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The Effect of Consumer Sentiment on Consumption

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Abstract

This paper seeks to identify whether changes in consumer sentiment have a direct effect on consumption. In order to demonstrate a causal effect running from sentiment to consumption we need to identify changes in sentiment that are likely to be unrelated to other factors simultaneously affecting sentiment and consumption. To do this, we take advantage of the fact that immediately after elections at which there is a change of government consumers supporting the winning party report substantially more optimistic expectations about both personal and general economic conditions than supporters of the losing party. Following a change of government, we find robust evidence that supporters of the winning party report higher spending intentions than supporters of the losing party, providing evidence that consumer sentiment has a causal effect on consumption. We also find evidence that, following changes of government, motor vehicle purchases increased by relatively more in postcodes with a greater share of votes for the winning party. This provides evidence that self-reported spending intentions are indicative of actual consumption behaviour. Because the share of supporters for the government and the opposition is similar, the variation in sentiment that we use for identification is not evident at the national level. Thus, our results do not imply that changes of government have a noticeable effect on aggregate consumption. However, they do imply a causal effect that can run from sentiment to consumption.

JEL Classification Numbers: E20, E21

Keywords: consumer sentiment, Australia

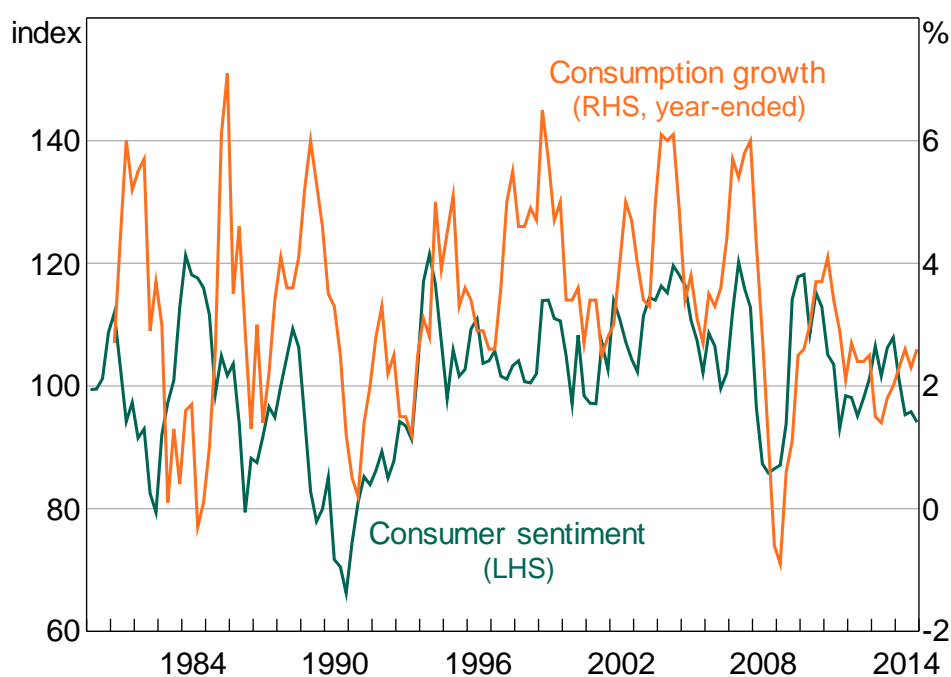
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1. Introduction

Household consumption accounts for more than half of national expenditure, making it important from a macroeconomic policy perspective to understand its behaviour. Changes in expectations about future economic conditions are thought by many to be an important source of variation in consumer spending. These changes may appear as innovations to consumer sentiment indices. Accordingly, consumer sentiment measures are believed by many to be both prognostic and causal. Some policymakers have expressed support for this view (Stevens 2011; Yellen 2015). Among academic economists, Blanchard (1993) and Hall (1993) have argued that an autonomous drop in consumption – foreshadowed in consumer sentiment – was an important contributor to the 1990–91 recession in the United States. Consistent with these views, there is a sizeable correlation between consumer sentiment and consumption growth (Figure 1). However, many economists remain sceptical about the information contained in consumer sentiment indices. The correlation between sentiment and consumption growth could reflect a common factor, such as changes in current income, that independently influence both sentiment and consumption, rather than sentiment having any causal effect on consumption. Typical of this view, Milton Friedman (1992, p 523) argued that ‘They [consumer confidence indices] are mostly a reflection of what’s going on rather than a cause’.

Figure 1: Consumer Sentiment and Consumption Growth



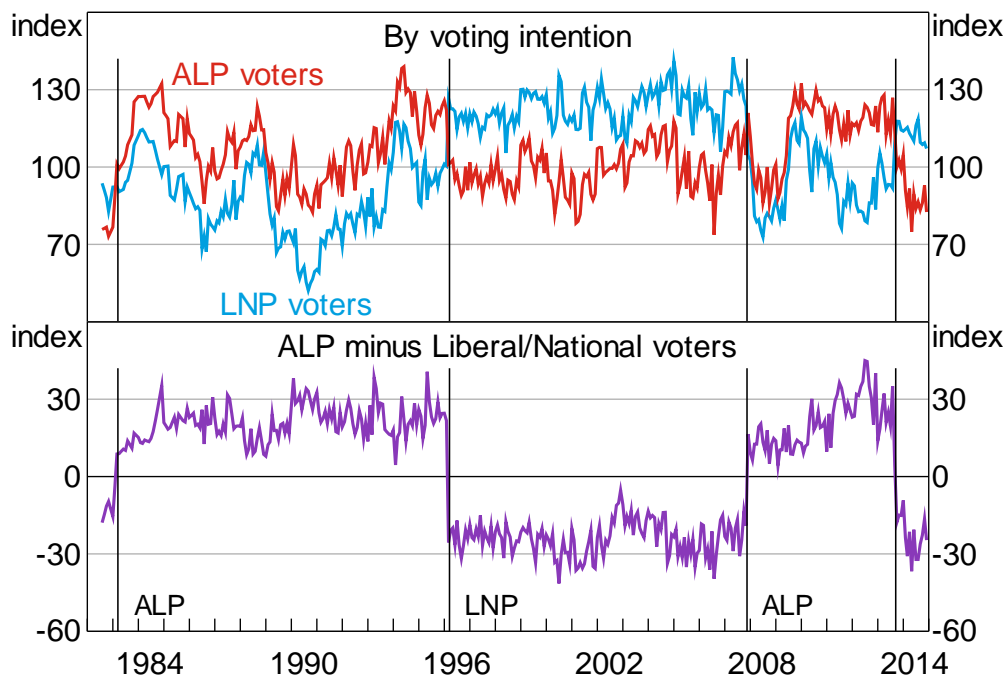
Note: Shows the aggregate Westpac-Melbourne Institute consumer sentiment index and the year-ended growth in household final consumption expenditure, sourced from the national accounts

Sources: ABS; Westpac and Melbourne Institute

In general, it is difficult to identify whether changes in consumer sentiment have a causal effect on consumption because it is challenging to find variation in sentiment that is unrelated to variation in fundamental determinants of economic conditions. However, in this paper, we are able to consider cross-sectional variation in sentiment related to individuals' political preferences to isolate variation that is plausibly unrelated to changes in current fundamental drivers of consumption. We use individual responses from the Australian consumer sentiment survey because it is unique in asking

individuals' about their voting intentions. We document that consumers report substantially higher levels of sentiment when their political party holds office at a federal level compared to those who support the opposition party. This can be seen in Figure 2, which shows the consumer sentiment index separately for supporters of the two major political parties in Australia: the Australian Labor Party (ALP) and the Liberal/National party (LNP). Over the period for which we have aggregate-level consumer sentiment data, there were four federal elections which resulted in a change of government: 1983, 1996, 2007 and 2013. These elections are represented by vertical lines in the figure. Strikingly, the difference in sentiment between these two groups of voters is large and it changes dramatically at elections for which there is a change of government, and is then sustained for the entire period each political party holds office.

Figure 2: Consumer Sentiment Index



Notes: Top panel shows the consumer sentiment index by consumers' self-identified voting intention; bottom panel shows the difference between the two series in the top panel; vertical lines show dates when government changed hands

Sources: Authors' calculations; Westpac and Melbourne Institute

The sharp and discrete change in sentiment at changes of government – 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. Furthermore, the timing of the shifts in sentiment at changes of government indicates that the variation reflects political preferences affecting economic beliefs rather than perceptions of current economic conditions affecting political preferences. Thus, we believe these shifts in sentiment around changes of government are more likely to represent pure sentiment than unbiased beliefs about future changes in incomes.

Our identification approach differs from much of the existing literature on consumer sentiment, which has mostly considered time series data and a control variable approach in seeking to identify whether changes in sentiment have a causal effect on consumption. Carroll, Fuhrer and Wilcox (1994) and Ludvigson (2004) find that after controlling for economic fundamentals – measured by labour 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 fundamental determinants of consumption that have not been accounted for, rather than any independent causal effect of changes in sentiment on spending (Ludvigson 2004). We believe our identification approach has two important advantages relative to this approach: first, by using cross-sectional data we remove all aggregate economic shocks that affect both sentiment and consumption, and; second, by using variation in sentiment caused by changes in government, rather than the residual-based approach of the time series literature, we can be more confident that the variation we use is independent of changes in fundamental determinants of current economic conditions.

We use two consumption indicators to estimate whether the shift in sentiment between ALP and Liberal/National voters at changes of government has a causal effect on consumption. First, we use self-reported spending intentions for a major household item, which is asked as part of the consumer sentiment survey, allowing us to match reported sentiment, political preferences and spending intentions at the individual level. Second, we use new motor vehicle sales to households by postcode, which we relate to postcode-level variation in vote shares. Motor vehicle sales are well suited for our purposes, being an important spending decision for most households.

Using the self-reported spending intentions data, we show that consumers report significantly more positive spending intentions when the political party they support is in government. The shift in spending intentions coincides with each of the three changes of government for which individual response data from the consumer sentiment survey are available: 1996, 2007 and 2013. To estimate the causal effect of changes in sentiment on spending intentions, we focus on the period around each change of government and at the individual level regress reported spending intentions on sentiment, using voting intention as an instrument for sentiment. This approach considers only variation in beliefs related to political preferences to identify the effect of sentiment on spending intentions, which we argue is variation unrelated to changes in current fundamental determinants of consumption. We estimate that an increase in sentiment causes consumers to report significantly more positive spending intentions.

