The Effect of Consumer Sentiment on Consumption: Cross-Sectional Evidence from Elections*

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Abstract

This paper seeks to identify the effect of consumer sentiment on consumption. Using Australian consumer sentiment data, which is unique in asking individuals about their political preferences, we show that consumers report substantially higher levels of sentiment when their self-identified political party holds office at a federal level compared to those who support the opposition party. The relative change in sentiment is large, occurs precisely at elections which result in a change of government, and is sustained for the entire period each party holds office. We argue that this variation in sentiment is plausibly unrelated to changes in current fundamental drivers of consumption. To determine whether changes in sentiment affect consumption, we match postcode-level vote-share data to new car sales to households. Using data from two elections which saw a change of government, we find that car sales to households increased relatively more in postcodes with a higher share of voters for the winning party. The results are robust to a variety of economic controls. Overall our results suggest that consumer sentiment contains independent information about future consumption.

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1 Introduction

Consumer sentiment is one of the most widely watched economic indicators. In the financial press, and in commentary by political and business leaders, consumer sentiment is often viewed to both predict and have a causal influence on future consumption growth. Central bank governors have also cited consumer sentiment as being an important factor in influencing economic activity (see Yellen 2015 and Stevens 2011). The attention paid by policymakers and business economists to changes in consumer sentiment is in large part motivated by an impressive correlation between sentiment and consumption growth (see Figure 1). But many academic economists remain skeptical about the information contained in consumer sentiment. The correlation between sentiment and consumption growth may reflect a common factor, such as changes in current income, independently influencing sentiment and consumption, rather than sentiment containing any meaningful independent information.[1]

Although the academic literature on consumer sentiment is relatively sparse, a few studies have attempted to identify whether sentiment contains meaningful independent information about the economy. Using aggregate time series data, Carroll et al. (1994) and Ludvigson (2004) find that after controlling for economic fundamentals - measured by labor income growth, stock prices and short term interest rates - sentiment contains some small but statistically significant independent information about future consumption growth. But it is unclear what additional information is contained in consumer sentiment. The incremental predictive power of sentiment could reflect current or past events embedded in other fundamentals that have not been controlled for, rather than any independent information about the future path of spending (Ludvigson 2004). If sentiment does contain forward-looking information, it is unclear whether the information represents mostly news about future incomes or some other factor.

We use cross-sectional variation in sentiment related to individuals' political partisanship

[1]Notable exceptions to the general skepticism among academic economists are Hall (1993) and Blanchard (1993), who argued that an autonomous drop in consumption – foreshadowed in consumer sentiment – was an important contributor to the 1990-91 recession in the United States.

to identify whether sentiment contains independent information about future consumption. Using individual response data from the Australian consumer sentiment survey, we document that consumers report substantially higher levels of sentiment when their self-identified political party holds office at a federal level compared to those who support the opposition party. This can be seen in Figure 2 where we show consumer sentiment separately for voters for the two major political parties in Australia: the Australian Labor Party (ALP) and the Liberal/National Party. Over the period for which we have consumer sentiment data, there were four federal elections which resulted in a change of government: 1983, 1996, 2007 and 2013. What is striking about Figure 2 is that the difference in sentiments between these two groups of voters is large, the relative change in sentiment occurs precisely at elections, and is sustained for the entire period each political party holds office.

The sharp and discrete change in sentiment precisely at elections – which in our sample have not coincided with major economic events – indicates that the variation in sentiment we exploit is unlikely to be related to changes in current or past fundamental drivers of consumption. These shifts in sentiment could reflect either biased beliefs or expectations about changes in the distribution of incomes. The consumer sentiment index is an average of five sub-indexes, and the most pronounced difference in sentiment between ALP and Liberal/National voters is for questions asking about expectations of future national economic conditions, indicating that beliefs about economic rather than distributional policy are a more likely cause of the differences in sentiment.

It is in general difficult to match self-reported spending intentions to actual behaviour because consumer sentiment surveys do not contain a unique identifier for individuals. But we are able to exploit geographic variation in vote shares at federal elections to identify whether differences in sentiment between ALP and Liberal/National voters match observed consumption behaviour. Our proxy for consumption at the postcode level is new car sales to households. New car sales is well-suited for our purposes, being an important spending decision for most households. It is also closely related to the consumer sentiment survey

question on whether it is a good time to buy a major household item.

Our data spans two changes in government, from the Liberal/National party to the ALP in 2007, and back to the Liberal/National party in 2013. We find that new car sales to households were at a relatively high level in ALP-leaning postcodes when the ALP held government between 2007 and 2013, consistent with the differences in consumer sentiment between ALP and Liberal/National voters. The estimated effects are large: moving from a hypothetical postcode with only Liberal/National voters to a postcode with only ALP voters is estimated to have been associated with an average 10 percentage point increase in new car sales during the period the ALP held government. This provides, we believe, some of the first evidence matching survey-based spending intentions data to actual behaviour.

Our cross-sectional approach implicitly controls for economy-wide shocks. But partisanship is correlated with economic variables, and it is possible that economic shocks to specific occupations or to parts of the income distribution independently influence consumption. To control for this, we regress postcode-level vote shares on a large set of economic variables and use only the variation in vote shares that cannot be explained by economic controls as our source of cross-sectional variation. The results are qualitatively similar, although these estimates are necessarily less precise, because about 60 percent of the variation in vote-shares is absorbed by the economic control variables.

Our paper makes several contributions to the literature. Firstly, by exploiting geographic variation in consumer sentiment and new car purchases, we are able to assess whether self-reported spending intentions match actual behaviour. Our results provide support for the usefulness of spending intentions elicited from surveys, and more generally speaks to the literature on the generalizability of opinions elicited in survey and experimental settings (see for example, Levitt and List 2007).

Secondly, our paper provides evidence that consumer sentiment contains forward-looking information. The sharp change in sentiment between ALP and Liberal/National voters at elections, which is unlikely to be related to a change in current fundamentals, precedes

changes in new car purchases for the two groups. The earlier literature has largely been unable to identify whether the information contained in consumer sentiment mostly proxies current and past fundamentals contained in other macroeconomic series, or contains information about future consumption plans. Our evidence is consistent with the VAR-based evidence presented by Barsky and Sims (2012), which indicates that innovations to sentiment have a slowly building but large effect on consumption.

Thirdly, our results provide a basis for believing that changes in pure sentiment can affect consumption. The innovations to sentiment at elections are large – of comparable size to a recession – and the response of consumption to a change in government that we identify is robust to a range of controls, suggesting that the variation in sentiment we use is more likely to represent pure sentiment innovations than news about fundamentals.[2] Reinforcing this, the political science literature has documented that differences in political affiliations can affect how individuals perceive past economic events (see Bartels 2002). Thus our results suggest an expansive view of sentiment, providing some empirical support for recent theoretical models that highlight a role for non-fundamental drivers of consumption (see for example Lorenzoni 2009, and Angeletos and La'O 2013).

Our paper is most similar to contemporaneous work by Mian et al. (2015), who use United States data to identify the effect of government economic policy views on consumption. They document how an individual's political preferences influence their views about the success of government economic policy. However they find that differences in perceptions between Democrats and Republicans about the success of government policy do not translate into differences in new car consumption between these partisan groups. We believe the Australian setting provides three key advantages compared to the United States. Firstly, because the Australian consumer sentiment survey includes a question on voting intentions,

[2]Barsky and Sims (2012) have argued that consumer confidence is likely to reflect information about future productivity rather than "animal spirits". We do not believe that our results are inconsistent with theirs. They argue that changes in animal spirits cannot lead to long lived changes in consumption because animal spirits do not affect an economy's productive capacity. Here we have two groups of consumers, so autonomous movements in consumption need not affect the productive capacity of the economy, if the consumption of one group of consumers moves in the opposite direction to the other.

we can directly observe political affiliation, rather than needing to impute it based on proxies for partisanship. Secondly, we use new car sales to households as our spending variable. Mian et al. (2015) use registration data, that also includes sales to business and the government, which adds noise to their measure. Finally, while voting is voluntary in the United States it is compulsory in Australia, reducing the possibility that local-area partisanship is mismeasured.

2 Consumer Sentiment and Partisanship

2.1 Consumer sentiment

The Westpac-Melbourne Institute Survey of Consumer Sentiment in Australia is modeled on the long running Thomson Reuters/University of Michigan Survey of Consumers in the United States. However, the Australian survey is unique in asking respondents who they would vote for at a federal election. The headline consumer sentiment index is an average of individual responses to five questions:

(i) current personal financial situation compared to a year ago;

(ii) expected change in personal financial situation over the year ahead;

(iii) expected change in economic conditions over the year ahead;

(iv) expected change in economic conditions over the next five years; and

(v) whether or not now is a good time to purchase a major household item.

The questions are asked in the order listed, and individual responses are classified as either positive, unchanged / don't know, or negative. An index for each question is constructed by subtracting the proportion of negative responses from the proportion of positive responses, and then adding 100. The headline consumer sentiment index is an equally-weighted average of the five sub-indexes. A value of 100 indicates neutral economic conditions, with the fraction of negative responses equal to the fraction of positive responses. Each question asks about the change rather than the level of economic conditions, and so is a stationary variable; the headline index of consumer sentiment has averaged close to 100 since its inception in the

mid-1970s. The survey is nationally representative and has sample size of about 1,200 each month, compared to 500 for the Michigan Survey of Consumers.

For each question making up the headline consumer sentiment index, an index has been constructed separately for ALP and Liberal/National voters, and the difference (ALP minus Liberal/National party voter sentiment) is shown in Figure 3. Notably, consumers report more positive responses when the party they would vote for holds office federally. The most pronounced response is for questions asking about economic conditions. For the self-reported spending intentions question – which is of most interest to us – statistical tests confirm a break in the mean level of the series precisely at elections (see Table 1).

2.2 Conditional consumer sentiment indices

One might be concerned that the difference in sentiment between ALP and Liberal/National voters reflect differences in characteristics between the two groups of voters, rather than just differences in partisanship. Economic and demographic information is also collected from respondents as part of the consumer sentiment survey. To isolate the difference in sentiment between the two groups of voters related to partisanship, we use individual-level response data from the consumer sentiment survey to construct sentiment indexes for ALP and Liberal/National party voters that condition on individual-level economic and demographic characteristics.

We assume that the categorical responses to the consumer sentiment questions (positive, unchanged / don't know or negative) mask a smooth underlying distribution of consumer sentiment. For each of the five sentiment questions, and each survey month, we fit an ordered probit model. In each probit model, we include self-reported partisanship and a range of individual-level economic and demographic controls: age, income, gender, occupation, education level, home ownership status and metropolitan or non-metropolitan location. Full details of the model are provided in Appendix A. Using the estimation results from each ordered probit model, we calculate the difference in probability of reporting a positive response

to a given survey question in each between an otherwise similar ALP and Liberal/National party voter. We then make an analogous calculation for a negative responses. Taking the difference between these two probabilities gives a conditional analogue to the unconditional sentiment indices shown in Figure 3. In particular, our measure can be interpreted as the difference in sentiment between ALP and Liberal/National party voters conditional on the economic and demographic characteristics of individuals in each group.

The conditional estimates for each question in the sentiment survey are shown in Figure 4. These estimates are similar to the unconditional estimates, shown in Figure 3. Hence differences in sentiment between ALP and Liberal/National party voters remain even after controlling for a while range of economic and demographic characteristics.

2.3 Other survey evidence

An entirely separate survey provides corroborating evidence that partisanship affects economic perceptions. A semi-annual Newspoll survey published in *The Australian* newspaper asks a randomly selected sample of voters whether they expect their standard of living to improve, stay the same, or get worse over the next six months. Figure 5 shows indexes for ALP and Liberal/National party voters, constructed using the same methodology as the consumer sentiment survey. Respondents are substantially more optimistic about their standard of living when the political party they support holds office federally.

