effects in stock market movements, it provides little support for the trade mechanism hypothesis.

There is, of course, another way to interpret the data. One might take the importance of the FTA as a maintained assumption, and interpret these regressions as indicative of the relative importance of the FTA for different sectors. It is not particularly surprising that the TSE industrials would show a marked positive relationship to the FTA, while forest products and real estate show only marginally significant effects. The insignificance of the energy results would have to be regarded as a surprise. However, Table 3 shows that the energy index is more variable than the other indices (relative to its mean), possibly indicating a relatively high incidince of large idiosyncratic errors, and therefore being harder to estimate well in a short time series.

Interestingly, all indices are related to their U.S. counterparts much as one would expect. The overall indices are closely related. The energy and industrials indices also have an economically significant relationship which is (marginally) statistically significant. The forest products indices have a (marginally) statistically significant relationship of negligible economic importance, while the real estate indices, which represent disjoint markets, do not show a statistically significant relationship in either regression.

7. Concluding Remarks

This paper examines the relationship between the Toronto Stock Exchange and election polls during the 1988 Canadian General Election campaign. The TSE was positively related to Conservative popularity in the polls. This effect is significant, but is considerably less than would be suggested by a simple OLS regression of the TSE on Conservative popularity. Once other factors, as represented by the NYSE, are taken into account, and a more acceptable dynamic structure is incorporated, the superficially strong relationship between polls and the TSE is sharply reduced, although still economically meaningful.

As with any empirical work in economics, further econometric issues could be addressed. Some readers might object that there is a possible "errors in variables" problem in the poll variable. Polls have sampling error associated with them, and even if the sampling error were effectively zero, the poll would still be an uncertain indicator of the likelihood of a Conservative victory. However, we are not trying to estimate the response of the TSE to the true popularity of the Conservatives, or to the true likelihood of their winning an election, but rather to the published polls.

If there is an errors in variables problem, then the coefficients on the poll variables are biased downward, indicating that the strength of the poll effect on the TSE may be underestimated. Similarly, if Canadian polls actually were affecting the NYSE, then this could also lead to an underestimate of the poll coefficients.

A second possible avenue for alternative econometric analysis would be to do time series "causality" tests. In the case of stock market movements, there is sound economic theory and evidence to support the idea that new public

information is incorporated into prices very rapidly. Therefore, a (one-period) lagged dependent variable should appear in the regression, but one should not go fishing for complex lag structures in the transmission of poll information to prices, as any additional apparent significance from this source is likely to be an artifact of the particular data set being used.

There are, as always, many slight modifications that one could undertake: differencing the data, using logs, using more complex dynamic specifications for the TSE sub-indices, etc. By careful use of these options one could come up with regression results that offer apparently higher significance levels. This strikes me, however, as going too far in the "data-mining" direction, and is likely to yield misleading significance estimates. I have tried to use only a small amount of data-generated (as opposed to prior) specification searching. As it happens, the basic character of the results is robust to small specification changes.

The testing of the trade mechanism hypothesis is much more suspect than the testing of the poll influence hypothesis. The basic idea is to test the effect of the FTA on stock market returns by comparing the movement of those stocks that should do well under the FTA with those that should be unaffected or those that should do poorly. While this idea is sound in principle, execution is difficult because it is very hard to identify those stocks that should do well. If we believe that energy stocks should do relatively well, then the energy regression results provide little support for the importance of the FTA, although they do not provide strong conflicting evidence either.

Our previous experiences with trade liberalization suggest, however, that most of the differential impact of the FTA is likely to be at the firm-specific level within industries. Looking at industry aggregates will mask the true

differential impact of the FTA and lead to an underestimate of its significance. One could certainly improve upon what is done here by allocating stocks to industry groups at a fairly low (eg. 4-digit) level of aggregation (as done by Eckbo (1986) for his analysis of Canadian mergers), and then use a model that can identify industry level stock market winners and losers. Both the assignment of stocks to industries, and obtaining reliable industry level predictions is, however, difficult and highly prone to error, especially for low levels of aggregation. In addition, if the main effects are at the firm level, even this approach would underestimate the significance of the FTA as measured by differential (as opposed to average) effects. In any case, this is a very large scale task and is beyond the scope of this paper.

Overall, the 1988 Canadian general election provides an excellent opportunity to test the effect of polls on stock prices. The results show a modest but clear investor preference for the Conservative Party. The opportunity to infer whether this preference results from Free Trade Agreement, as the campaign news coverage suggested, is considerably weaker. The magnitude of the effect of polls on the Toronto Stock Exchange is certainly consistent with the Free Trade interpretation, but the differential effect of polls on the TSE sub-indices fails to provide clear supporting evidence.

Appendix: Data

The following table lists all the data used in the paper.