Our postcode-level consumption indicator allows us to assess whether the spending intentions data map to actual consumption behaviour. The new motor vehicle purchases data we use span two changes in government, from the Liberal/National party to the ALP in 2007, and back to the Liberal/National party in 2013. Consistent with the spending intentions data, we find that new motor vehicle purchases by households increased in ALP postcodes relative to Liberal/National postcodes following the ALP victory at the 2007 election, and that new motor vehicle purchases by households fell in ALP postcodes relative to Liberal/National postcodes following the change of government from the ALP to the Liberal/National party at the 2013 election. 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 political preferences could be correlated with economic variables, and it is possible that economic shocks to specific occupations or to parts of the income distribution influence consumption independently. To control for this, we regress the share of votes for the ALP by postcode on a large set of postcode-level

economic variables and use only the variation in postcode-level vote shares that cannot be explained by economic controls as our source of cross-sectional variation. The results are qualitatively similar.

Our paper makes several contributions to the literature. First, by exploiting geographic variation in consumer sentiment and new motor vehicle 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 usefulness of opinions elicited in survey and experimental settings (e.g. Levitt and List 2007).

Second, our paper provides evidence that consumer sentiment has a causal effect on consumption. 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 spending intentions and new motor vehicle 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 independent information about future consumption plans. This is because they did not have access to cross-sectional variation that is likely to be independent of economic fundamentals, such as political preferences.

Third, our results provide a basis for believing that changes in pure sentiment can affect consumption. Disagreement between ALP and Liberal/National voters is evident in expectations for both personal and general economic conditions. Differences in beliefs about personal economic conditions could be mutually consistent, possibly reflecting distributional effects of government policy. But both groups of voters cannot be correct in their disagreement about changes in general economic conditions. Thus, the disagreement about general economic conditions between ALP and Liberal/National voters is, from the point of view of an outside observer, more likely to reflect noise than news about fundamentals.¹ Reinforcing this, the political science literature has documented that differences in political affiliations can affect how individuals perceive even past economic events (Bartels 2002). Thus, our results suggest an expansive view of sentiment, providing empirical support for recent theoretical models that highlight a role for non-fundamental drivers of consumption (e.g. Lorenzoni 2009; Angeletos and La'O 2013).

Our paper is most similar to Mian, Sufi and Khoshkhoh (2015), who use US data to show that consumers report more positive views about government economic policy when the political party they support controls the Presidency. We provide comparison between our findings and theirs in Appendix A.

1 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 offsets the other.

2. Consumer Sentiment and Partisanship

2.1 Consumer Sentiment

The Westpac-Melbourne Institute Survey of Consumer Sentiment in Australia is modelled on the Thomson Reuters/University of Michigan Surveys of Consumers in the United States. However, the Australian survey is unique in asking respondents who they would vote for at a federal election. To measure sentiment, each month respondents are asked about:

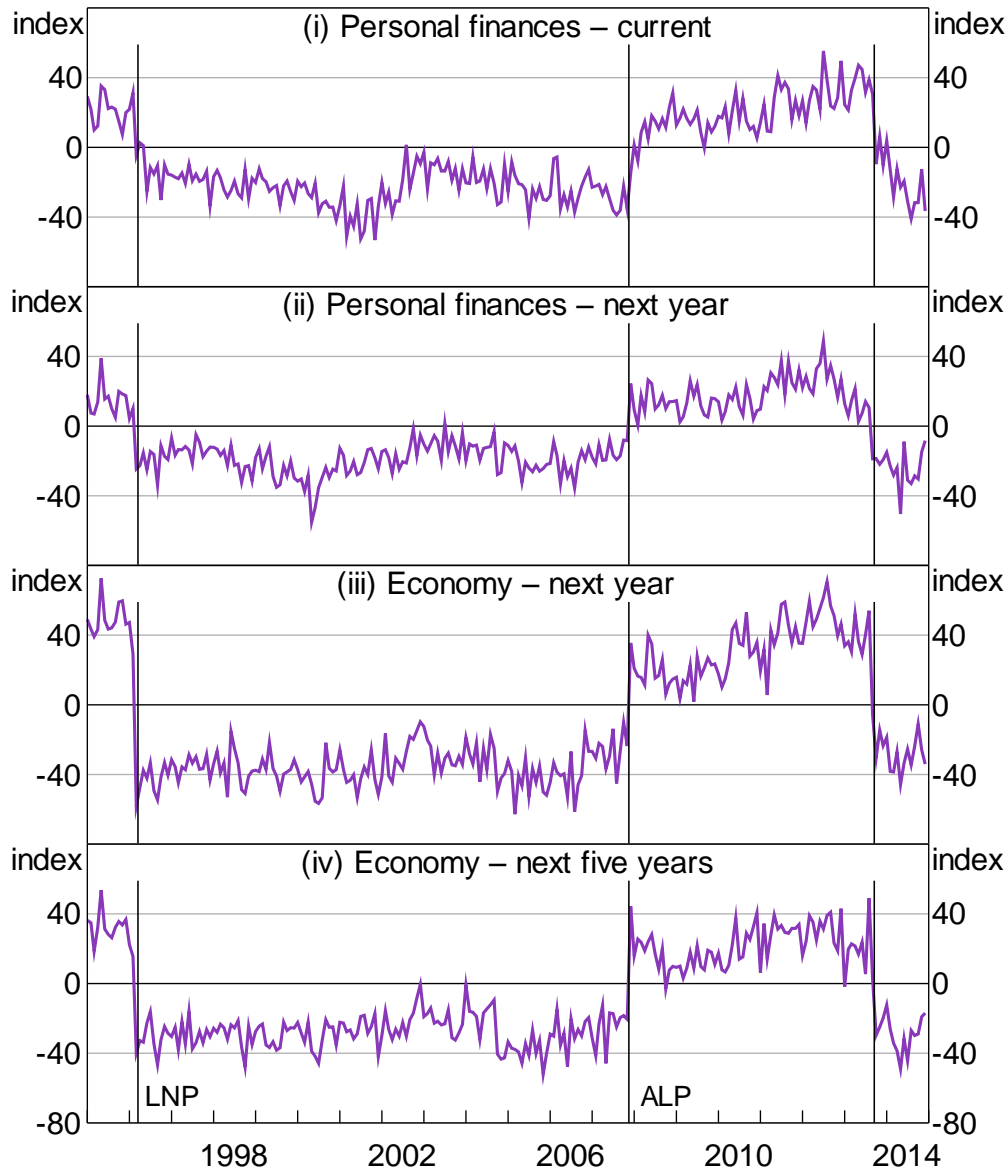
- (i) their current personal financial situation compared to a year ago
- (ii) the expected change in their personal financial situation over the year ahead
- (iii) the expected change in economic conditions over the year ahead
- (iv) the expected change in economic conditions over the next five years.

Individual responses for each question 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. A value of 100 indicates a neutral economic outlook, 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; each index has averaged close to 100 since the inception of the survey. The survey is nationally representative and has a sample size of about 1 200 each month (compared to 500 for the Michigan Surveys of Consumers).²

For each of the four questions outlined above, we construct an index separately for ALP and Liberal/National voters, and the difference (ALP minus Liberal/National voter sentiment) is shown in Figure 3. For each question, consumers report more positive responses when the political party they would vote for holds office federally. Notably the relative change in sentiment occurs in the month of an election when there is a change of government. This change in sentiment around a change in government is sharp, with there being a 2.5 standard deviation movement on average for the series relating to personal finances and a larger 4.5 standard deviation movement on average for the series relating to economic conditions. These large movements in sentiment around a change of government support using partisanship as a way to identify the effect of the sentiment on consumption. We find it hard to think of any changes in current or past consumption fundamentals that could consistently move sentiment by this much during the month of an election. We show later that differences in sentiment between these two groups of voters remain even after controlling for differences in the economic and demographic characteristics of voters.

2 The aggregate consumer sentiment index is constructed by averaging responses to these four questions as well as responses to a question asking about whether it is a good time to purchase a major household item. We view this latter question as representing an outcome variable as it measures spending intentions. We discuss the spending intentions question in more detail in Section 4.1.

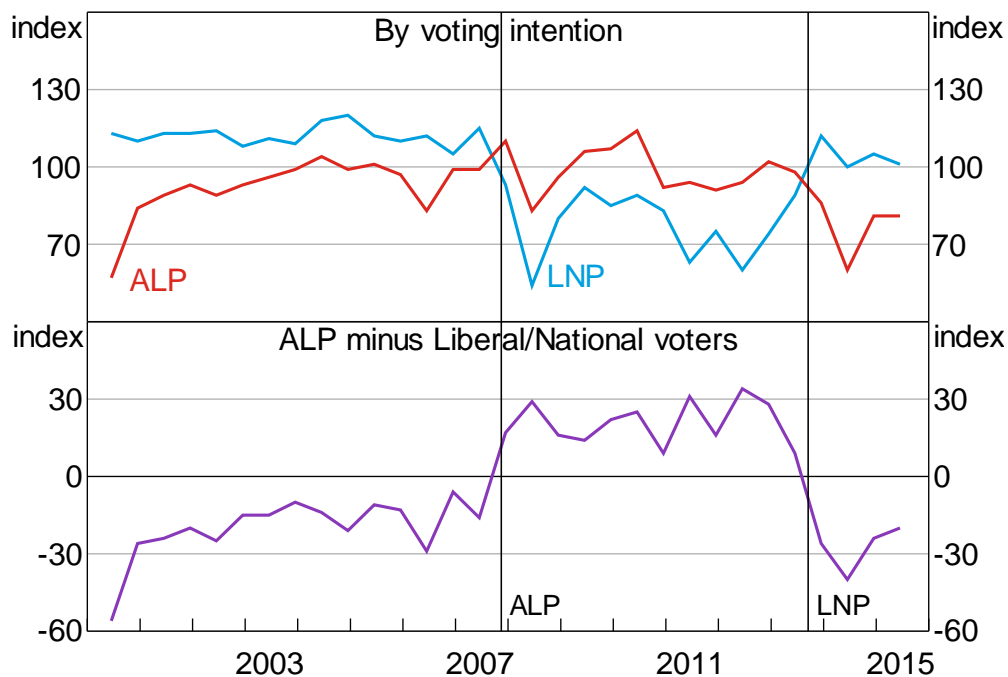
Figure 3: Economic Belief Components of Consumer Sentiment Survey
ALP minus Liberal/National voters



Notes: The consumer sentiment survey contains four questions asking about economic beliefs; for each question a separate index is constructed for self-identified ALP and Liberal/National voters, each panel shows the difference between these index levels; the survey questions are: (i) change in personal financial situation compared to a year ago, (ii) expected change in personal financial situation over the next year, (iii) expected change in general economic conditions over the next year, (iv) expected change in general economic conditions over the next five years; responses to each question are either positive, unchanged/don't know, or negative; vertical lines show dates when government changed hands

Source: Westpac and Melbourne Institute

As an aside, an entirely separate survey provides corroborating evidence that partisanship affects economic beliefs. 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 4 shows indices for ALP and Liberal/National voters, constructed using the same methodology as the consumer sentiment survey. Respondents are relatively more optimistic about their standard of living when the political party they support holds office federally.