2.4 Partisanship and economic beliefs

While there has been relatively little attention paid in the economic literature to the effect of partisanship on economic perceptions, a large survey-based political science literature routinely finds that voters are more likely to hold positive views about economic conditions if their partisanship matches that of the president or party in government (e.g., Bartels 2000, Bartels 2002, Evans and Andersen 2006, Gerber and Huber 2009 and Wlezien et al. 1997). Some of the most striking evidence comes from Bartels (2002), who analyzed responses to

the 1988 American Election Studies survey, which asked: "Would you say that compared to 1980, the level of unemployment in the country has gotten better, stayed the same or gotten worse?" A similar question was asked about inflation. A Republican, Ronald Reagan, was the president during this eight-year period, during which the unemployment rate fell by around 1.5 percentage points and inflation fell by close to 10 percentage points. Bartels (2002) found a strong relationship between beliefs about how the economy evolved during Reagan's presidency and respondents' partisanship: only 30 percent of respondents identifying as strong Democrats said that unemployment had improved since 1980, compared with more than 80 percent of strong Republicans; similarly, only about 20 percent of strong Democrats said that inflation was better than in 1980, compared with 70 percent of strong Republicans.

Although the political science literature provides clear evidence that partisanship acts as a screen through which people perceive economic conditions, there has been little testing of whether the beliefs expressed in surveys influence economic behaviour. The political science literature has noted that survey respondents may engage in partisan "cheer leading" when answering survey questions, in which case survey responses may be an inaccurate indicator of actual behaviour (e.g., Lau et al. 1990). More generally, the attitudes expressed in surveys may differ from the considerations consumers bring to mind when making spending decisions. An important contribution of this paper is to test for a relationship between survey responses and consumption behaviour.

3 Data

The unit of measurement in our analysis is a postcode. This allows us to work with a relatively small geographic area, with on average about 8,000 people residing in a postcode.

3.1 Vote shares

Australia has a parliamentary political system, with either the ALP or the Liberal/National party holding government since World War II. Voting is compulsory, with failure to vote resulting in a fine. This has ensured turnout above 93 per cent at each election in the post-War period. This is important because it minimizes the possibility of mismeasurement of local-area partisanship, which would arise with voluntary voting if those who choose to vote are different than those who do not. By contrast, turnout of eligible voters in the US has varied between 49 and 63 per cent since 1960.[3]

We measure partisanship on a postcode level as the fraction of votes going to the ALP in a federal election. We compute this from Australian Electoral Commission's two-party preferred (TTP) measure.[4] There are currently 150 federal electorates (equivalent to US Congressional districts) in Australia, with electorate boundaries set by an independent non-partisan commission. Voting occurs at more than 8,000 polling places. We aggregate these results to the roughly 2,300 postcodes in Australia.

Polling data indicate that a change of government for the two elections in our sample could have been anticipated in advance of the election (Figure 6). Despite this, consumer sentiment moves precisely when the government changes hands, rather than in advance based on polling data.[5] One possible explanation is that a majority of voters do not pay attention to polling data. Reinforcing this, in a Newspoll survey conducted between just four and six days prior to the 2007 federal election, 45 per cent of Liberal/National party supporters said they believed their party would win the election, despite reliable evidence to the contrary

[3]Data on Australian voter turnout is sourced from the Australian Electoral Commission. US data is from the International Institute for Democracy and Electoral Assistance.

[4]Voters are required to order each candidate in their political division from most to least preferred. Candidates with the least number of first-preference votes are successively eliminated until two candidates remain. Votes for eliminated candidates are transferred to the next most preferred candidate indicated on each ballot. Thus the winning candidate in each political division captures at least 50 per cent of the vote. Their share of votes is the two-party preferred (TPP) vote share, our measure of partisanship. In all but a few electorates, the two candidates remaining at the end of the count are from the ALP or the Liberal/National party. For the few electorates where an independent or minor party either won or came second, we use a TPP measure constructed such that the top two candidates are from each of the major parties.

[5]Unlike in the US, government changes hands as soon as the election result is known.

and widespread media coverage of opinion polls leading up to the election.

3.2 Consumption

We use the number of new car sales as our postcode-level consumption measure. We think that car purchases are a good metric of consumption because it represents an important spending decision for households. Between 1995 and 2013 the consumer sentiment survey included a question asking whether it is a good time to buy a car. Using the methodology outlined in Section 2.2, we construct the difference in responses between ALP and Liberal/National voters to this question conditional on an individual's economic and demographic characteristics. There is a very close relationship between attitudes toward buying a car and self-reported spending intentions for a major household item, indicating that new cars sales is a good measure of consumption to map to sentiment (Figure 7).

New car sales data are sourced from VFACTS. These are administrative data covering the universe of new car sales. The data record the postcode of the owner, not the location of the dealership where the car was purchased. One benefit of the VFACTS sales data is disaggregation by buyer type. We use only new car sales to households (and exclude sales to businesses and governments) because this maps most closely to the survey of consumer sentiment.[6] The data span the November 2007 and the September 2013 changes in government.

To control for differences in population growth across postcodes we measure new car sales in per capita terms. Population data is sourced from the five-yearly Socio-Economic Indexes for Areas Census. We linearly interpolate the data to get population estimates between census dates.[7]

[6]Sales to businesses and governments account for around 55 per cent of total annual new car sales.

[7]For the period after 2011, the most recent Census, we assume postcode-level population growth continues at its rate over the period 2006-11.

3.3 Control variables

Differences in partisanship across postcodes are correlated with economic variables. We use a range of postcode-level variables to control for these differences. We use average taxable income data, from the Australian Taxation Office, which are available annually until the 2012/13 financial year. The Census provides a range of postcode-level economic variables every five years: the share of people with a college education, average age, the unemployment rate, the share of people who rent, and the share of employed people in white-collar professions. We also collect postcode-level information on the share of employment by industry. Industries are grouped according to the NAICS classification. We also collect information on the geographic location of a postcode. Postcodes are classified - in increasing order of remoteness - as being in either a major city, inner regional, outer regional, remote or very remote. This data is sourced from the Australian Statistical Geography Standard. Throughout the paper, we exclude postcodes in the Australian Capital Territory (ACT), where the federal public service is located. Changes in government may have an immediate effect on the incomes of federal public servants, through hiring or redundancies. Hence, consumption for those people can be affected by other channels rather than via sentiment effects.

3.4 Summary statistics

The top and bottom panels of Table 2 report postcode-level summary statistics by population-weighted quintiles of ALP vote share at the 2007 and 2013 federal elections. Demographic and employment by industry data reported in Table 2 is sourced from the Census closest in time to each election: the 2006 Census for the 2007 election and the 2011 Census for the 2013 election. In the analysis that follows we refer to the 5th quintile as the top quintile (in terms of the ALP vote share), while we will refer to the 1st quintile as the bottom quintile (in terms of the ALP vote share).

Our analysis is able to exploit large differences in vote shares across postcodes, with the top quintile having a 36 percentage point higher ALP vote share at the 2007 and 2013

elections than the bottom quintile. Income is decreasing in ALP vote share, and so is the mean level of new car purchases. Postcodes with a higher ALP vote share also tend to have a lower share of white-collar employment, a higher unemployment rate, and a higher share of renters. However, differences in educational attainment and average age are relatively minor. By industry, the main differences are the relatively high share of manufacturing employment and low share of agricultural employment in high ALP vote share postcodes. By geographic location, 88 percent of postcodes in the top quintile are in metropolitan areas, compared with 50 percent of postcodes in the bottom quintile.

4 Consumer sentiment and consumption

4.1 Without controls

The first question we seek to answer is whether differences in self-reported spending intentions between ALP and Liberal/National party voters are reflected in differences in observed new car sales. ALP voters became substantially more optimistic about economic conditions than Liberal/National party voters when the ALP won government at the 2007 election. If the opinions expressed in the sentiment survey are indicative of actual consumption behaviour we should expect to see a relative increase in new car sales in ALP-leaning postcodes. Conversely we would expect to see a relative increase in new car sales in Liberal/National-leaning postcodes following 2013 election when the Liberals/Nationals won government.

To see if self-reported spending intentions are informative about actual consumption, we estimate the following regression over the period 2004-2014:

$$log\left(mv_{it}\right) = \alpha_i + \sum_{j=-T_0}^{T_1} \delta_j d_t + \sum_{j=-T_0, j\neq T_\tau}^{T_1} \beta_j \left(d_t \times ALP_i^\tau\right) + \epsilon_{it}, \tag{1}$$

where mv_{it} is per capita new car sales in postcode i in quarter t, α_i is a postcode-specific fixed effect, d_t is an indicator variable taking the value unity in year-quarter t and zero

otherwise, ALP_i^τ is the ALP vote share in postcode i for an election held at time τ, and ϵ_{it} is an error term.[8] The coefficients δ_j are quarterly fixed effects, capturing all variation in new car sales that is common across postcodes, such as seasonality, changes in new car prices, and aggregate economic shocks. The coefficients of interest are β_j, indicating the relationship in quarter t between ALP vote share and per capita new car sales. The omitted category in the regression is the quarter in which the election is held, so all estimated β_j-coefficients are relative to that period. Note we estimate equation (1) separately for the 2007 and 2013 elections. So the December quarter 2007 is the omitted quarter in the regression using the 2007 vote share data, while the September quarter 2013 is the omitted quarter when we use the 2013 vote share data. We use weighted least-squares, with weights equal to the average number of new car sales over the two years prior to the change in government at time τ.[9]

The top panel of Figure 8 presents the β-coefficient estimates from equation (1) together with two standard error confidence bands, using vote shares for the 2007 federal election. The coefficient estimates indicate the log change in the quarterly level of new car sales, relative to the December quarter 2007, when moving from a hypothetical postcode with only Liberal/National voters to one with only ALP voters. Shortly after the ALP won government at the 2007 federal election, there was a sustained increase in the level of new car sales in ALP-leaning postcodes relative to Liberal/National party leaning postcodes. In the three years following the 2007 election, the β-coefficients average to about 0.1. This indicates that going from a postcode with no ALP voters to a postcode where everyone votes for the ALP increases per capita car sales by 10 per cent. The estimated β-coefficients over this period are for the most part statistically significant. The largest difference in the average level of new car sales between ALP and Liberal/National postcodes occurred around 2012. This lines up

[8]The use of a log transformation for the dependent variable results in the exclusion of observations with zero car sales in a given quarter. Based on the regression weights, which are equal to the average number of car sales over the two year prior to a change in government, the postcodes that contain a zero observation in any given quarter account for less than 1.5 percent of new car sales over the weighting period. As an alternative, we have estimated equation (1) with the level rather than the log level of per capita new car sales as the dependent variable, which does not result in the exclusion of any data. The results are very similar, and so we present results using the log transformation to facilitate interpretation of our results.

[9]Using population weights instead does not materially change our results.

with the largest difference between ALP and Liberal/National voters in spending intentions for a major household item from the consumer sentiment survey.

The bottom panel of Figure 8 reports analogous results using vote share data from the 2013 election, at which the Liberal/National party won office. All estimated effects are relative to the September quarter 2013. Although, the fall in the estimated of β-coefficients start prior to the 2013 election, consistent with the consumer sentiment survey, an average of the β-coefficients indicates a 7 percentage point lower level of new car purchases by ALP voters relative to Liberal/National party voters in the two years after the ALP's loss of government compared to the ALP's last two years in office. However, the estimated change in the level of new car sales is smaller for the 2013 than the 2007 change in government, so the average level of new car purchases by ALP voters relative to Liberal/National party voters has not yet returned to its average over the pre-2007 period.

The results in this section indicate that differences in consumer sentiment between ALP and Liberal/National party voters are reflected in differences in new car sales, providing some validation for information contained in the sentiment survey. Further, the results, particularly from the 2007 election, also suggest that consumer sentiment can contain forward looking information about consumption, given that sentiment changes precede consumption changes.

4.2 With controls

Partisanship is correlated with a range of economic indicators (Table 2), so it is possible that economic shocks borne by either ALP or Liberal/National party voters could be responsible for the changes in new car consumption described in the previous section. For example, because ALP leaning postcodes have a relatively high share of manufacturing employment, a change in economic conditions for the manufacturing sector could be expected to affect ALP voters more than Liberal/National party voters, and so directly influence new car sales.