DATE	IND	PFP	EN	RE	TSE	G	AVE	NYSE	NY-IND	FFP	FEN	FRE
Sept 15	1953.92	3622.66	3648.39	14452.95	3261.32	37	37.00	268.13	307.94	1188	1238	908
Sept 16	1957.60	3616.41	3647.31	14407.11	3261.83	37	37.00	270.65	310.81	1195	1239	910
Sept 19	1943.66	3614.70	3657.31	14355.12	3255.39	37	37.00	268.82	308.45	1188	1237	913
Sept 20	1953.28	3607.70	3655.21	14444.54	3261.20	37	37.00	269.73	309.47	1184	1241	910
Sept 21	1949.64	3619.79	3649.40	14430.64	3258.60	37	37.00	270.16	310.11	1184	1234	907
Sept 22	1936.34	3612.30	3650.15	14474.99	3252.29	37	37.00	269.18	308.82	1172	1230	907
Sept 23	1949.70	3610.99	3642.86	14417.57	3260.38	37	37.00	269.76	309.4	1172	1226	912
Sept 26	1944.45	3597.04	3632.64	14389.40	3260.56	37	37.00	268.88	308.4	1170	1226	906
Sept 27	1945.36	3602.17	3624.91	14360.28	3262.15	37	37.00	268.26	307.45	1170	1220	907
Sept 28	1944.38	3610.40	3624.10	14322.74	3266.15	37	37.00	269.08	308.46	1171	1221	907
Sept 29	1969.57	3605.62	3632.48	14348.79	3283.03	37	37.00	272.59	312.68	1182	1231	908
Sept 30	1972.15	3656.53	3599.47	14385.74	3283.71	37	37.00	271.91	311.67	1184	1226	913
Oct 3	1961.98	3627.48	3541.35	14375.70	3284.53	43	43.00	271.38	311.14	1179	1214	909
Oct 4	1956.06	3632.56	3506.04	14397.37	3295.88	43	43.00	270.62	310.42	1197	1205	908
Oct 5	1970.55	3662.55	3486.56	14365.85	3310.29	43	44.00	271.86	311.9	1206	1202	911
Oct 6	1995.73	3679.19	3496.09	14488.27	3343.11	43	44.00	272.39	312.66	1200	1206	910
Oct 7	2050.18	3743.93	3527.74	14601.51	3398.39	43	44.00	278.07	319.17	1216	1216	912
Oct 11	2033.52	3722.10	3545.58	14542.09	3390.70	43	44.00	277.93	319.62	1210	1221	913
Oct 12	2016.28	3748.93	3539.04	14395.83	3367.51	43	43.33	273.98	314.92	1186	1218	914
Oct 13	2021.34	3722.15	3557.41	14372.25	3371.62	43	43.33	275.22	316.32	1182	1222	913
Oct 14	2013.14	3732.05	3568.49	14440.11	3373.84	43	43.33	275.5	316.7	1174	1232	915
Oct 17	2015.11	3742.70	3588.14	14415.48	3376.76	39	43.00	276.41	317.75	1178	1248	913
Oct 18	2018.36	3779.74	3577.40	14418.94	3385.15	39	43.00	279.38	321.44	1185	1251	916
Oct 19	1998.49	3747.55	3598.22	14476.07	3380.03	39	43.00	276.97	318.81	1182	1249	916
Oct 20	2025.96	3784.89	3631.32	14551.41	3405.09	39	43.00	282.88	326.07	1189	1263	915
Oct 21	2030.43	3793.39	3623.13	14478.38	3416.78	39	43.00	283.66	326.84	1194	1263	916
Oct 24	2021.99	3802.18	3596.08	14538.94	3411.61	40	42.50	282.28	325.48	1195	1249	914
Oct 25	2018.11	3835.59	3581.79	14545.61	3424.48	40	42.50	282.38	325.66	1181	1252	915
Oct 26	2026.36	3844.17	3583.48	14598.21	3430.15	40	42.50	281.38	324.22	1176	1247	916
Oct 27	2002.79	3849.52	3570.14	14486.12	3404.74	40	42.50	277.28	319.18	1162	1235	913
Oct 28	2006.72	3850.59	3576.25	14501.54	3405.51	40	40.00	278.53	320.67	1162	1241	915
Oct 31	1986.14	3832.78	3578.91	14559.18	3395.52	38	35.00	278.97	321.26	1158	1236	905
Nov 1	1986.53	3839.98	3558.53	14509.82	3396.60	38	34.75	279.06	321.24	1157	1236	908
Nov 2	1965.70	3821.15	3528.59	14408.98	3378.59	38	34.75	279.06	321.35	1158	1237	908
Nov 3	1964.25	3822.44	3501.25	14352.83	3373.07	38	34.75	279.2	321.51	1155	1241	909
Nov 4	1928.76	3839.19	3456.02	14374.79	3335.81	38	34.75	276.31	318.09	1143	1229	907
Nov 7	1866.02	3729.28	3385.02	14052.98	3260.72	31	33.00	273.93	315.36	1121	1215	904
Nov 8	1891.56	3755.38	3401.33	14126.07	3278.23	31	33.00	275.15	316.75	1145	1220	903
Nov 9	1874.96	3748.72	3390.19	13937.86	3262.24	31	34.00	273.33	314.61	1130	1214	903
Nov 10	1872.49	3759.84	3383.70	13922.66	3259.32	31	35.00	273.69	315	1131	1218	904
Nov 11	1851.70	3732.57	3348.27	13889.28	3231.09	31	35.00	267.92	308.11	1104	1198	899
Nov 14	1859.25	3725.18	3345.49	13852.78	3232.18	35	36.00	267.72	307.73	1103	1197	899
Nov 15	1865.42	3733.35	3353.49	13766.89	3244.95	35	36.00	268.34	308.44	1115	1199	900
Nov 16	1844.21	3704.24	3308.03	13764.39	3209.82	35	36.00	263.82	302.84	1101	1187	896
Nov 17	1846.23	3672.97	3281.36	13611.26	3198.55	35	36.00	264.6	303.93	1099	1187	895
Nov 18	1861.21	3660.73	3290.58	13480.86	3221.08	35	36.00	266.47	306.36	1111	1189	896
Nov 21	1894.45	3702.65	3321.01	13596.26	3265.40	35	38.50	266.22	306.14	1111	1191	892

SOURCES: The poll data was obtained from Richard Johnston, Director, 1988 Canadian Election Study, and was compiled from public sources. All polls are entered on the first day for which they can affect trading. For example, polls released over a weekend enter the data set on the following Monday, and polls released after the close of trading enter the data set on the following day. The TSE data is taken directly from published TSE sources, and the U.S. stock price data is taken from Standard and Poor's daily stock price series.

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