Figure 4: Newspoll – Expected Change in Standard of Living

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

Sources: Authors' calculations; Newspoll

2.2 Partisanship and Economic Beliefs

The idea that partisanship affects consumers' beliefs is not unique to the Australian data. In the political science literature, there is a large amount of survey-based evidence 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. Wlezien, Franklin and Twigg 1997; Bartels 2000, 2002; Evans and Andersen 2006; Gerber and Huber 2009). Some of the most striking evidence comes from Bartels (2002), who analysed 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 found a strong relationship between beliefs about how the economy evolved during Reagan's Presidency and respondents' partisanship: only 30 per cent of respondents identifying as 'strong' Democrats said that unemployment had improved since 1980, compared with more than 80 per cent of 'strong' Republicans. Similarly, only about 20 per cent of strong Democrats said that inflation was better (lower) than in 1980, compared with 70 per cent of strong Republicans.

Although the political science literature provides clear evidence that partisanship acts as a prism 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 'cheerleading' when answering survey

questions. Hence survey responses may be an inaccurate indicator of actual behaviour (Lau, Sears and Jessor 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.

2.3 Conditional Consumer Sentiment Indices

The large movements in consumer sentiment following an election with a change of government indicate that the variation in sentiment we will exploit is unlikely to be related to past or current economic fundamentals. This is further supported by the political science literature which finds that partisanship affects an individual's outlook for the economy. However, a concern is that the movement in sentiment observed around a change of government reflects expected changes to tax and transfer policies made by the incoming government that differentially affect government and opposition party supporters. That is, the government may enact policies that favour its supporters. Given that policy set by the federal government cannot be targeted to specific individuals, but rather to groups of people (based on, for example, their age, occupation or income), we address this concern by controlling for observed economic and demographic differences between ALP and Liberal/National voters. In particular, using economic and demographic information collected from respondents in the consumer sentiment survey, we construct sentiment indices for ALP and Liberal/National 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 sentiment question, and each survey month, we fit an ordered probit model:

$$s_{i,j,t}^* = \mathbf{X}_{it} \boldsymbol{\Gamma}_{j,t} + \phi_{j,t} ALP_i + \varepsilon_{i,j,t} \quad (1)$$

where $s_{i,j,t}^*$ is the latent sentiment of consumer i in response to question j in survey 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.³ \mathbf{X}_{it} is a vector of covariates for consumer i , capturing an individual's age, income, gender, occupation, education, home ownership status and whether they live in a metropolitan or non-metropolitan area. $\boldsymbol{\Gamma}_{j,t}$ is the vector of coefficients on those covariates in month t . Negative responses are assumed to correspond to levels of the latent sentiment variable below the threshold $\mu_{j,t}^{low}$, positive responses correspond to levels of the latent sentiment variable above the threshold $\mu_{j,t}^{high}$, 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

$$p_{i,j,t}^{pos} \stackrel{def}{=} \Pr(s_{i,j,t}^* > \mu_{j,t}^{high}) = \Pr(\varepsilon_{i,j,t} > \mu_{j,t}^{high} - \mathbf{X}_{it} \boldsymbol{\Gamma}_{j,t} - \phi_{j,t} ALP_i) \quad (2)$$

3 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 voter.

and analogously for the other two responses. The thresholds $\mu_{j,t}^{low}$ and $\mu_{j,t}^{high}$ 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 term. Observations are weighted by their sampling frequency, ω_i . Because $\Gamma_{j,t}$ is estimated separately by survey month we control for the possibility that changes in government policy directed to particular demographic groups alter the relationship between the demographic variables and consumer sentiment.

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 voter is

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

and similarly for negative responses,

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

Subtracting Equation (4) from Equation (3), and rearranging gives:

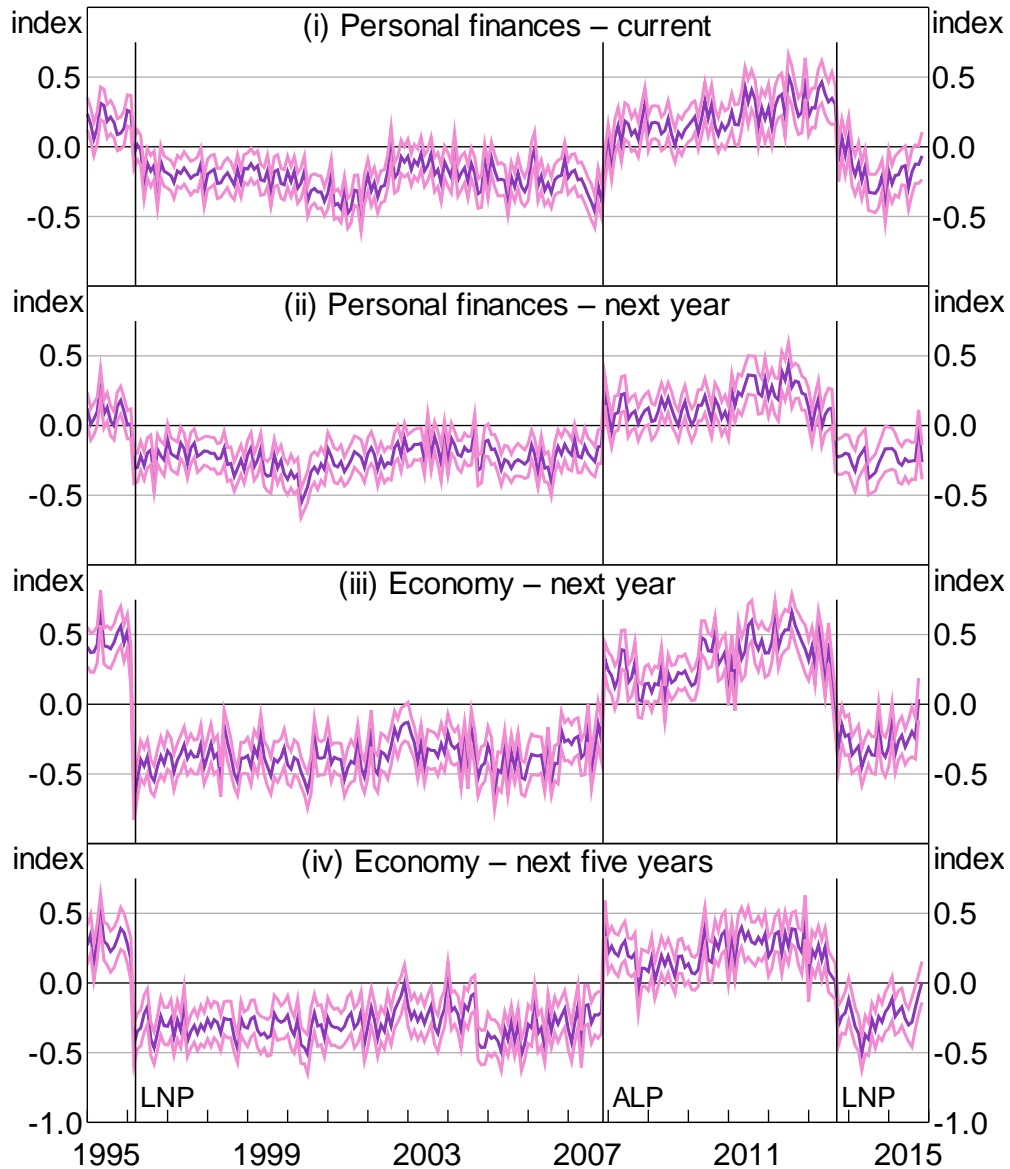
$$\begin{aligned} \Delta \bar{p}_{j,t}^{pos} - \Delta \bar{p}_{j,t}^{neg} &= \frac{1}{N} \sum_{i=1}^N \omega_i \left[\hat{p}_{i,j,t}^{pos} (ALP_i = 1) - \hat{p}_{i,j,t}^{neg} (ALP_i = 1) \right] \\ &\quad - \frac{1}{N} \sum_{i=1}^N \omega_i \left[\hat{p}_{i,j,t}^{pos} (ALP_i = 0) - \hat{p}_{i,j,t}^{neg}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

The first term on the right-hand side of Equation (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 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 (5) provide conditional analogues to the raw sentiment indices.

The conditional estimates for each expectations question in the sentiment survey are shown in Figure 5 and are similar to the unconditional estimates, shown in Figure 3. Thus the difference in responses between ALP and Liberal/National voters remain even after controlling for differences between voters. This provides evidence that shifts in sentiment are unlikely to be driven by expected changes in tax or transfer policy, which are likely to be related to observable differences between voters.