Another possibility is that an incoming government favors its supporters using tax policy. This can have a direct effect on consumption by changing the distribution of income. Given

that policy set by the federal government cannot be targeted to specific individuals, but rather to particular groups of people (based on, for example, employment status, the industry they work in or their income) we attempt to address this concern by controlling for observed economic differences between ALP and Liberal/National party voters.

While our identification approach uses partisanship as a source of variation in economic perceptions, there would ideally also be no difference in economic fundamentals between ALP and Liberal/National party voters. We use two approaches to control for these differences. In the first approach, we try and construct a measure of pure partisanship by isolating variation in the ALP vote share at each election that is uncorrelated with observable economic differences between ALP and Liberal/National party voters. We then use this variation as our source of identification. We also employ difference-in-difference regressions, which allows us to control for difference in income growth across postcodes.

4.2.1 Pure partisanship

To construct a measure of pure partisanship, we separately regress the ALP vote share at the 2007 and 2013 elections on a wide range of economic variables, and take the residual series. The regression includes the full set of demographic and industry variables reported in Table 2, as well as controls for the geographic characteristics of a postcode. Regression results are reported in Table 3.[10] The economic control variables absorb between 55 and 60 per cent of the postcode-level variation in vote shares.

We then re-estimate equation (1) replacing the observed ALP vote share variable with our measure of pure partisanship. Formally, we now estimate the regression

$$log\left(mv_{it}\right) = \alpha_i + \sum_{j=-T_0}^{T_1} \delta_j d_t + \sum_{j=-T_0, j\neq T_\tau}^{T_1} \beta_j \left(d_t \times \xi_i^\tau\right) + \epsilon_{it}, \tag{2}$$

where ξ_i^τ is the residual for postcode i from a regression of the ALP vote for the election held

[10] For the 2007 election, we use 2006/07 mean taxable income, and for the 2013 election we use 2012/13 data, which is the most recent available.

at date τ on the set of control variables described above. To allow for use of a generated regressor, standard errors are constructed using 1000 bootstrap replications.

Results using this residual variation in the ALP vote share for both the 2007 and 2013 elections show a qualitatively similar profile to that from equation (1) without controls (Figure 9). We again find little evidence of a pre-trend before the 2007 election. Following the ALP's victory at the 2007 election we estimate that a positive ALP vote share residual is associated with a higher level of new car purchases. Also consistent with the consumer sentiment survey, this pattern reverses around the time of the 2013 election, at which the Liberal/National party formed government. The change in new car purchases is more pronounced than in the regression without controls. Although the downward trend in new car purchases began about 18 months prior to the 2013 election, it does line up with the timing of the downward trend in the difference between ALP and Liberal/National voters on whether it is a good time to buy a major household item in the consumer sentiment survey, which is also plotted in Figure 9.

Because the control variables absorb over half the variation in the ALP vote share across postcodes, the standard errors around our estimates are now larger. But we nonetheless believe that the point estimates are informative, particularly given that they follow a broadly similar pattern to the point estimates from the regression without controls. These results provide further evidence that consumers' stated spending intentions in the sentiment survey do correspond with observed behaviour. Given our extensive use of controls, these results provide evidence that innovations to sentiment have a causal effect on consumption.

4.2.2 Difference-in-difference regressions

We have investigated whether the differential consumption response of Liberal/National and ALP party voters around changes in government can be explained by differences in observable economics characteristics. We relied on point-in-time data, mostly from the 2006 and 2011 Census. This approach controls for differential income shocks correlated with observable eco-

nomic characteristics. To allow for differential income shocks not correlated with observable economic characteristics, we now adopt a difference-in-difference framework, which allows us to control for changes in postcode-level incomes over time. Here we argue that if different groups of voters experience different shocks than this should show up in their incomes.

We estimate the following difference-in-difference regression at an annual frequency:

$$\triangle^h log\left(mv_{i,t+h}\right) = \alpha + \beta_h ALP_i^{2007} + \sum_j \gamma_j X_{ij} + \phi \triangle^h log\left(inc_{i,t+h}\right) + \varepsilon_{i,h} \tag{3}$$

where $\triangle^h log\left(mv_{i,t+h}\right)$ is the percent change in per capita car purchases in postcode i between 2007 and year 2007+h, where $h = \{1,\ 2, ...\ 6\}$. Control variables include postcode-level growth in taxable income, $\triangle^h log\left(inc_{i,t+h}\right)$, and the full set of control variables $X_{i,j}$ listed in Table 2. Because the latest release of Australian Taxation Office income data is for the 2012/2013 financial year, we can only estimate equation (3) for the 2007 election. As before, we use the average number of new car purchases over the two years before the 2007 election as regression weights.

We estimate equation (3) separately over six different time horizons: 2007 to 2008 ($h = 1$), 2007 to 2009 ($h = 2$), and so on, until the period 2007 to 2013 ($h = 6$). Figure 10 shows estimates of β_h in the presence and absence of the control variables (left- and right-hand panels, respectively). Figure 10 can be interpreted as follows: the first data point at 2008 on the figure shows the effect that moving from a postcode with no ALP voters to only ALP voters has on growth in new car sales over the period from 2007 to 2008. The second data point for 2009 shows this same effect, but for car sales over a two year window from 2007 to 2009, and so on. The size of these estimated effects are non-trivial: going from a hypothetical postcode with only Liberal/National party voters to another postcode with only ALP voters is estimated to have increased per capita new car purchases by around 30 percent four years after the 2007 election, even after we control for changes in income.

Our identification strategy relies on variation in the ALP vote share across postcodes. We would expect that the effect of partisanship on car sales to be more pronounced in the

postcodes that have either a high fraction of ALP or Liberal/National voters. We would like to see if just using these "extreme" postcodes makes a material difference to our results. The bottom panels of Figure 10 report estimates for equation (3) restricting the estimation sample to postcodes in the top and bottom quintiles of ALP vote share at the 2007 federal election. The results are similar in this subset of postcodes, suggesting that most of our identification comes from postcodes at the extremes of partisanship.

Overall, the estimates presented in this subsection are consistent with our earlier results, providing further evidence that sentiment has a causal effect on consumption. Again, there is also evidence that consumer sentiment contains forward looking information as changes in sentiment occur precede changes in consumption.

5 Discussion of results and relation to the literature

The literature looking at consumer sentiment has been primarily interested in answering two questions. Firstly, does consumer sentiment contain information independent from other economic indicators? Related to this, what do changes in consumer sentiment represent? For example, does sentiment reflect current economic conditions or does it capture expectations of the future?

An earlier literature using aggregate time-series variation, attempted to answer the first question by controlling for macroeconomic fundamentals (such as income growth, stock prices and interest rates) in regressions of consumption on consumer sentiment (see Bram and Ludvigson 1998, Carroll et al. 1994 and Ludvigson 2004). However, the information attributed to consumer sentiment by the time-series literature could reflect fundamentals that have not been controlled for, or non-linear relationships between macroeconomic fundamentals and consumption growth, rather than any independent information contained in consumer sentiment (Ludvigson 2004). We believe our identification approach provides a cleaner way to look at the effect of sentiment on consumption. By using cross-sectional variation, we differ-

ence out the effect of all common macroeconomic shocks on sentiment. Our approach also makes clear the source of variation used for identification - differences in sentiment related to partisanship.

This earlier time-series literature did find that sentiment contained information about future consumption. However the amount of additional information from adding sentiment to a consumption growth forecasting regression, was typically been found to be small (see Ludvigson 2004). Like the earlier literature, we also find that sentiment contains information independent of current macroeconomic conditions. However, our results suggest that changes in sentiment can have a pronounced effect on consumption. One possibility is that time-series averages mask specific episodes in which sentiment contains a lot of additional information, as argued by Hall (1993) and Blanchard (1993) for the 1990-91 US recession. As a case in point, the variation we use is masked in aggregate data because there are a similar number of ALP and Liberal/National party voters. Like the earlier literature, our results also suggest that consumer sentiment has predictive power about future consumption. This is consistent with the empirical evidence in Barsky and Sims (2012), who find using aggregate time-series data that innovations to sentiment have long-lasting effects on consumption.

In terms of the what the variation in sentiment we identify represents, we believe that it is more likely to represent pure sentiment shocks resulting from partisanship than unbiased expectations about changes in future incomes. Firstly, the shift in sentiment between ALP and Liberal/National party voters occurs immediately following a change of government. These movements in sentiment are sharp and of a similar magnitude to that observed during recessions. Consumers are more optimistic about both personal and national economic conditions when the political party they support holds office, suggesting that beliefs about changes in the income distribution are not the source of variation in sentiment. This interpretation is consistent with the political science literature, which finds that partisanship plays an important role in an individual's assessment of actual and expected macroeconomic conditions. We also find it hard to think of any new information that would become available immediately

following an election which would lead to such large movements in sentiment between ALP and Liberal/National voters.

Secondly, we make use of an extensive set of controls to account for the fact that partisanship is correlated with economic variables. Specifically, we regressed postcode-level vote shares on a broad set of economic variables and used only the unexplained variation in vote shares as our source of cross-sectional variation. Even after controlling for these factors, we still find that changes in sentiment between ALP and Liberal/National party voters predict changes in new car sales. Overall, these two considerations lead up to believe that we are identifying changes in new car purchases driven by perceptions of future economic conditions related to partisanship rather than changes in current economic fundamentals across postcodes. We believe that this provides some support for the notion that there could be exogenous movements in consumption predicted by sentiment as advocated by both Hall (1993) and Blanchard (1993).

Finally, one important implication of our work is that an individual's reported spending intentions captured by the consumer sentiment survey does translate into actual changes in consumption. This helps validate research relying on spending intentions data as a proxy for consumption when using survey data (for example Bachmann et al. (2015)).

Our paper is most similar to Gerber and Huber (2009) and Mian et al. (2015), who both use cross-sectional data to identify a relationship between partisanship and consumption. In particular, they investigate whether changes in county-level consumption following US presidential elections are related to county-level voting outcomes. Each paper takes a different approach and reaches a different conclusion.[11]

Gerber and Huber (2009) find evidence that consumption increases more in counties that voted for the incoming president. In contrast, Mian et al. (2015) report no statistically significant effect. These differences in results partly reflect how each set of authors measure

[11]Mian et al. (2015) use responses from the question: "As to the economic policy of the government - I mean steps taken to fight inflation or unemployment - would you say that the government is doing a good job, only fair or a poor job?".

consumption. Gerber and Huber (2009) use county-level sales tax revenue data, which is problematic because consumers may shop in one county but live in another. Mian et al. (2015) use self-reported spending intentions from the Michigan consumer sentiment survey and actual spending measured using new car registrations and credit card data.

In terms of how consumption is measured, our paper is most closely related to Mian et al. (2015). This leads to the question why we find that changes in sentiment affect consumption while they do not? We believe that our data allows us to better measure sentiment, partisanship and consumption at a disaggregated level. In Appendix B we provide a reconciliation between our results and those from Mian et al. (2015). To summarize, Mian et al. (2015) have to impute an individual's partisanship based on the county where they live. Imputing partisanship in our data based on an individual's postcode, rather than using their stated political preferences, results in no longer being able to see the effect of an election in consumer's self-reported spending intentions. Secondly, Mian et al. (2015) measure car sales using registration data which includes sales to businesses and governments as well as households. Using our data, we find that the inclusion of business and government car sales makes it more difficult to see a positive relationship between the ALP vote share and car sales post the 2007 election. Lastly, since voting is compulsory in Australia, we have a better measure of local area partisanship.

6 Conclusion

We use novel variation in consumer sentiment associated with political preferences to investigate whether innovations to consumer sentiment have a causal effect on consumption. In particular, we use the fact that consumers report substantially higher levels of sentiment when their political preferences match those of the governing political party compared to those who support the political party in opposition. The difference in sentiment between voters of the two parties is large, with the divergence in sentiment between these two groups

opening up immediately following an election with a change in government. This difference in sentiment is sustained until there is another change in government.