Figure 5: Economic Belief Components of Consumer Sentiment Survey – Conditional Indices

ALP minus Liberal/National voters



Notes: See notes to Figure 3; for each question and each survey month an ordered probit model is fitted, the set of 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 voter, the same is done for negative responses; each panel shows the difference (positive minus negative) between these two estimated average marginal effects, providing an econometric analogue to the unconditional means shown in Figure 3; the lighter lines are two standard error bands

Sources: Authors' calculations; Westpac and Melbourne Institute

3. Data

We study the effect of consumer sentiment on consumption using individual- and postcode-level consumption data. On an individual level, we match reported spending intentions to reported economic beliefs. Our study is novel because it also uses actual spending data at a postcode level, the most disaggregated level at which an annual or higher frequency consumption proxy is available. We measure consumption using the number of new motor vehicle purchases in a

postcode. In particular, we match the share of votes for each of the major parties by postcode with postcode-level motor vehicle purchase data to see if postcodes with a greater fraction of voters for the incoming government purchased relatively more motor vehicles.

3.1 Individual-level Data

We proxy consumption at the individual level using spending intentions data from the consumer sentiment survey. In particular, we use the response to the question on whether it is a good time to purchase a major household item. Responses are classified as positive, unchanged/don't know, or negative. Using other questions in the survey, we can match an individual's stated spending intentions to their sentiment, political preferences and a range of economic and demographic characteristics. The data are available on a monthly basis and span the changes in government in March 1996, November 2007 and September 2013.

3.2 Postcode-level Data

3.2.1 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 rates of at least 93 per cent at each election in the post-War period. This is important because it minimises the possibility of mismeasurement of local-area partisanship, which would arise with voluntary voting if those who choose to vote have different political preferences from those who do not vote. By contrast, turnout in the United States has varied between 49 and 63 per cent since 1960.⁴

We measure partisanship at the postcode level as the share of votes going to the ALP in a federal election using the Australian Electoral Commission's two-party preferred measure.⁵ 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 polling place results to the 2 738 postcodes in Australia.

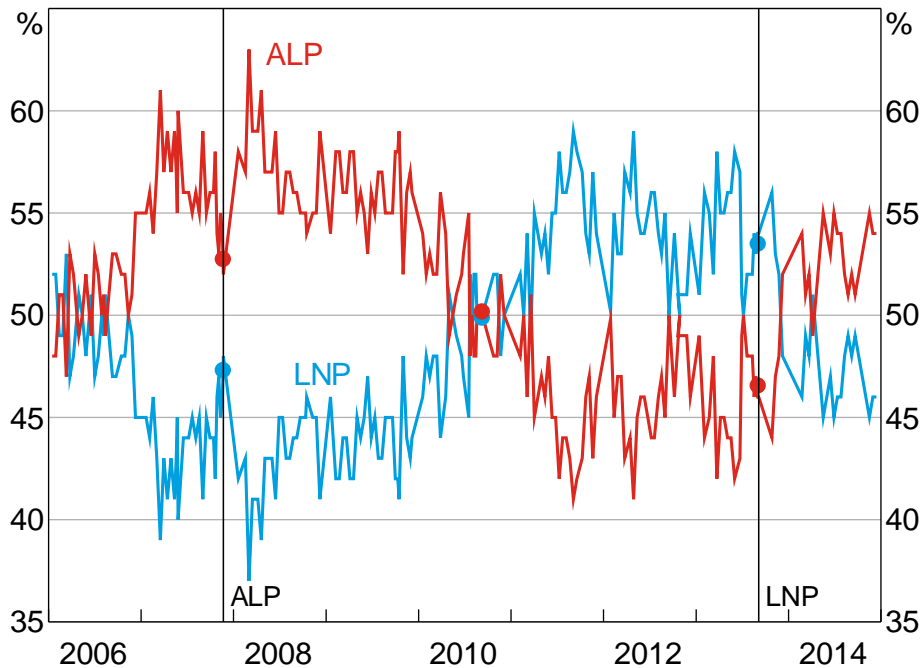
Political opinion polling data indicate that a change of government for the two elections in our sample could have been anticipated in advance of the election (Figure 6). Despite this, consumer sentiment moves precisely when the government changes hands, rather than in advance based on polling data.⁶ 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 supporters said they believed their party would win the election, despite polling evidence to the contrary and widespread media coverage of opinion polls leading up to the election.

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

5 We use vote shares for elections to the House of Representatives (lower house). In all but a few electorates, the two candidates remaining at the end of the vote 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 two-party preferred measure constructed such that the top two candidates are from each of the major parties.

6 Unlike in the United States, the government changes hands as soon as the election result is known.

Figure 6: Political Opinion Polling
Newspoll survey



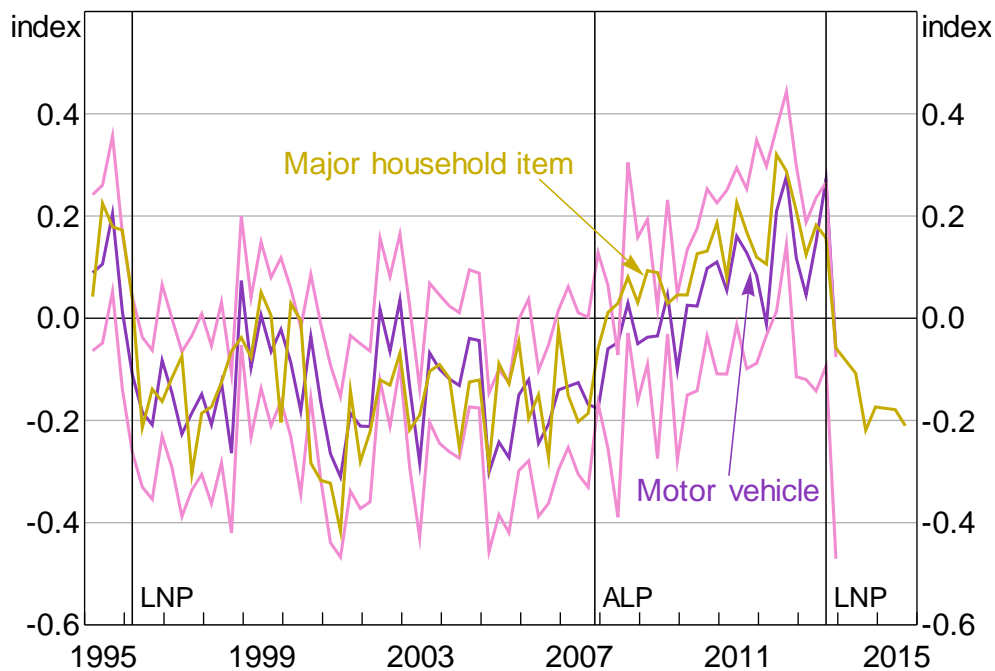
Notes: Shows ALP and LNP two-party preferred vote shares from the generally fortnightly Newspoll survey; dots indicate actual vote shares at the November 2007, September 2010 and September 2013 Federal elections; vertical lines show dates when government changed hands

Source: Newspoll

3.2.2 Consumption

We use the number of motor vehicle sales as our postcode-level consumption measure. We think that motor vehicle 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 motor vehicle. Using the methodology outlined in Section 2.3, 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 motor vehicle and self-reported spending intentions for a major household item, indicating that motor vehicle sales is a good measure of consumption to map to sentiment (Figure 7).

Figure 7: Spending Intentions – Good Time to Buy a Motor Vehicle
Conditional, ALP minus Liberal/National voters



Notes: Shows the effect of changes of government on spending intentions for *motor vehicles*; index is constructed from individual response data and conditions on respondents' economic and demographic characteristics (see notes to Figure 5); consumers asked whether now is a good time to buy a motor vehicle and responses are either good, neutral, or bad; the *motor vehicles* 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*

Sources: Authors' calculations; Westpac and Melbourne Institute

Motor vehicle sales data are sourced from VFACTS. These are administrative data covering the universe of motor vehicle sales. The data record the postcode of the owner, not the location of the dealership where the motor vehicle was purchased. One benefit of the VFACTS sales data is disaggregation by buyer type. We use only motor vehicle sales to households (and exclude sales to businesses and governments) because this corresponds most closely to the sample underlying the consumer sentiment survey.⁷ The data span the November 2007 and the September 2013 changes in government.

To control for differences in population growth across postcodes we measure motor vehicle sales in per capita terms. Population data are sourced from the five-yearly Socio-Economic Indexes for Areas census. We linearly interpolate the data to get population estimates between Census dates.⁸

⁷ Sales to businesses and governments account for around 55 per cent of total annual motor vehicle sales.

⁸ For the period after 2011, the most recently available Census, we assume postcode-level population growth continues at its rate over the period 2006–11.

3.2.3 Control variables

The federal government's tax and transfer policies could differentially affect different groups of voters. We use a range of postcode-level variables to control for these differences. We use average taxable income data from the Australian Taxation Office. The Census provides a range of postcode-level economic variables every five years: the share of people with a tertiary 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. These data are 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 of 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.

3.2.4 Summary statistics

Table 1 reports 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 1 are 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.

Our analysis is able to exploit large differences in vote shares across postcodes, with the fifth quintile having a 36 percentage point higher ALP vote share at the 2007 and 2013 elections than the first quintile. Income is decreasing in ALP vote share, and so is the mean level of motor vehicle 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 per cent of postcodes in the top quintile of ALP vote share are in metropolitan areas, compared with 50 per cent of postcodes in the bottom quintile.