To see if sentiment changes affect consumption, we match postcode-level vote share data with postcode level new car sales. If changes in sentiment do affect consumption then we would expect that following a change of government, postcodes with a greater proportion of voters for the incoming party would purchase relatively more cars than postcodes with a greater proportion of voters for the outgoing government. Results from two elections show this to be the case. We find that following an ALP election victory in 2007 that postcodes with a higher ALP vote share did purchase relatively more cars compared with postcodes with a high share of Liberal/National party voters. This effect then reversed around the time of the Liberal/National party election victory in 2013. Our results are robust to the inclusion of an extensive set of postcode-level economic and demographic control variables.

Our results provide evidence that the information contained in the consumer sentiment survey is informative about consumption. Further we also find that consumer sentiment contains forward looking information, as the sharp change in sentiment between ALP and Liberal/National voters at an election precedes changes in car purchases. Our use of controls, and the sharp change in sentiment that we observe precisely at elections in which there is a change in government, lead us to believe that the relative changes in consumption that we find are related to partisanship rather than to differences in current economic fundamentals across postcodes. In this sense, our results provide evidence that changes in pure sentiment can affect consumption.

The existing macroeconomic time series literature sought to identify whether consumer sentiment contains any independent information beyond that captured by other macroeconomic economic indicators. If consumer sentiment does contain independent information, is it useful to policymakers? Our results indicate that sentiment does contain useful information beyond that captured by macroeconomic time series. Therefore, from a policy making perspective, we suggests that if policymakers do notice a divergence between consumer sentiment

and the level of economic activity suggested by macroeconomic data, then this divergence may contain important information about future consumption.

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A Conditional sentiment indices

We use individual response data from the consumer sentiment survey to construct sentiment indexes for ALP and Liberal/National party voters conditional on individual level economic and demographic characteristics.

For each of the five sentiment questions, and each survey month, we fit an ordered probit model. Responses to each sentiment question are classified as either positive, unchanged / don't know or negative. We assume that the categorical response data mask a smooth underlying distribution of consumer attitudes:

$$s^*_{i,j,t} = \mathbf{X}_{i,t}\mathbf{\Gamma}_{j,t} + \phi_{j,t}ALP_i + \varepsilon_{i,j,t}, \tag{A.1}$$

where $s^*_{i,j,t}$ is the latent sentiment of consumer i in response to question j in survey month t, $\mathbf{X}_{i,t}$ is a vector of covariates for person i, $\Gamma_{j,t}$ is the vector of coefficients on those covariates in month t, ALP_i is a dummy variable if consumer i identifies as an ALP voter, $\phi_{j,t}$ is the coefficient on the ALP dummy variable, and $\varepsilon_{i,j,t}$ is a normally distributed error term.[12] Negative responses are assumed to correspond to levels of the latent sentiment variable below the threshold $\mu^{low}_{j,t}$, positive responses correspond to levels of the latent sentiment variable above the threshold $\mu^{high}_{j,t}$, and unchanged/don't know responses to levels of the latent sentiment variable between these two thresholds. Thus, the probability that consumer i reports a positive response to question j in survey month t is

$$p^{pos}_{i,j,t} \equiv Pr\left(s^*_{i,j,t} > \mu^{high}_{j,t}\right) \quad = \quad Pr\left(\varepsilon_{i,j,t} > \mu^{high}_{j,t} - \mathbf{X}_{i,t}\mathbf{\Gamma}_{j,t} - \phi_{j,t}ALP_i\right) \tag{A.2}$$

and analogously for the other two responses. The thresholds $\mu^{low}_{j,,t}$ and $\mu^{high}_{j,t}$ and the coefficients $\phi_{j,t}$ and $\Gamma_{j,t}$ are jointly estimated using maximum likelihood, under the identification constraints that the error term, $\varepsilon_{i,j,t}$, has unit variance and the regression omits a constant

[12] The estimated equation includes dummy variables for consumers who identify as minor party voters, which for brevity are not reported here. Effects are relative to the baseline of a Liberal/National party voter.

term. Observations are weighted by their sampling frequency, ω_i.

We are interested in the effect of partisanship on consumer attitudes. The estimated average difference in the probability of reporting a positive response to question j in month t between an otherwise similar ALP voter and a Liberal/National party voter is

$$\Delta\bar{p}_{j,t}^{pos} = \frac{1}{N}\sum_{i=1}^{N}\omega_i\left[\hat{p}_{i,j,t}^{pos}\left(ALP_i=1\right)-\hat{p}_{i,j,t}^{pos}\left(ALP_i=0\right)\right] \tag{A.3}$$

and similarly for negative responses,

$$\Delta\bar{p}_{j,t}^{neg} = \frac{1}{N}\sum_{i=1}^{N}\omega_i\left[\hat{p}_{i,j,t}^{neg}\left(ALP_i=1\right)-\hat{p}_{i,j,t}^{neg}\left(ALP_i=0\right)\right] \tag{A.4}$$

Subtracting equation (A.4) from equation (A.3), and rearranging gives:

$$\begin{aligned}\Delta\bar{p}_{j,t}^{pos}-\Delta\bar{p}_{j,t}^{neg} \;=\; & \frac{1}{N}\sum_{i=1}^{N}\omega_i\left[\hat{p}_{i,j,t}^{pos}\left(ALP_i=1\right)-\hat{p}_{i,j,t}^{neg}\left(ALP_i=1\right)\right] \\ & -\frac{1}{N}\sum_{i=1}^{N}\omega_i\left[\hat{p}_{i,j,t}^{pos}\left(ALP_i=0\right)-\hat{p}_{i,j,t}^{neg}\left(ALP_i=0\right)\right]\end{aligned} \tag{A.5}$$

The first term on the right-hand side of equation (A.5) is the probability for an ALP voter of reporting a positive response less the probability of reporting a negative response; the second term is the same for Liberal/National party voters. Each term mirrors the published sentiment indices, which are constructed by subtracting the fraction of negative responses from positive responses. Thus, estimates of equation (A.5) provide conditional analogues to the raw sentiment indices.

B Reconciliation with Mian et al. (2015)

Our paper is most closely related to Mian et al. (2015), who use US data to investigate whether changes in county-level consumption following a presidential election, that results in a change in party that holds the presidency, are related to county-level voting outcomes. They

find no statistically significant relationship between partisanship and consumer spending. We offer a few explanations as to why our results differ to theirs.

Firstly, the Australian consumer sentiment survey asks respondents about their political preferences. In contrast, Mian et al. (2015) have to impute an individual's partisanship based on the county where they live. We believe that a possible reason why Mian et al. (2015) cannot see a change in individual's perception of whether it is a good time to buy a major household item around elections is because of this imputation.[13] To see the effect of imputing partisanship, using our data we impute an individual's partisanship based on their postcode. In particular, we re-compute conditional consumer sentiment indices using the same methodology as that outlined in Appendix A. But instead of using an individual's self-reported voting intentions we use the postcode-level ALP vote share in their postcode of residence at the 2007 election. Comparing the results in Figure A2 where partisanship is imputed to that in Figure 2, where we observe partisanship, we can see that imputing partisanship introduces noise into the data. Nonetheless, these estimates do suggest that ALP voters became more pessimistic about the national economy (sub-indices d and e in Figure A2) following changes in government. But the effect of partisanship on spending intentions is too small to detect when political preference is imputed from postcode-level vote shares. These results using the imputed measure of partisanship mirror the findings of Mian et al. (2015) for the US, and so provide a reconciliation between our findings.

In terms of how cars are measured, because we are interested in the effect of consumer sentiment on consumption, we use car sales to households. Mian et al. (2015) use registration data which includes car sales to businesses and governments in addition to households. To see the effect of using total car sales data we re-estimate equation (1) using Australian car registration data. The data is sourced from the ABS and is available on an annual basis. Figure A1 shows the effect of an increase in the ALP vote share on car sales. As the figure indicates, the standard errors around our estimates of partisanship on car consumption are

[13] An exception is following the Obama victory in 2008 respondents in Republican leaning counties become relatively more pessimistic about spending.

larger when we use registration data rather than just sales to households. We also find that when we use registration data it is unclear whether changes in sentiment affect consumption as our estimated coefficients have a saw-toothed pattern around the 2007 election.[14]

Finally, voting in Australia is compulsory. In contrast, voting in the US is voluntary. This can lead to selection issues. For example, it is well known that voter turnout can be affected by opinion polls. This leads to measurement error which can downwardly bias the estimated effect of partisanship on consumption.

[14]Mian et al. (2015) also use credit card data in their analysis. Unfortunately we do not have access to credit card data.

Table 1: Bai and Perron (1998)Break Test:
Spending Intentions: ALP minus Lib/Nat Voters

Double maximum test	Information criteria	SupF test	Sequential test	Break dates
UD-Max	BIC	SupF(2|1)	3 breaks	Dec-07
87.16***	2 breaks	64.53***		Apr-10
WD-Max	LWZ	SupF(3|2)		Sep-13
87.16***	3 breaks	33.62***		
		SupF(4|3)		
		7.60		
		SupF(5|4)		
		16.27**		

Notes: This table reports tests for a break in the difference between the mean level of spending intentions for ALP and Liberal/National voters. The double maximum tests are for an unspecified number of breaks against the null of zero breaks. Both the WDMax and UDMax test statistics evaluate an F-statistic for 1–5 breaks, with the breakpoints selected by global minimization of the sum of squared residuals. The UDMax statistic weights the five F-statistics equally, while the WDMax statistic weights the F-statistics such that the marginal p-values are equal across the number of breaks. The WDMax test statistic reported is for a 1 per cent significance level test. The LWZ statistic is a modified Schwarz criterion. The SupF$(i+1|i)$ test is for $i+1$ breaks against the null of i breaks. The sequential test selects the number of breaks stepwise from zero breaks using the SupF test. The break dates are those identified by minimizing the sum of squared errors conditional on the number of breaks found. ***, ** and * represent statistical significance at the 1, 5 and 10 per cent levels, respectively.

Summary: There is statistically significant evidence of a break in relative spending intentions for ALP and Liberal/National voters at changes of government.

Table 2: Means: by Quintile of ALP Vote Share

Quintiles:	All	1	2	3	4	5
November 2007 election: ALP victory						
ALP vote share, 2007 election	0.53	0.36	0.46	0.53	0.60	0.72
Car purchases per capita	0.023	0.025	0.025	0.024	0.022	0.019
Income	48,107	54,186	49,042	47,380	46,264	43,627
Age	37	38	37	37	37	36
Share with college education	13.9	14.5	14.0	14.0	13.4	13.4
Share renting their home	27.6	22.8	25.1	26.7	29.5	33.8
Share with white collar job	32.7	39.0	33.8	32.6	30.2	27.7
Unemployment rate	5.5	4.3	4.8	5.0	5.6	7.7
Industry shares:						
Agriculture	3.3	9.0	2.9	2.4	1.2	0.8
Mining & construction	10.3	10.0	11.2	10.8	10.4	9.1
Manufacturing	11.1	8.9	10.0	10.3	12.1	14.3
Retail & wholesale trade	21.2	19.9	20.8	21.3	21.8	22.5
Services	17.2	16.9	17.2	17.2	17.2	17.6
Health & education	18.6	18.7	19.4	19.3	18.5	17.1
Arts & accommodation	8.0	7.6	8.2	7.9	7.8	8.3
Public sector	6.4	5.5	6.5	6.8	7.1	6.4
September 2013 election: Liberal/National victory						
ALP vote share, 2013 election	0.47	0.30	0.40	0.47	0.54	0.66
Car purchases per capita	0.022	0.024	0.024	0.023	0.022	0.019
Income	62,784	71,223	64,127	61,802	60,345	56,271
Age	38	39	38	38	37	36
Share with college education	16.5	16.8	16.0	16.4	16.8	16.6
Share renting their home	30.1	26.4	29.1	29.2	30.6	35.5
Share with white collar job	33.8	39.2	33.9	33.3	32.6	30.0
Unemployment rate	5.8	4.7	5.6	5.5	5.9	7.4
Industry shares:						
Agriculture	2.6	7.6	2.3	1.6	0.9	0.6
Mining & construction	11.4	11.6	12.8	12.2	11.0	9.6
Manufacturing	9.5	7.7	8.6	9.1	9.9	12.3
Retail & wholesale trade	20.1	18.8	19.7	20.1	20.6	21.4
Services	17.5	17.4	17.2	17.2	17.8	18.1
Health & education	20.1	20.0	20.7	20.7	20.2	18.9
Arts & accommodation	8.2	7.7	8.4	8.2	8.0	8.7
Public sector	6.6	5.5	6.3	6.9	7.6	6.4

Notes: This table reports population-weighted means for each variable by quintile of ALP vote share and for the total population. Postcode characteristics data are taken from the Census that is the closest in time to the change in government: the 2006 Census for the 2007 federal election and the 2011 Census for the 2013 federal election. The Australian Capital Territory is excluded.