Table 1: Means
By quintile of ALP vote share

| | Total population | Quintiles | | | | |
|--|------------------|-----------|--------|--------|--------|--------|
| | | 1 | 2 | 3 | 4 | 5 |
| November 2007 election: ALP victory | | | | | | |
| ALP vote share | 53.4 | 36.3 | 46.0 | 52.9 | 60.1 | 71.7 |
| Motor vehicle purchases per capita | 0.025 | 0.027 | 0.027 | 0.025 | 0.024 | 0.020 |
| Income (\$) | 50 317 | 57 132 | 51 330 | 49 552 | 48 243 | 45 319 |
| Average age (yrs) | 37 | 38 | 38 | 37 | 37 | 36 |
| Share with tertiary education | 13.9 | 14.5 | 14.0 | 14.1 | 13.4 | 13.4 |
| Share who rent | 27.6 | 22.8 | 25.1 | 26.7 | 29.6 | 33.8 |
| Unemployment rate | 5.5 | 4.3 | 4.8 | 5.0 | 5.6 | 7.7 |
| Share in white-collar profession | 32.7 | 39.0 | 33.8 | 32.7 | 30.1 | 27.6 |
| Industry share of employment: | | | | | | |
| Agriculture | 3.2 | 9.0 | 2.9 | 2.4 | 1.2 | 0.8 |
| Mining and construction | 10.3 | 10.0 | 11.2 | 10.8 | 10.5 | 9.1 |
| Manufacturing | 11.1 | 8.9 | 10.0 | 10.3 | 12.1 | 14.3 |
| Retail and wholesale trade | 21.2 | 19.9 | 20.8 | 21.3 | 21.8 | 22.5 |
| Services | 17.2 | 16.9 | 17.2 | 17.3 | 17.2 | 17.6 |
| Health and education | 18.6 | 18.7 | 19.4 | 19.4 | 18.5 | 17.1 |
| Arts and accommodation | 8.0 | 7.6 | 8.2 | 7.9 | 7.8 | 8.3 |
| Public sector | 6.4 | 5.4 | 6.4 | 6.8 | 7.1 | 6.4 |
| Other | 3.8 | 3.6 | 3.9 | 3.9 | 3.9 | 3.9 |
| September 2013 election: Liberal/National victory | | | | | | |
| ALP vote share | 47.2 | 30.1 | 39.8 | 46.6 | 53.9 | 65.7 |
| Motor vehicle purchases per capita | 0.026 | 0.028 | 0.027 | 0.026 | 0.026 | 0.021 |
| Income (\$) | 68 424 | 77 614 | 70 192 | 67 501 | 65 831 | 60 969 |
| Average age (yrs) | 38 | 39 | 38 | 38 | 37 | 36 |
| Share with tertiary education | 16.5 | 16.8 | 16.0 | 16.3 | 16.9 | 16.6 |
| Share who rent | 30.1 | 26.4 | 29.1 | 29.2 | 30.7 | 35.4 |
| Unemployment rate | 5.8 | 4.7 | 5.5 | 5.5 | 5.8 | 7.4 |
| Share in white-collar profession | 33.8 | 39.2 | 34.0 | 33.3 | 32.7 | 30.0 |
| Industry share of employment: | | | | | | |
| Agriculture | 2.6 | 7.6 | 2.4 | 1.6 | 0.9 | 0.6 |
| Mining and construction | 11.4 | 11.6 | 12.7 | 12.2 | 11.0 | 9.6 |
| Manufacturing | 9.5 | 7.7 | 8.6 | 9.1 | 9.9 | 12.3 |
| Retail and 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 | 18.0 |
| Health and education | 20.1 | 20.0 | 20.7 | 20.7 | 20.2 | 19.0 |
| Arts and accommodation | 8.2 | 7.6 | 8.4 | 8.2 | 8.0 | 8.7 |
| Public sector | 6.6 | 5.5 | 6.3 | 6.9 | 7.7 | 6.4 |
| Other | 3.9 | 3.7 | 3.9 | 4.0 | 3.9 | 3.9 |

Notes: Reports population-weighted means for each variable by quintile of the 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; income data are taxable income for 2006/07 and 2012/13; motor vehicles data are total per capita purchases for 2007 and 2013; postcodes in the ACT are excluded

Sources: ABS; Australian Electoral Commission; Authors' calculations; VFACTS

4. Consumer Sentiment and Consumption

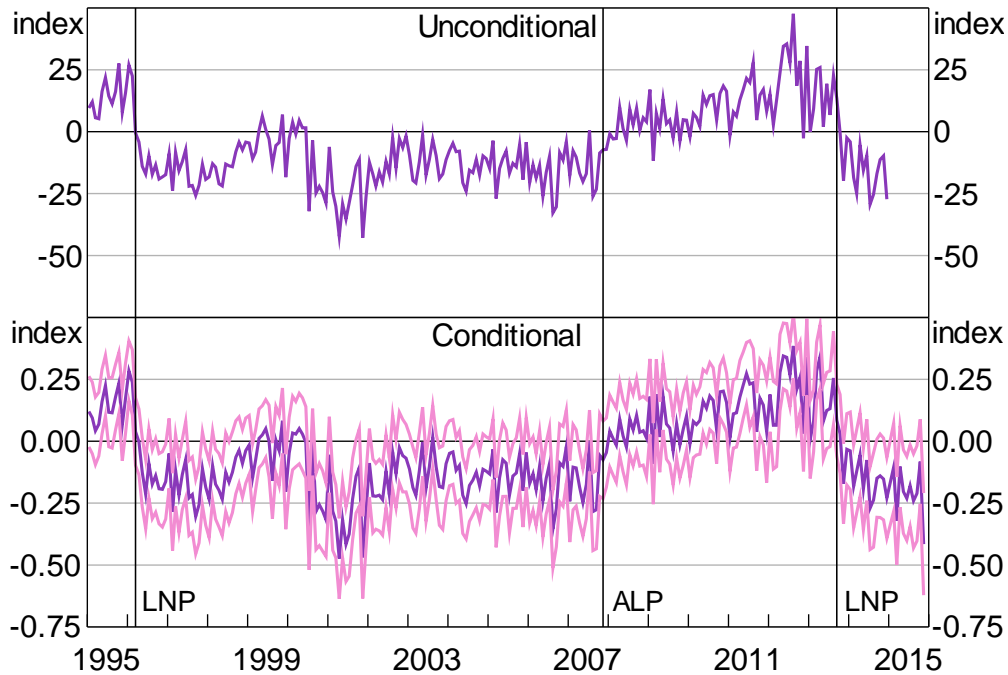
In this section we investigate whether the sharp changes in sentiment between ALP and Liberal/National voters around changes of government affects consumption behaviour. We first investigate the response of individual-level spending intentions and then the response of postcode-level motor vehicle purchases. For each spending measure we first document the response around changes of government without the inclusion of controls. Treating the variation in sentiment that we exploit as a natural experiment, we do not need to include controls to provide valid identification. As a robustness test we also present results for each spending measure conditioning on available controls. At the individual level, the controls are the same variables used in Section 2. For the analysis of motor vehicle spending, we use the analogous set of postcode-level controls described in Section 3.2.3.

4.1 Spending Intentions

In the top panel of Figure 8 we show the difference in stated spending intentions between ALP and Liberal/National voters. Consumers report higher spending intentions when their political party holds government at the federal level, with statistical tests finding a break in the mean level of the series following an election that results in a change of government (see Table A1 for break test results).⁹ This finding also carries through when we construct conditional spending intentions indices for ALP and Liberal/National voters using the methodology outlined in Section 2.3. The bottom panel of Figure 8 shows that differences in spending intentions between ALP and Liberal/National voters remain after controlling for an individual's economic and demographic characteristics.

9 The 1996 election was held on 2 March. The consumer sentiment survey is conducted at the end of each month and can continue into the start of the following month. This is why the break in the spending intentions series for the 1996 election occurs in February 1996.

Figure 8: Spending Intentions – Good Time to Buy a Major Household Item
ALP minus Liberal/National voters



Notes: Shows the effect of changes in government on spending intentions for a major household item; consumers were asked whether 'now is a good time to buy a major household item' and responses are either good, neutral, or bad; a separate index is constructed for ALP and Liberal/National voters as 100 plus the share of positive responses less the share of negative responses; top panel shows the difference between these two indices; bottom panel shows the conditional analogue; see notes to Figure 5

Sources: Authors' calculations; Westpac and Melbourne Institute

Comparing responses in the consumer sentiment survey to questions about economic conditions (Figure 3) and spending intentions (Figure 8) suggests a positive relationship between sentiment and spending intentions. Consumers report both a more positive economic outlook and positive spending intentions when their political party is in power. To formally test this, we estimate the following regression on the unit record consumer sentiment survey data:

$$spending_{i,t} = \delta_t + \phi expect_{i,t} + \sum_j \gamma_j \mathbf{X}_{i,j,t} + \varepsilon_{i,j,t} \quad (6)$$

where $spending_{i,t}$ is the reported spending intention of individual i in month t and $expect_{i,t}$ is an individual's reported expectations of future economic conditions, $\mathbf{X}_{i,j,t}$ is the full set of economic and demographic control variables for person i listed in Section 2.3 and δ_t is a survey month dummy. The difficulty in estimating Equation (6) is that while $expect_{i,t}$ captures sentiment shocks, it also captures shocks to fundamentals factors that could jointly influence consumption and expectations. We therefore need an instrument that is correlated with the 'sentiment' but not the fundamental shock. Our instrument is an individual's partisanship. Specifically, we instrument $expect_{i,t}$ with a dummy variable that is equal to 1 if a survey respondent's voting intention matches the political party in office and is zero otherwise. As we have shown above, the sentiment of both ALP and Liberal/National voters move discretely and sharply in the month of an election where there is a change of government, with it being difficult to think of any current or past consumption fundamentals that could consistently increase sentiment by this amount in an election month.

We estimate Equation (6), with $expect_{i,t}$ instrumented by partisanship, over the period one year before and after an election with a change in government. We measure $expect_{i,t}$ using either of the two questions in the consumer sentiment survey asking individuals about their expectations of economic conditions over the next one and five years. These two questions relate to national economic conditions faced by all consumers and so abstract from considerations related to the distribution of government revenues. Note Equation (6) is estimated separately for expectations of economic conditions in one year's time and in five years' time. We code the answers to the spending intentions and expectations of future economic conditions questions as follows: positive responses take on a value of 3, unchanged or don't know responses take on a value of 2 and negative responses take on a value of 1. A linear probability model is estimated for both the first-stage and second-stage regressions.¹⁰

Results from three changes of government – 1996, 2007 and 2013 – are shown in Table 2. In the first stage, we find that consumers are more positive about future economic conditions when their partisanship matches that of the federal government. The precision of the first-stage results indicate that our instrument is strong.

For each change of government, we find that an improvement in expectations of future economic conditions has a statistically significant positive effect on spending intentions. This provides evidence that changes in sentiment can have a causal effect on stated spending intentions at the individual consumer level.

10 Both the spending intentions and sentiment data are categorical. We choose to estimate the first-stage equation using a linear probability model, rather than an ordered probit, because with instrumental variables, OLS estimates of the first stage produce consistent estimates. First-stage estimates using a probit model are consistent only under restrictive assumptions. We also estimated the second stage using a probit model and the first stage as a linear probability model. The results were similar to that in the text.

Table 2: Beliefs about General Economic Conditions and Spending Intentions

| Second stage: $spend_{it} = \delta_t + \sum_j \gamma_j \mathbf{X}_{i,j,t} + \phi expect_{it} + \varepsilon_{it}$ | | | | | | |
|---|---------------------------|------------------------|---------------------------|------------------------|---------------------------|------------------------|
| | 1996 election | | 2007 election | | 2013 election | |
| <i>expect: next year</i> | 0.360*** (0.031) | | 0.302*** (0.061) | | 0.435*** (0.061) | |
| <i>expect: 5 years</i> | | 0.524*** (0.047) | | 0.329*** (0.062) | | 0.511*** (0.077) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 22 650 | 21 954 | 24 985 | 24 045 | 26 241 | 26 000 |
| First stage: $expect_{it} = \delta_t + \sum_j \gamma_j \mathbf{X}_{i,j,t} + \lambda support_{it} + \varepsilon_{it}$ | | | | | | |
| | 1996 election | | 2007 election | | 2013 election | |
| | <i>expect: next years</i> | <i>expect: 5 years</i> | <i>expect: next years</i> | <i>expect: 5 years</i> | <i>expect: next years</i> | <i>expect: 5 years</i> |
| <i>support</i> | 0.437*** (0.013) | 0.307*** (0.014) | 0.237*** (0.013) | 0.242*** (0.014) | 0.304*** (0.017) | 0.252*** (0.016) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 22 650 | 21 954 | 24 985 | 24 045 | 26 241 | 26 000 |

Notes: Each regression uses individual response data pooled over the period one year before and after each election with a change in government: March 1996, November 2007 and September 2013; the variable *expect: next year* is beliefs about the 'expected change in general economic conditions over the next year', with responses coded as 1 (negative), 2 (unchanged/don't know), and 3 (positive); *expect: 5 years* is responses to the analogous question about economic conditions over the next five years; *support* takes the value unity if a survey respondent's self-identified voting intention matches the political party in office and zero otherwise; *spend* is responses to the question 'do you think now is a good time to buy a major household item' with responses coded as 1 (bad time), 2 (neither good/nor bad), and 3 (good time); the set of controls $\mathbf{X}_{i,j,t}$ includes: gender, age, occupation, education, home ownership, income, metro/non-metro, plus a constant; δ_t is a survey/month fixed effect; the categorical variables *expect* and *spend* are treated as linear variables; the first stage is estimated using OLS and the second stage is estimated using two-stage least squares; robust standard errors have been used and are reported in parentheses; ***, ** and * denote results statistically different from zero at the 1, 5 and 10 per cent levels, respectively

4.2 Actual Spending Data

We now investigate whether the stated spending intentions data are consistent with the postcode-level motor vehicle purchases data.

4.2.1 Without controls

We would like to know if differences in self-reported spending intentions between ALP and Liberal/National voters are reflected in differences in observed motor vehicle sales. ALP voters became substantially more optimistic about economic conditions than Liberal/National 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 would expect to see a relative increase in motor vehicle sales in ALP-leaning postcodes. Conversely, we would expect to see a relative increase in motor vehicle sales in Liberal/National-leaning postcodes following the 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 2004–14:

$$\log(mv_{it}) = \alpha_i + \sum_{j=-T_0}^{T_1} \delta_j d_{jt} + \sum_{j=-T_0, j \neq T_\tau}^{T_1} \beta_j (d_t \times ALP_i^\tau) + \varepsilon_{i,t} \quad (7)$$

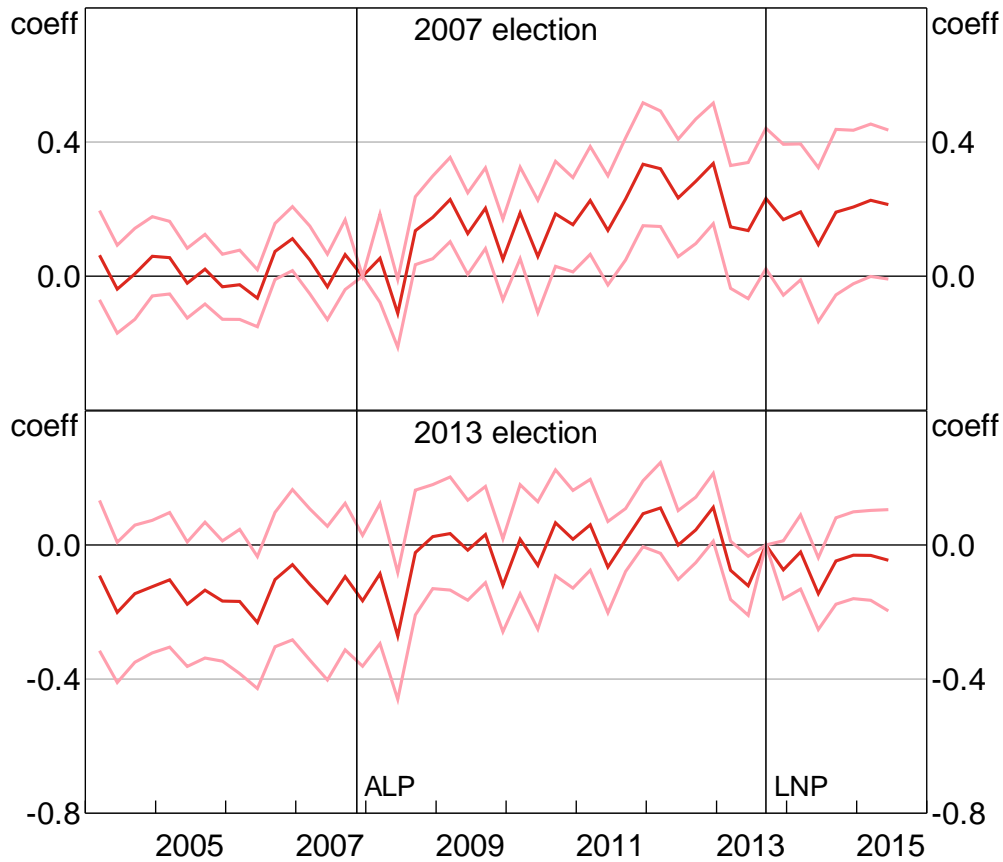
where mv_{it} is per capita motor vehicle sales in postcode i in quarter t , α_i is a postcode-specific fixed effect, d_t is an indicator variable taking the value unity in period t and zero otherwise, ALP_i^τ is the ALP vote share in postcode i for an election held at time τ , and $\varepsilon_{i,t}$ is an error term.¹¹ The coefficients δ_j are quarterly fixed effects, capturing all variation in motor vehicle sales that is common across postcodes, such as seasonality, changes in motor vehicle 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 motor vehicle 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. We estimate Equation (7) separately for the 2007 and 2013 elections using weighted least squares, with weights equal to the average number of motor vehicle sales over the two years prior to the change in government under consideration at time τ .¹² We are primarily interested in the change in β_j coefficients around the 2007 and 2013 changes of government, but report coefficient estimates for the entire sample period 2004–14. The most relevant estimates of Equation (7) are those based on weights closest to the change of government under consideration. Standard errors are clustered at an electorate level.

The top panel of Figure 9 presents the β_j coefficient estimates from Equation (7) 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 motor vehicle 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 motor vehicle sales in ALP-leaning postcodes relative to Liberal/National-leaning postcodes. In the three years following the 2007 election, the β_j 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 motor vehicle sales by 10 per cent. The estimated β_j coefficients over this period are for the most part statistically significant. The largest difference in the average level of motor vehicle sales between ALP and Liberal/National postcodes occurred around 2012. This lines up with the largest difference between ALP and Liberal/National voters in spending intentions for a major household item from the consumer sentiment survey.

11 The use of a log transformation for the dependent variable results in the exclusion of observations with zero motor vehicle sales in a given quarter. Based on the regression weights, which are equal to the average number of motor vehicle sales over the two years prior to a change of government, the postcodes that contain a zero observation in any given quarter account for less than 1.5 per cent of motor vehicle sales over the weighting period. As an alternative, we have estimated Equation (7) with the level of per capita motor vehicle 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.

12 Using population weights instead does not materially change our results.

Figure 9: Partisanship and Motor Vehicle Purchases
Coefficient on ALP vote share



Notes: Top panel shows coefficient estimates β_j for Equation (7) using vote share data from the 2007 Federal election, the omitted category is the December quarter 2007 when the ALP won government; bottom panel shows coefficient estimates β_j using vote share data from the 2013 Federal election, the omitted category is the September quarter 2013 when the Liberal/National party won government; standard errors are clustered by federal electorates; vertical lines show dates when government changed hands

Sources: ABS; Authors' calculations; VFACTS

The bottom panel of Figure 9 reports analogous results using vote share data from the 2013 election when the Liberal/National party won office. While the fall in the estimated β_j coefficients start prior to the 2013 election, consistent with the spending intentions data, an average of the β_j coefficients indicates a 7 percentage point lower level of motor vehicle purchases by ALP voters relative to Liberal/National voters in the two years after the ALP's loss of government compared to the ALP's last two years in office.

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

4.2.2 With controls

Partisanship is correlated with a range of economic indicators (Table 1). An incoming government could enact tax and transfer policies that favour its supporters. This can have a direct effect on

consumption by changing the distribution of income, implying that government policy, rather than sentiment, could be responsible for the changes in motor vehicle consumption described in the previous sub-section. As noted before, policy set by the federal government cannot be targeted to specific individuals, but rather to particular groups of people. While our identification approach uses partisanship as a source of variation in economic perceptions, there would ideally also be no difference in how government policy affects ALP and Liberal/National 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 change of government that is uncorrelated with observable economic differences between ALP and Liberal/National voters. We then use this variation as our source of identification. We also employ difference-in-difference regressions, which allow us to control for differences in income growth across postcodes.