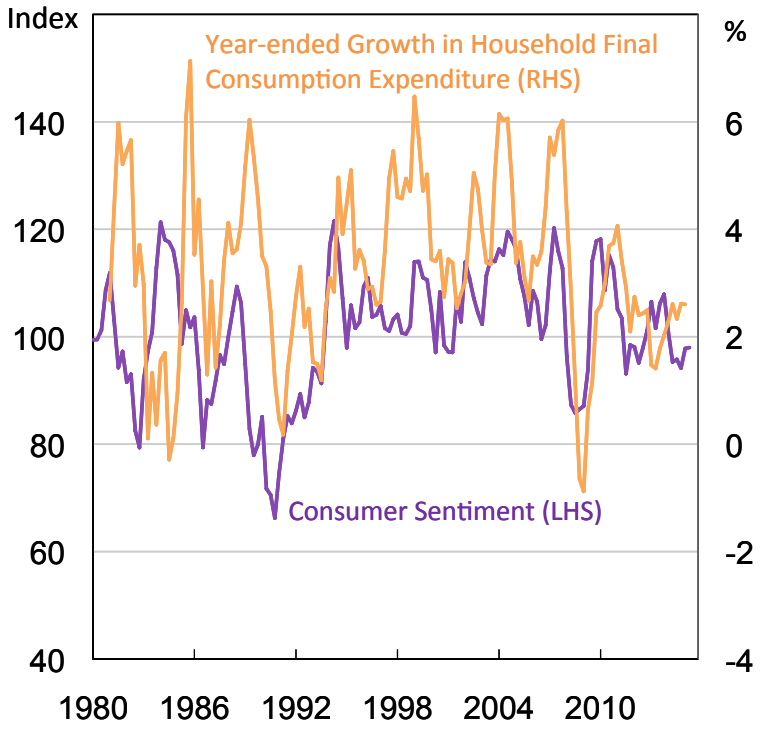
Table 3: ALP Vote Share Regressions

	ALP vote share: 2007	ALP vote share: 2013
Log taxable income	-0.1851***	-0.2432***
	(0.0265)	(0.0112)
Bachelor's degree or higher: per cent	0.0121***	0.0112***
	(0.0014)	(0.0013)
Average age: years	-0.0020***	-0.0024***
	(0.0009)	(0.0009)
Unemployment rate: per cent	0.0171***	0.0105***
	(0.0013)	(0.0018)
Share of renters: per cent	0.0001	-0.0002
	(0.0003)	(0.0004)
White-collar profession: per cent	-0.0084***	-0.0074***
	(0.0010)	(0.0013)
Industry of employment: per cent		
Agriculture	-0.0061***	-0.0071***
	(0.0009)	(0.0010)
Mining & construction	-0.0039***	-0.0036***
	(0.0009)	(0.0009)
Manufacturing	-0.0018**	0.0023***
	(0.0008)	(0.0011)
Retail & wholesale trade	-0.0093***	-0.0113***
	(0.0011)	(0.0013)
Services	-0.0041***	-0.0053***
	(0.0012)	(0.0013)
Health and education	-0.0060***	-0.0042***
	(0.0011)	(0.0012)
Arts and accommodation	-0.0079***	-0.0054***
	(0.0015)	(0.0016)
Other	-0.0115***	-0.0137***
	(0.0037)	(0.0035)
Region: inner regional	-0.0506***	-0.0502***
	(0.0088)	(0.0093)
Region: outer regional	-0.0545***	-0.0591***
	(0.0098)	(0.0106)
Region: remote	-0.0213	-0.0335
	(0.0153)	(0.0172)
Region: very remote	0.0031	0.0115
	(0.0293)	(0.0243)
R^2	0.6064	0.5514
Observations	2265	2263

Notes: This table reports coefficient estimates from a regression of the ALP vote share on postcode level characteristics. For the 2007 election, income is measured using 2006/07 financial year taxable income data and other variables are taken from the 2006 Census. For the 2013 election, income is measured using 2012/13 financial year taxable income data and other variables are taken from the 2011 Census. Observations are weighted by the number of voters in a postcode at each election. Baseline covariates are: home owner, blue-collar profession, public sector industry, and metropolitan location. The Australian Capital Territory is excluded. ***, **, and * indicate results statistically different from zero at the 1, 5 and 10 percent levels, respectively.

Summary: economic covariates explain 55 and 61 per cent of ALP vote share at the 2007 and 2013 federal elections, respectively.

Figure 1: Consumer Sentiment and Consumption Growth

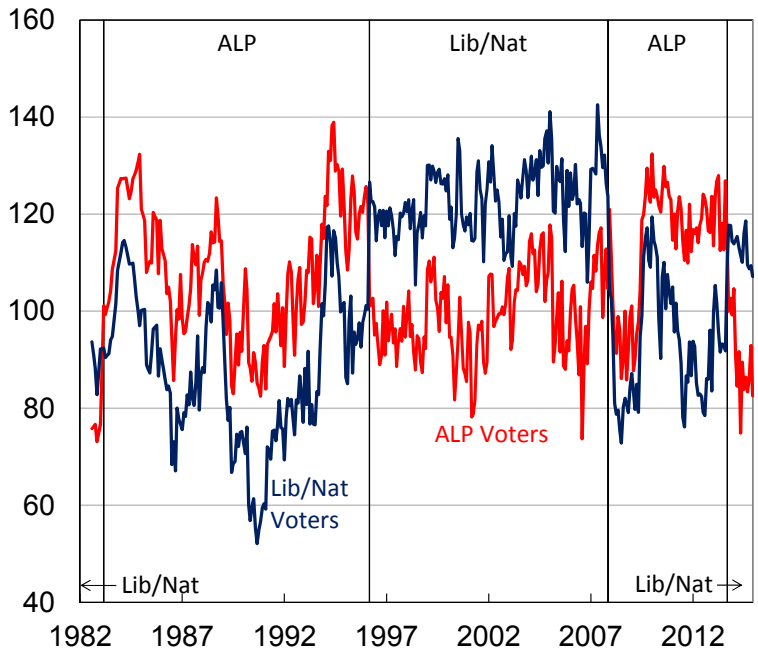


Notes: The figure shows year-ended growth in household final consumption expenditure, sourced from the national accounts, and the aggregate Westpac-Melbourne Institute consumer sentiment index.

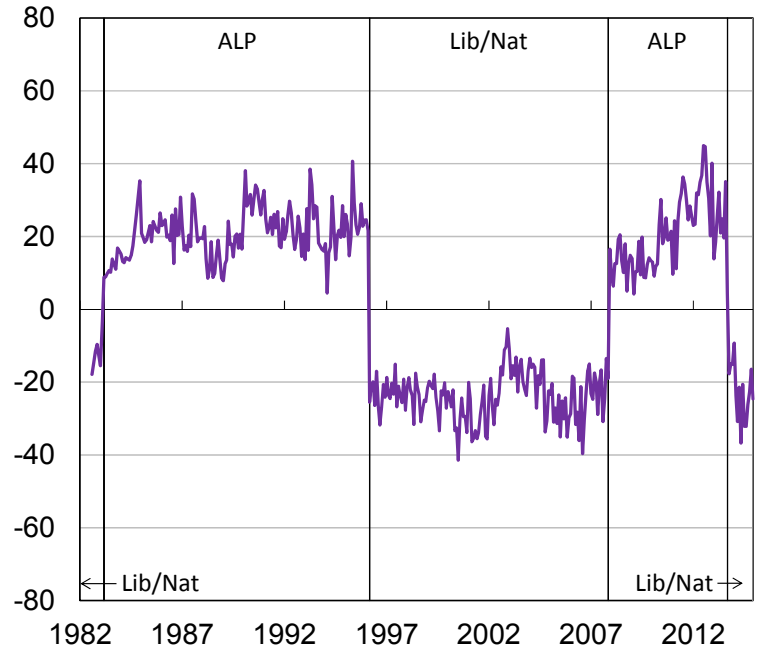
Summary: There is a high correlation between sentiment and consumption growth.

Figure 2: Consumer Sentiment Index

(a) By Voting Intention



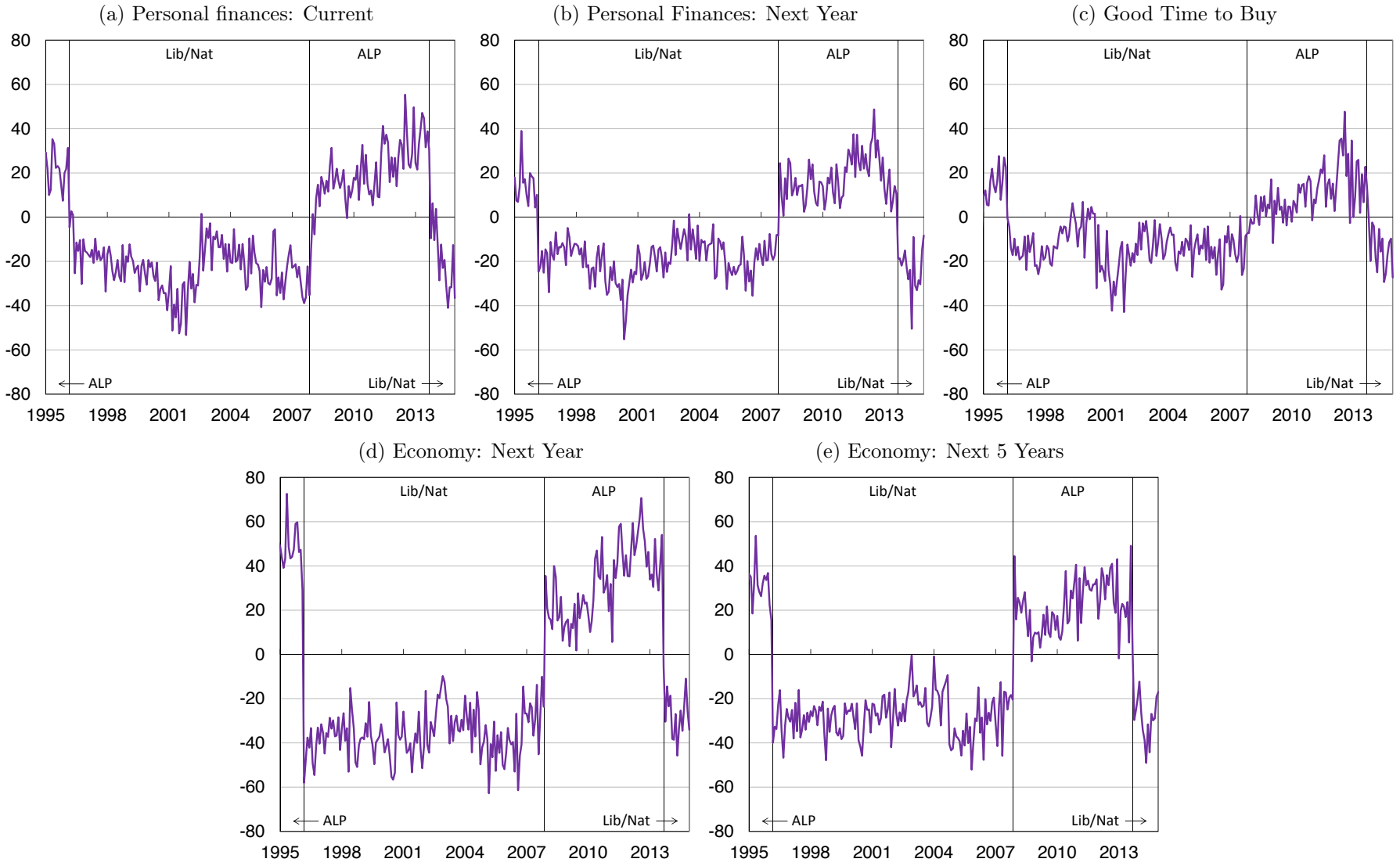
(b) ALP Minus Liberal/National Voters



Notes: The top panel shows the consumer sentiment index by consumers' self-identified voting intention; the bottom panel shows the difference between the two series in the top panel: ALP minus Liberal/National party voters. Vertical lines show dates when government changed hands.