4.2.2.1 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 1, as well as controls for the geographic characteristics of a postcode. (Regression results are reported in Table A2.¹³) The economic control variables absorb between 55 and 60 per cent of the postcode-level variation in vote shares.

We then re-estimate Equation (7), replacing the observed ALP vote share variable with our measure of pure partisanship. Formally, we estimate the regression

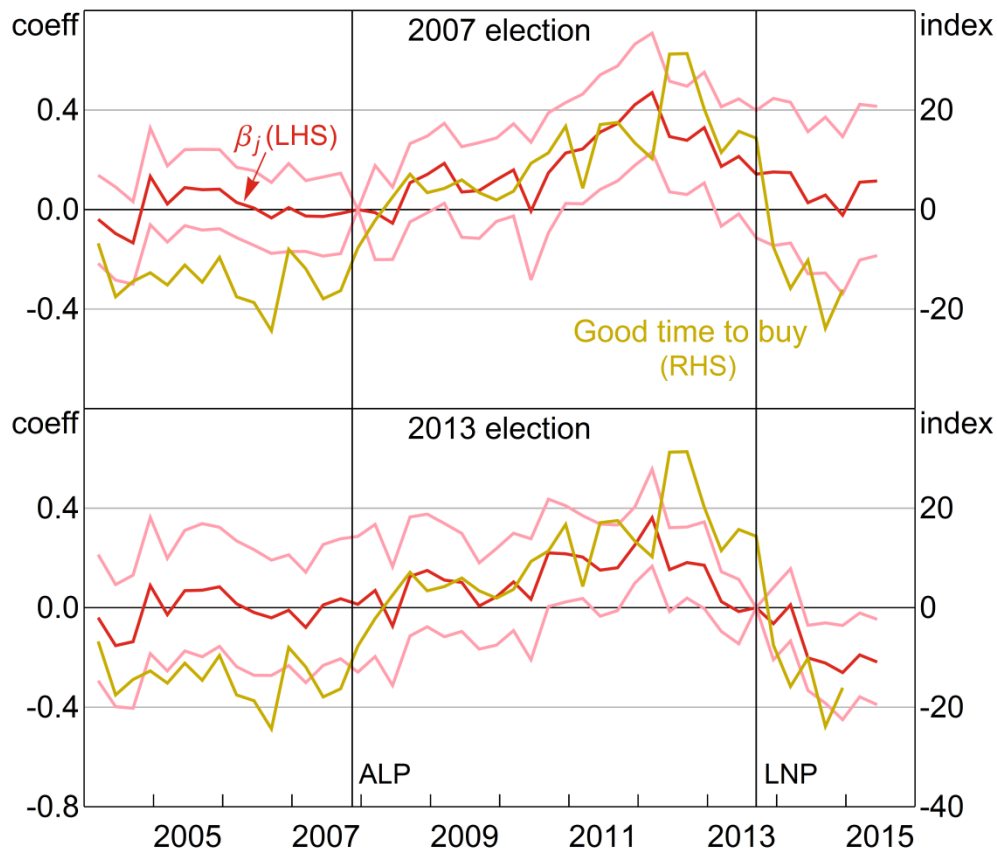
$$\log(mv_{it}) = \alpha_i + \sum_{j=-T_0}^{T_1} \delta_j d_{jt} + \sum_{j=-T_0, j \neq T_1}^{T_1} \beta_j (d_{jt} \times \xi_i^\tau) + \varepsilon_{i,t} \quad (8)$$

where ξ_i^τ is the residual for postcode i from a regression of the ALP vote share for the election held at date τ on the set of control variables described above. To allow for the use of a generated regressor, standard errors are constructed using 1 000 bootstrap replications, with resampling conducted at the electorate level.

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 (7) without controls (compare Figures 9 and 10). 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 motor vehicle 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 motor vehicle purchases is more pronounced than in the regression without controls. Although the downward trend in motor vehicle 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 10.

13 For the 2007 election, we use 2006/07 mean taxable income, and for the 2013 election we use 2012/13 data.

Figure 10: Partisanship and Motor Vehicle Purchases
Coefficient on unexplained variation in ALP vote share



Notes: Shows coefficient estimates β_j for Equation (8); top panel shows coefficient estimates β_j using vote share data from the 2007 Federal election, the omitted category is the December quarter 2007 when the ALP won government; bottom panel shows the coefficient estimates β_j using vote share data from the 2013 Federal election, the omitted category is the September quarter 2013 when the Liberal/National party won government; lighter lines are 95 per cent confidence bands calculated from 1 000 bootstrap replications; resampling was conducted at the federal electorate level; 'Good time to buy' is the difference between ALP and Liberal/National voters in self-reported spending intentions for a major household item; vertical lines show dates when government changed hands

Sources: ABS; Authors' calculations; VFACTS; Westpac and Melbourne Institute

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 also provide further evidence that changes in sentiment have a causal effect on consumption.

4.2.2.2 Difference-in-difference regressions

We have investigated whether the differential consumption response of Liberal/National and ALP voters around changes of 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 economic 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 then this should show up in their incomes.

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

$$\Delta^h \log(mv_{i,t+h}) = \alpha_h + \beta_h ALP_i^{2007} + \sum_j \gamma_j \mathbf{X}_{i,j,h} + \phi_h \Delta^h \log(inc_{i,t+h}) + \varepsilon_{i,h} \quad (9)$$

where $\Delta^h \log(mv_{i,t+h})$ is the percentage change in per capita motor vehicle purchases in postcode i between 2007 and year $2007 + h$, where $h = \{1, 2, \dots, 6\}$. Control variables include postcode-level growth in taxable income, $\Delta^h \log(inc_{i,t+h})$, and the full set of control variables $\mathbf{X}_{i,j,h}$ listed in Table 1. Because Australian Taxation Office income data are available for only one year after the 2013 election we only estimate Equation (9) for the 2007 election. As before, we use the average number of motor vehicle purchases over the two years before the 2007 election as regression weights.

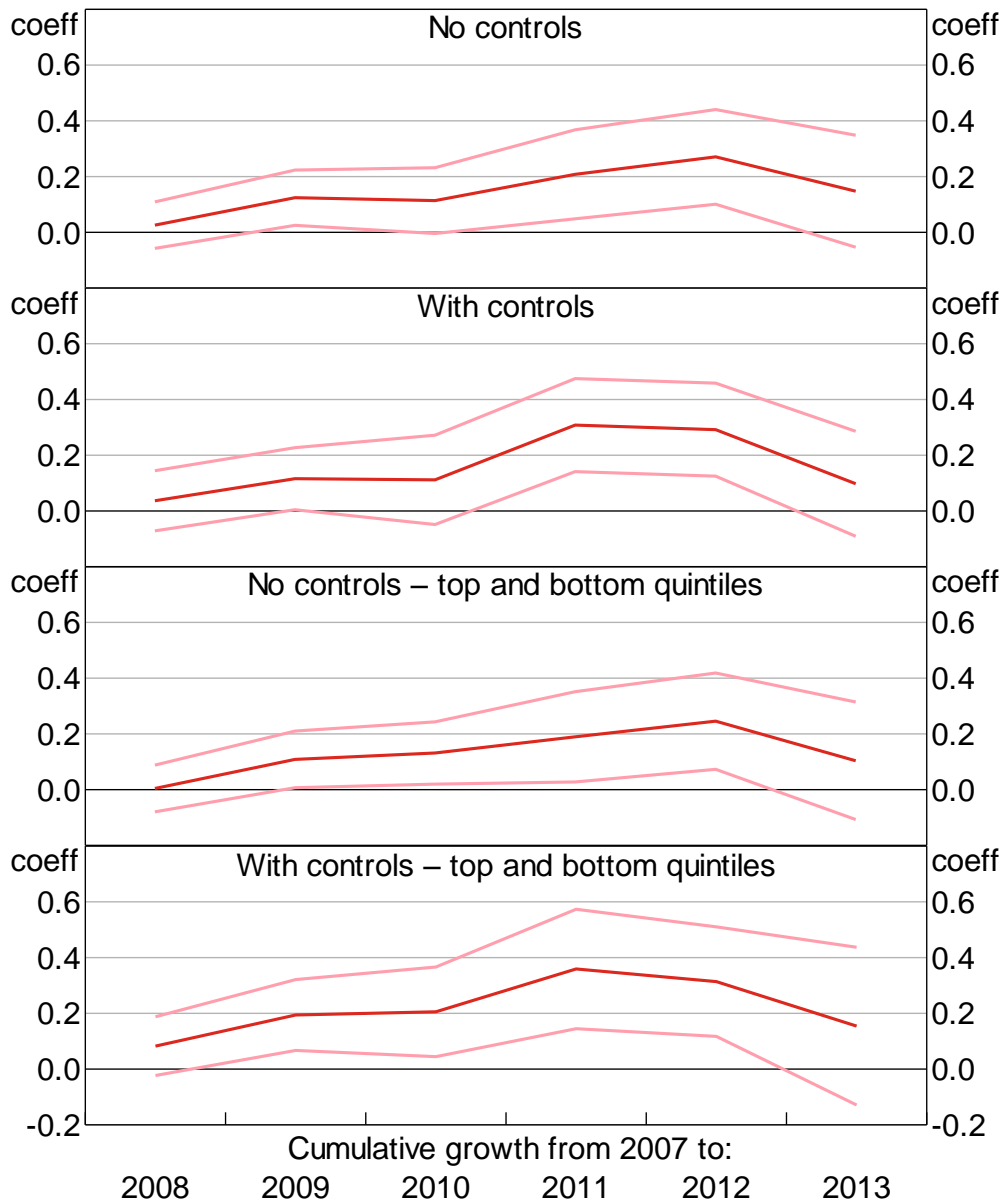
We estimate Equation (9) separately over six different time horizons: 2007 to 2008 ($h = 1$), 2007 to 2009 ($h = 2$), and so on, until the period 2007 to 2013 ($h = 6$). Figure 11 shows estimates of β_h in the presence and absence of the control variables. Figure 11 can be interpreted as follows: the first data point at 2008 shows the effect on growth in motor vehicle sales from 2007 to 2008 when moving from a postcode with no ALP voters to one with only ALP voters. The second data point for 2009 shows this same effect, but for motor vehicle 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 voters to another postcode with only ALP voters is estimated to have increased per capita motor vehicle purchases by around 30 per cent four years after the 2007 election, even after we control for changes in income.