Summary: Sentiment is substantially higher when a consumer's self-identified political party holds government.

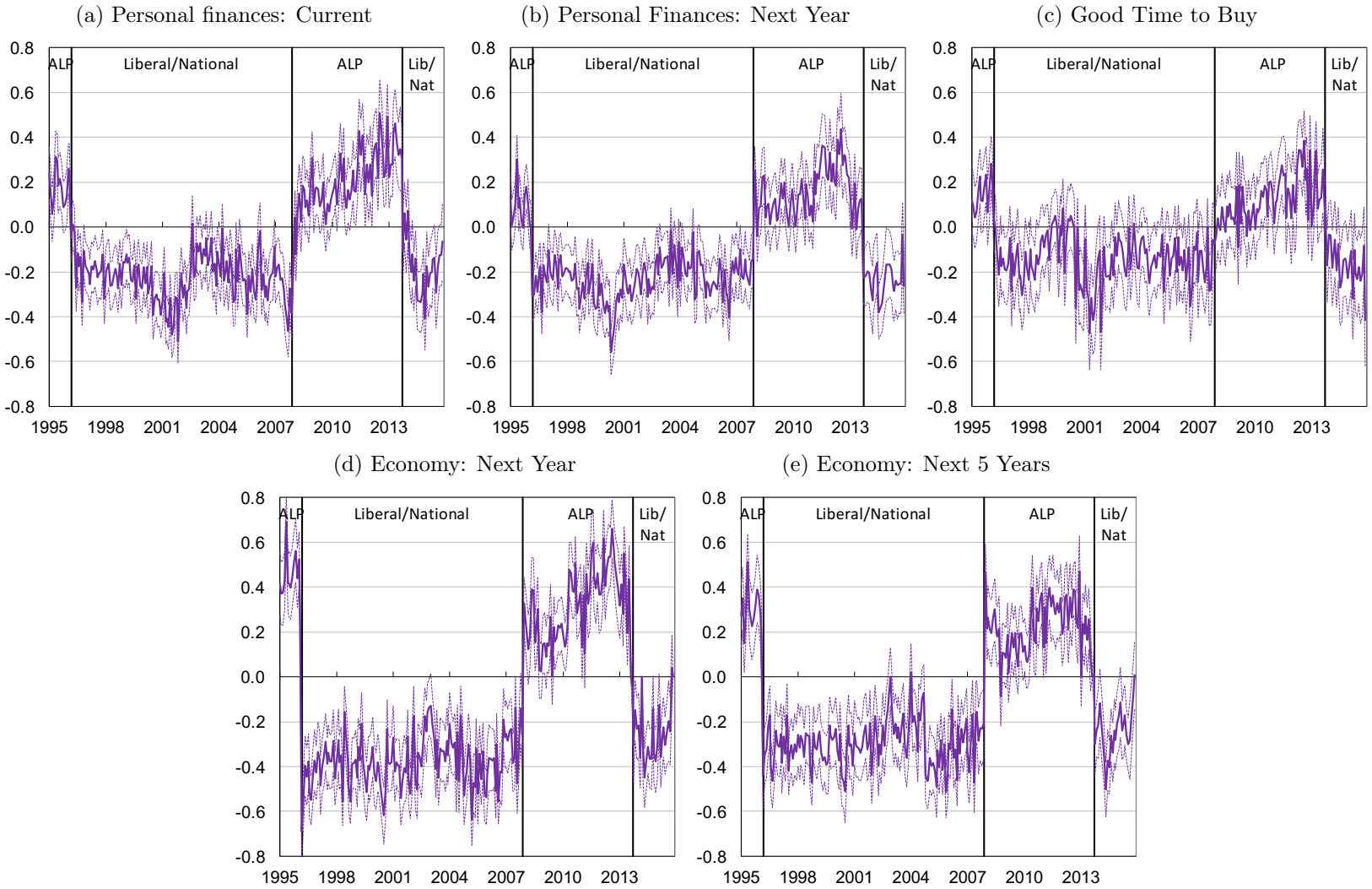
Figure 3: Components of Consumer Sentiment: ALP minus Liberal/National Voters



Notes: The consumer sentiment index is an average of responses to five questions. Each panel shows the difference in the index level for self-identified ALP minus Liberal/National voters. Vertical lines show dates when government changed hands. The five questions are: (a) change in personal financial situation compared to a year ago; (b) expected change in personal financial situation over the next year; (c) good time to buy a major household item; (d) expected change in general economic conditions over the next year; (e) expected change in general economic conditions over the next five years.

Summary: Each component of the consumer sentiment index is higher for consumers when the political party they support holds government.

Figure 4: Conditional Components of Consumer Sentiment: ALP minus Liberal/National Voters

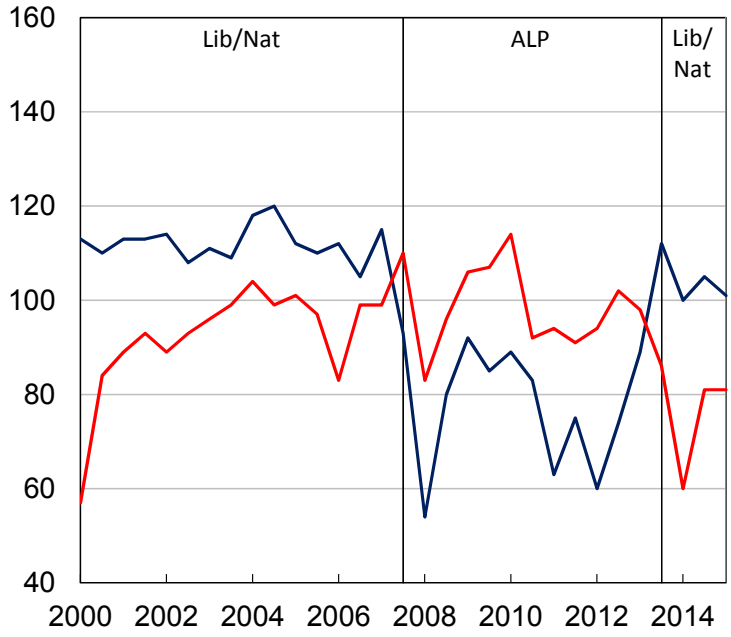


Notes: Responses to each question are either positive, unchanged/don't know, or negative. (See notes to Figure 3 for details on each question.) For each question and each survey month an ordered probit model is fitted; the set of included variables are: gender, age, occupation, education, home ownership, income, metro/non-metro and voting intention. For each month, the estimated average marginal effect of reporting a positive response is calculated for an ALP voter relative to a Liberal/National party voter; the same is done for negative responses. The lines reported in each figure are the difference (positive minus negative) between these two estimated average marginal effects, providing an econometric analogue to the unconditional means shown in Figure 3. Dashed lines are two standard error bands. Vertical lines show dates when government changed hands.

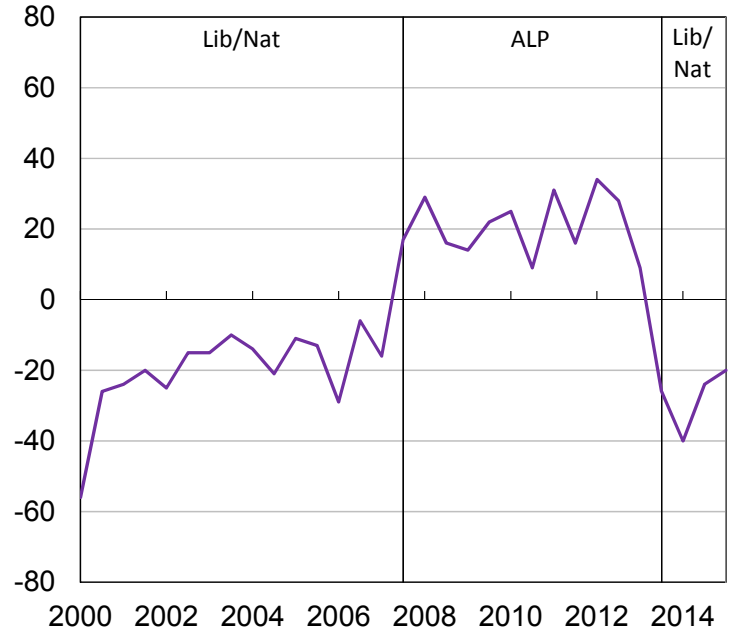
Summary: After controlling for individual level characteristics, each component of the consumer sentiment index is higher for consumers when the political party they support holds government.

Figure 5: Newspoll: Expected Change in Standard of Living

(a) By Voting Intention



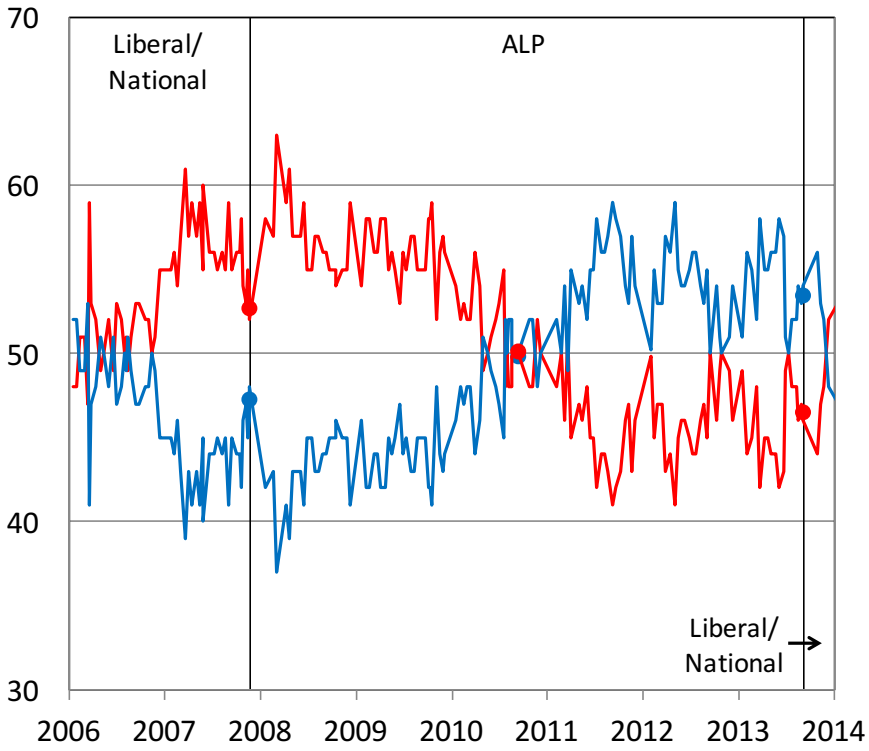
(b) ALP Minus Liberal/National Voters



Notes: *Newspoll* surveys consumers on their expected change in standard of living over the next six months; responses are improve, no change/uncertain, or get worse. An index is constructed by subtracting the fraction reporting a negative response from the fraction reporting a positive response. The top panel shows the index level by consumers' voting intention. The bottom panel shows the difference between the two series in the top panel: ALP minus Liberal/National party voters. Vertical lines show dates when government changed hands. The survey has been conducted in June and December each year since 2000.

Summary: The *Newspoll* survey, entirely separate from the consumer sentiment survey, shows that consumers are more optimistic about their standard of living when the political party they support holds government.

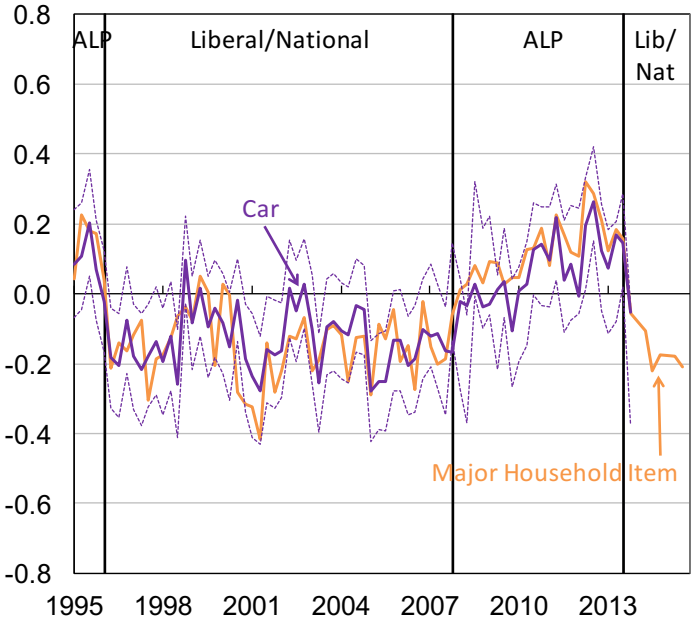
Figure 6: Political Opinion Polling: *Newspoll* Two-Party Preferred Vote Shares



Notes: The figure shows ALP (red) and Liberal/National party (blue) Two-Party Preferred vote shares from the generally fortnightly *Newspoll* survey. Vertical lines indicate elections at which there was a change of government. Circles indicate actual vote shares at the November 2007, September 2010, and September 2013 elections.

Summary: The Liberal/National party trailed in the *Newspoll* survey for over a year before losing the 2007 election; polling before the 2013 change of government was more mixed.

Figure 7: Spending Intentions Cars: Good Time to Buy: All Consumers

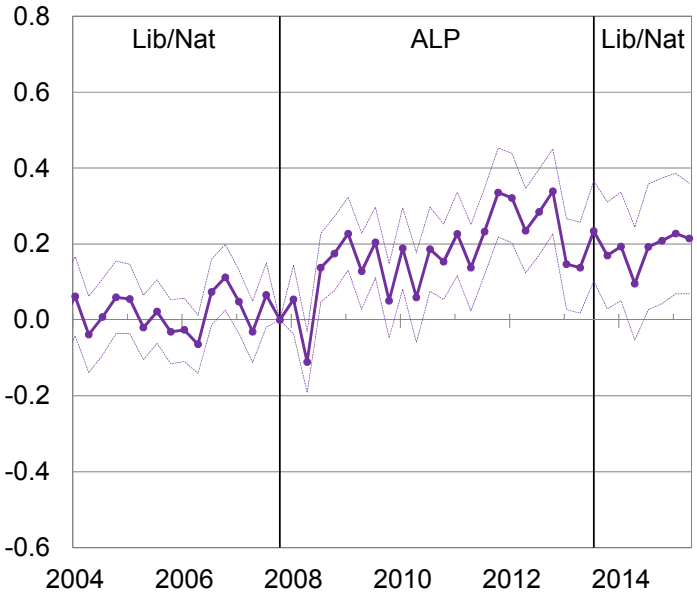


Notes: The figure shows the effect of changes of government on spending intentions for *cars*. The index is constructed from individual response data and conditions on respondents' economic and demographic characteristics (see notes to Figure 4 for details). Consumers were asked whether 'now is a good time to buy a car', and responses classified as either *good*, *neutra*l, or *bad*. The *cars* question was asked on a quarterly basis from 1995-2006, then monthly until January 2014, when it was discontinued. We show the index on a quarterly basis, together with the analogous index of spending intentions on *a major household item.*

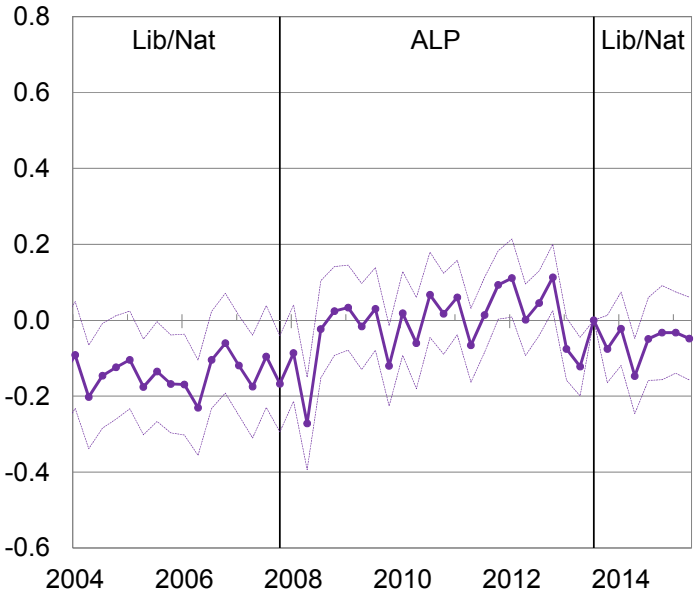
Summary: Consumers are more likely to report that now is a good time to buy a car if the political party they support holds government, conditional on individual-level characteristics.

Figure 8: Partisanship and Car Purchases:
Coefficient on ALP Vote Share

(a) 2007 Election Vote Shares



(b) 2013 Election Vote Shares

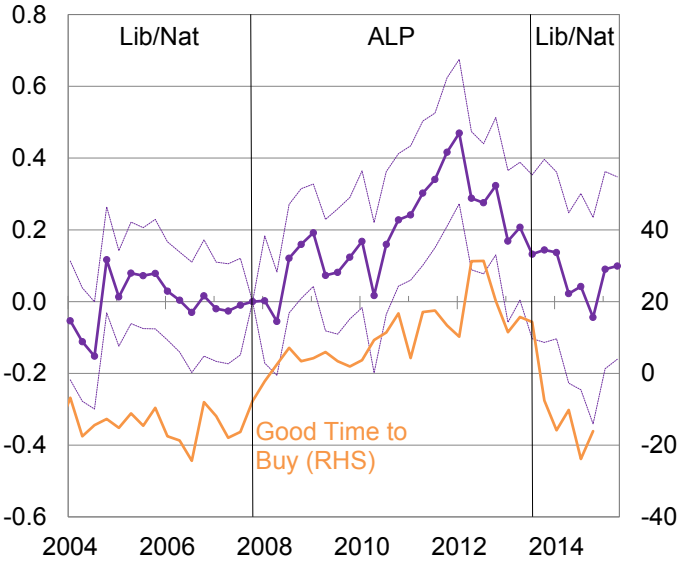


Notes: The top panel shows the coefficients β_j from the regression $log\left(mv_{it}\right) = \alpha_i + \sum_{j=-T_0}^{T_1} \delta_j d_t + \sum_{j=-T_0}^{T_1} \beta_j \left(d_t \times ALP_i^{2007}\right) + \epsilon_{it}$, where mv_{it} is car sales in postcode i in quarter t, α_i is a postcode-specific fixed effect, d_t is a dummy variable taking the value unity in quarter t, and ALP_i^{2007} is the ALP vote share in postcode i at the 2007 federal election; the coefficients β_j are relative to the omitted quarter December 2007, when the ALP won government. The bottom panel reports the coefficients β_j using vote shares from the 2013 federal election, and the omitted category is the September quarter 2013, when the Liberal/National party won government.

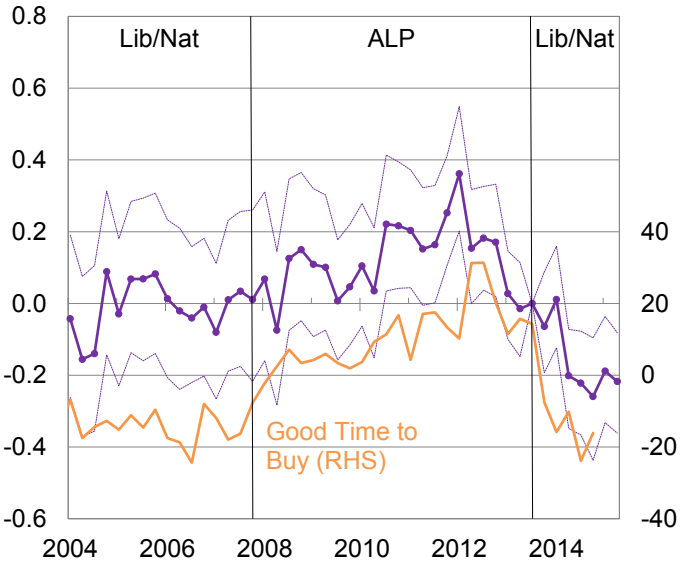
Summary: Car sales were higher in ALP-leaning postcodes relative to Liberal/National leaning postcodes when the ALP held office between November 2007 and September 2013.

Figure 9: Partisanship and Car Purchases:
Coefficient on Unexplained Variation in ALP Vote Share

(a) 2007 Election Vote Shares



(b) 2013 Election Vote Shares

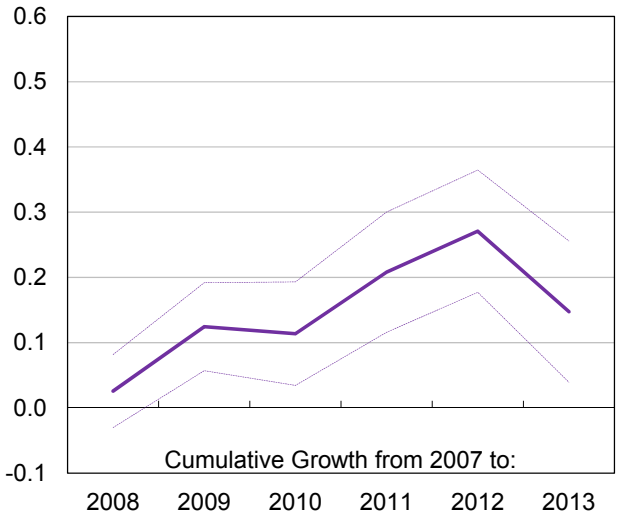


Notes: The dotted line in the top panel shows the coefficients β_j from the regression $log\left(mv_{it}\right) = \alpha_i + \sum_{j=-T_0}^{T_1} \delta_j d_t + \sum_{j=-T_0}^{T_1} \beta_j \left(d_t \times \xi_i^{2007}\right) + \epsilon_{it}$, where mv_{it} is car sales in postcode i in quarter t, α_i is a postcode-specific fixed effect, d_t is a dummy variable taking the value unity in quarter t, and ξ_i^{2007} is the residual for postcode i from a cross-sectional regression of ALP vote share at the 2007 federal election on controls; see Table 3 for details. The coefficients β_j are relative to the omitted quarter December 2007, when the ALP won government. The bottom panel reports the coefficients β_j using vote shares from the 2013 federal election, and the omitted category is the September quarter 2013, when the Liberal/National party won government. Dashed lines show 95 per cent confidence bands calculated from 1000 bootstrap replications. The *Good Time to Buy* series is the difference between ALP and Liberal/National party voters in self-reported spending intentions for a major household item.

Summary: Controlling for observable differences in characteristics of postcodes, car sales were higher in ALP-leaning postcodes relative to Liberal/National leaning postcodes when the ALP held office between November 2007 and September 2013.

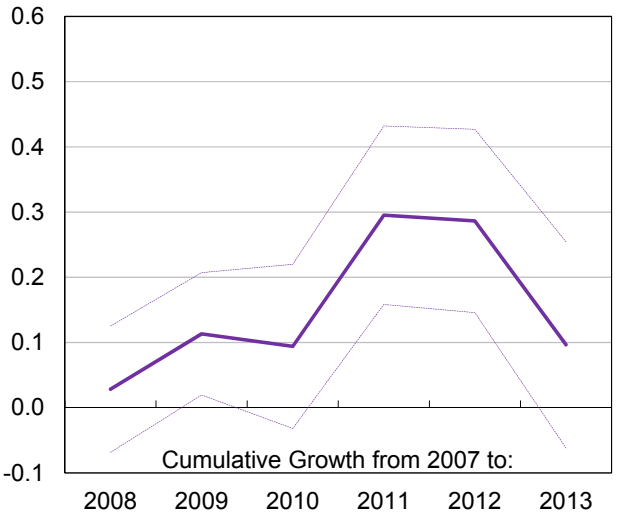
Figure 10: Partisanship and Car Sales: Difference-in-Difference Regressions
Coefficient on ALP Vote Share at 2007 Election

(a) Without Controls



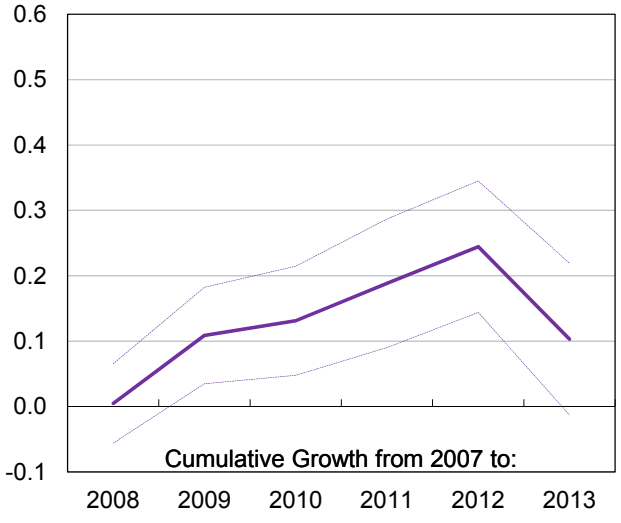
Note: dashed lines indicate +/- two standard error band.

(b) With Controls



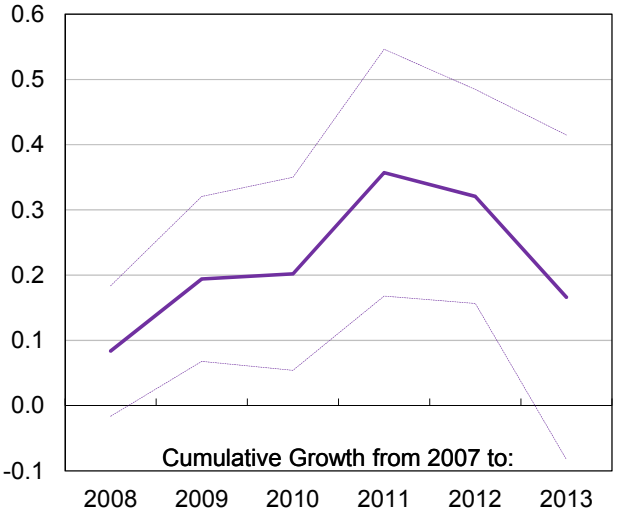
Note: dashed lines indicate +/- two standard error band.

(c) Without Controls: Top and Bottom Quintiles



Note: dashed lines indicate +/- two standard error band.

(d) With Controls: Top and Bottom Quintiles

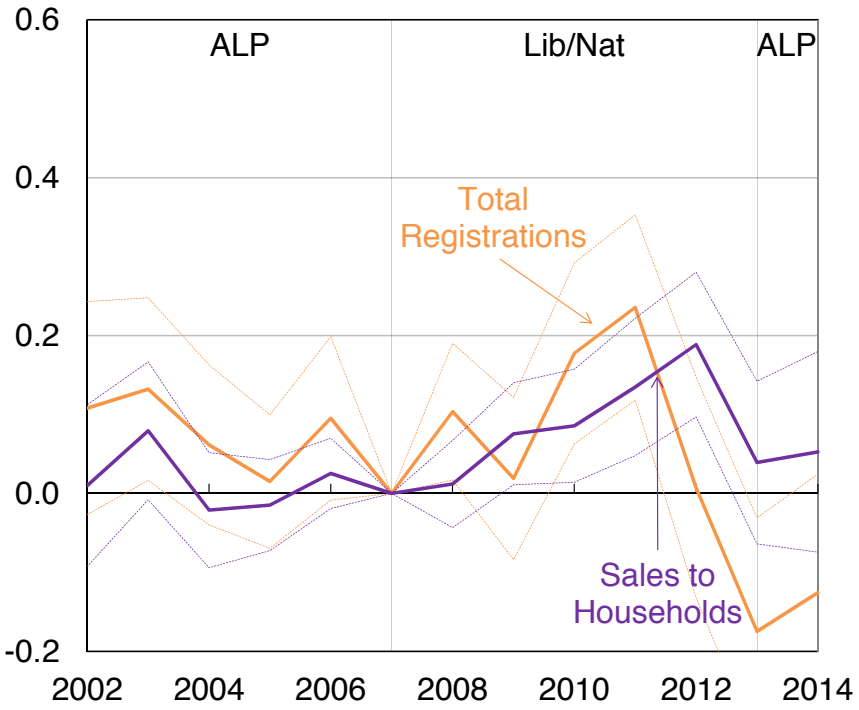


Note: dashed lines indicate +/- two standard error band.

Notes: Each panel reports coefficients β_h from a regression of the form $\triangle^h log\left(mv_{i,t+h}\right) = \alpha + \beta_h ALP_i^{2007} + \sum_j \gamma_j X_{ij} + \phi \triangle^h log\left(inc_{i,t+h}\right) + \varepsilon_{i,h}$, where $mv_{i,t}$ is car sales in postcode i in year t, $\triangle^h$ is the h-year difference operator, ALP_i^{2007} is the ALP vote share in postcode i at the 2007 federal election, X_{ij} is characteristic j for postcode i, and $inc_{i,t}$ is mean taxable income for postcode i in year t. Each coefficient β_h reported in the figures is from a separate regression. The first panel reports coefficients β_h from a regression including no controls, and the second panel includes the full set of controls listed in Table 2. The third and fourth panels repeat the first two panels restricting the data sample to postcodes in the top and bottom population-weighted quintiles of ALP vote share at the 2007 federal election.

Summary: Controlling for income growth and other observable differences in characteristics of postcodes, car sales were higher in ALP-leaning postcodes relative to Liberal/National leaning postcodes when the ALP held office between November 2007 and September 2013.

Figure A1: Partisanship and Car Purchases:
By Total Registration and Sales Data to Households

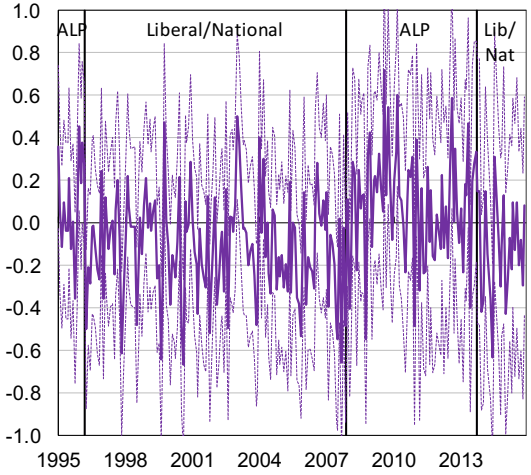


Notes: The graph shows the coefficients β_j from the regression $log\left(mv_{it}\right) = \alpha_i + \sum_{j=-T_0}^{T_1} \delta_j d_t + \sum_{j=-T_0}^{T_1} \beta_j \left(d_t \times ALP_i^{2007}\right) + \epsilon_{it}$, where mv_{it} is car sales in postcode i in quarter t, α_i is a postcode-specific fixed effect, d_t is a dummy variable taking the value unity in year t, and ALP_i^{2007} is the ALP vote share in postcode i at the 2007 federal election; the coefficients β_j are relative to the omitted quarter December 2007, when the ALP won government. We measure per capita car purchases in two ways: from sales to households and from registration data that includes sales to households, businesses and the government.

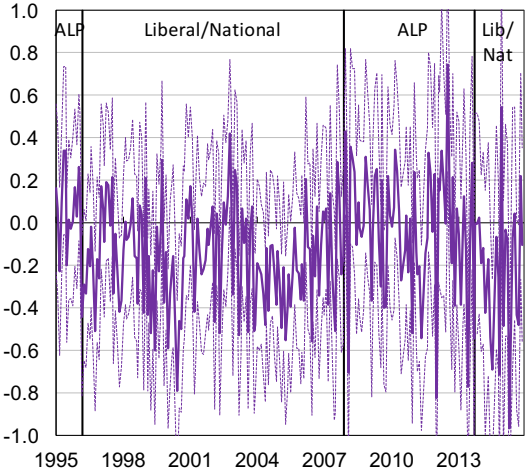
Summary: Measuring car sales using total registrations rather than sales to households adds noise, obscuring the relationship between changes in government and new car consumption.

Figure A2: Components of Consumer Sentiment: Imputed Partisanship, ALP minus Liberal/National Voters

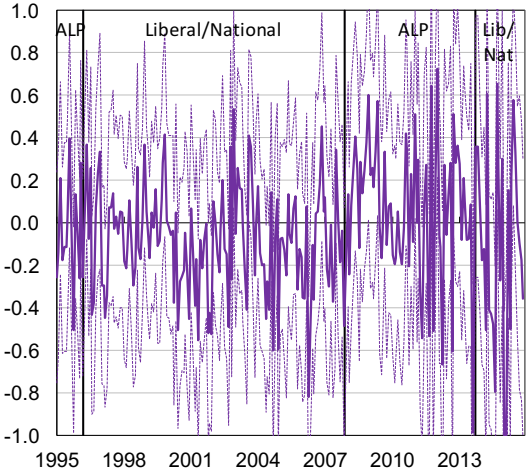
(a) Personal finances: Current



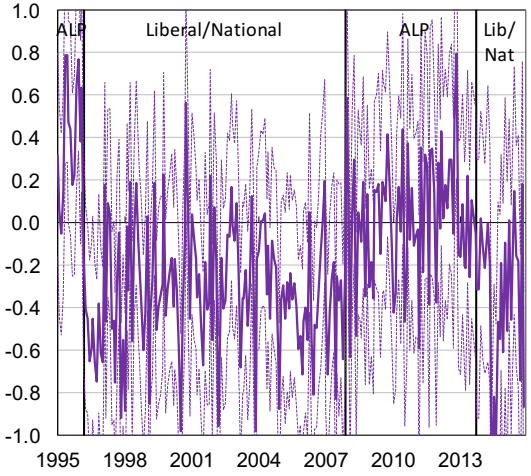
(b) Personal Finances: Next Year



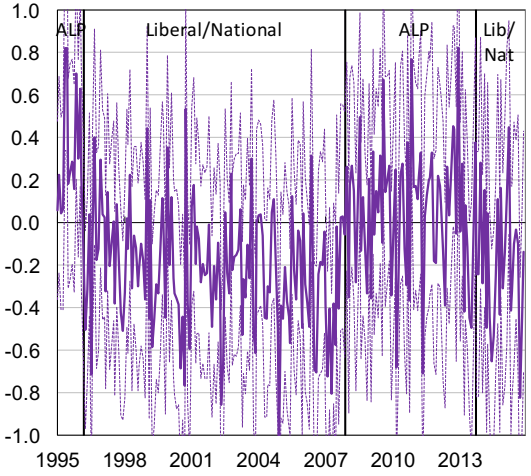
(c) Good Time to Buy



(d) Economy: Next Year



(e) Economy: Next 5 Years



Notes: These estimates repeat those of Figure 4 using imputed rather than self-reported partisanship as the dependent variable. The measure of partisanship is the ALP vote share at the 2007 federal election in the postcode of residence for each survey respondent. See notes to Figure 4 for further details.

Summary: The effect of partisanship on spending intentions cannot be detected when partisanship is imputed based on the postcode-level ALP vote share of the survey respondent. But an effect of partisanship on views about general economic conditions is evident.