For postcodes with a similar proportion of ALP and Liberal/National voters, changes of government have relatively little net effect on sentiment, suggesting that much of our identification comes from postcodes at the political 'extremes'. Reflecting this, the results are similar if we restrict the estimation sample to postcodes in the top and bottom quintiles of ALP vote share at the 2007 Federal election.

Overall, the estimates presented in this sub-section are consistent with our earlier results, providing further evidence that sentiment has a causal effect on consumption. Again, we find evidence that consumer sentiment contains forward-looking information, as changes in sentiment occur before changes in consumption.

Figure 11: Partisanship and Motor Vehicle Purchases – Difference-in-difference Regressions

Coefficient on ALP vote share at 2007 Federal election



Notes: Shows coefficient estimates β_i for Equation (9); each coefficient β_i is from a separate regression; top panel shows coefficient estimates β_i from a regression including no controls; the second panel includes the full set of controls listed in Table 1; the third and bottom 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; the lighter lines are two standard error bands

Sources: ABS; Authors' calculations; VFACTS

5. Relation to the Empirical Literature

One important implication of our work is that an individual's reported spending intentions captured by the consumer sentiment survey is a good proxy for actual changes in consumption. The difficulty in obtaining individual-level consumption data has led researchers (e.g. D'Acunto, Hoang and Weber 2015; Bachmann, Berg and Sims 2015) to use spending intentions as a proxy for consumption. Our results help validate the research relying on spending intentions data.

We find that consumer sentiment influences consumption and has predictive power for future movements in consumption. This is consistent with results from the earlier time series literature which tried to determine if sentiment contained information independent of current economic fundamentals by employing controls for macroeconomic fundamentals (such as income growth, stock prices and interest rates) in sentiment regressions (Carroll *et al* 1994; Matsusaka and Sbordone 1995; Bram and Ludvigson 1998; Ludvigson 2004). However, one issue that has faced the time series literature is that the information attributed to consumer sentiment could reflect fundamental drivers of consumption that have not been controlled for (Ludvigson 2004). By using cross-sectional variation, we implicitly control for the effect on sentiment of common macroeconomic shocks. Our approach also makes clear the source of variation used for identification – differences in sentiment related to partisanship.

We find that changes in sentiment at an individual level can have a noticeable effect on consumption. This contrasts with the earlier time series literature which found that changes in aggregate sentiment increases the explanatory power in consumption growth forecasting regressions only marginally (Ludvigson 2004).¹⁴ Consistent with this, Roberts and Simon (2001) show that a substantial proportion of the variation in sentiment indices can be explained by lagged macroeconomic indicators, indicating that much of the variation in aggregate sentiment is driven by variation in current fundamentals. One possibility is that time series averages mask specific episodes in which sentiment contains a lot of additional information, as argued by Blanchard (1993) and Hall (1993) for the 1990–91 US recession. In our case, the variation we use is masked in aggregate data because there are a similar number of ALP and Liberal/National voters.

In terms of 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 for two reasons. First, the shift in sentiment between ALP and Liberal/National 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 affects an individual's assessment of past and future macroeconomic conditions.

Second, we make use of an extensive set of controls to account for the fact that partisanship is correlated with economic variables. After controlling for these factors, we still find a positive relationship between sentiment and consumption. We believe that this provides some support for the notion that there could be exogenous movements in consumption predicted by sentiment, as advocated by Blanchard (1993) and Hall (1993).

Our paper is most similar to Gerber and Huber (2009) and Mian *et al* (2015), who both use cross-sectional county-level data to identify a relationship between partisanship and consumption following US elections as the party occupying the Presidency changed. Gerber and Huber find evidence that consumption increases more in counties that voted for the incoming president. In

14 Though Matsusaka and Sbordone (1995), using a VAR framework, do find that sentiment accounts for between 13–26 per cent of the innovation variance in GNP.

contrast, Mian *et al*/ report no statistically significant effect. These differences in results partly reflect how each set of authors measures consumption. Gerber and Huber use county-level sales tax revenue data, which is problematic because consumers may shop in one county but live in another. Mian *et al*/ use data similar to ours, including self-reported spending intentions from the Michigan Surveys of Consumers and motor vehicle registrations.

This leads to the question of why we find that changes in sentiment affect consumption while Mian *et al*/ (2015) do not. We believe that our data allow us to better measure sentiment, partisanship and consumption at a disaggregated level. In Appendix A we provide a reconciliation between our results and those from Mian *et al*/. To summarise, 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 voting intention, results in no longer being able to see the effect of a change in government on a consumer's self-reported spending intentions. Secondly, Mian *et al*/ measure motor vehicle 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 motor vehicle sales makes it more difficult to see a positive relationship between the ALP vote share and motor vehicle sales. Lastly, since voting is compulsory in Australia, we have a better measure of local area partisanship.

6. Implications for Macroeconomic Models

To this point we have taken the changes in consumer sentiment at changes of government as given, and sought to identify their effect on consumers' spending intentions and postcode-level motor vehicle purchases. Here we discuss whether this variation could reflect mechanisms identified by existing macroeconomic models.

The sharp changes in sentiment at changes of government represent variation plausibly unrelated to changes in current economic conditions, suggesting that changes of government may act as news shocks (Beaudry and Portier 2006). Barsky and Sims (2012, p 1371) have argued that 'fundamental news is the main driving force behind the observed relationship between confidence and subsequent economic activity'.

We do not believe that the shifts in sentiment at changes of government reflect unbiased expectations of changes in future incomes. Changes of government could lead to systematic changes in the income distribution, benefiting supporters at the expense of opponents, but consumers disagree on both expected personal and general economic conditions. Supporters of the winning party expect both their own and national economic conditions to improve substantially, while supporters of the losing party expect the opposite. Any explanation based on changes in future incomes would have to reconcile these conflicting beliefs about national economic conditions. We also find it difficult to think of systematic changes in government economic policy that could cause the magnitude of revisions to beliefs about personal economic conditions that we see in the sentiment survey at changes of government. Furthermore, controlling for a wide range of economic and demographic groupings to which economic policy could be targeted does little to reduce the difference in sentiment between supporters and opponents of the government.

Another possibility is that the variation in sentiment we use represents noise shocks, which Barsky and Sims (2012, p 1345) define to be ‘... optimism or pessimism that, while not ex ante irrational, is erroneous from the point of view of an outside observer with knowledge of the shocks’. Lorenzoni (2009) develops a model in which noise shocks cause consumers to temporarily over or underestimate the economy’s productive capacity, generating aggregate demand-like features. Consumers receive a noisy signal about changes in aggregate productivity, but learning is sluggish because idiosyncratic supply shocks and dispersed information create a high degree of uncertainty about current productivity. In our setting, this would equate to particularly slow learning, with sentiment responding predictably at each change of government, and disagreement between supporters of the government and opposition party persisting for the entire term each party holds office. This suggests that voters hold strong priors about the superiority of their party’s economic management, and face strong frictions filtering the contribution of their party’s economic policy from other influences on economic outcomes. The evidence from Bartels (2002), discussed earlier, indicates that there are even substantial frictions limiting learning by voters about past economic conditions.

In a departure from the news-noise view of business cycles, there is a literature looking at how agents can coordinate on market equilibria. Matsusaka and Sbordone (1995) find that a model with strategic complementarities can lead to multiple equilibria with sentiment influencing which equilibrium is reached. Angeletos and La’O (2013) develop a unique-equilibrium model in which aggregate fundamentals and preferences are known by all agents to be unchanging but sentiment shocks can nonetheless cause variation in aggregate demand. Sentiment shocks generate correlation in higher-order beliefs, such that optimism (pessimism) is justified by signals that others are also optimistic (pessimistic). The variation in sentiment at changes of government that we document could be a result of higher-order belief dynamics along the lines of Angeletos and La’O, but this is necessarily speculative because only first-order beliefs are observable. Furthermore, there is nothing in the theory proposed by Angeletos and La’O that would generate strong positive within-group correlation in beliefs and strong negative between-group correlation in beliefs.

Considering these possibilities, we believe that the partisan variation in sentiment most likely represents noise. But we remain surprised that barriers to learning are sufficiently strong for these difference in beliefs to be so persistent and predictable. While difficult to explain from a theoretical point of view, it is these features of the sentiment data that are so useful from an econometric identification point of view.

7. Conclusion

We have sought to identify whether changes in economic beliefs reflected in consumer sentiment indices have a causal effect on consumption. To do this, we have used variation in sentiment around changes of government that is plausibly unrelated to changes in current fundamental drivers of consumption. In particular, we have taken advantage of the fact that consumers are substantially more optimistic about economic conditions when the party they support is in government. The difference in sentiment between supporters of the two parties is large and changes occur immediately following an election at which there is a change of government.

To see if the beliefs captured in sentiment affect consumption, we match an individual consumer's expectations of future economic conditions from the consumer sentiment survey to their spending intentions. We find that consumers that have a more positive economic outlook report more positive spending intentions. We validate these results using actual postcode-level consumption data. In particular, following an election with a change of government, motor vehicle purchases increase by relatively more in postcodes with a greater share of voters for the winning party.

We believe that our results have important implications for policymakers and researchers for two reasons. First, we find that spending intentions elicited in sentiment surveys are a good proxy for actual consumption. Since individual-level consumption data is difficult to obtain, our results provide support for researchers using spending intentions to study consumption responses. Second, we find that consumer sentiment has a casual effect on consumption. Given our extensive use of controls and the large movement in sentiment we observe at changes of government, we believe that the variation in sentiment we identify represents pure sentiment shocks rather than unbiased expectations about changes in future incomes. Therefore, consumer sentiment can contain important information not captured by other macroeconomic indicators. From a policymaking perspective, this suggests that divergences between consumer sentiment and the level of economic activity implied by macroeconomic data can contain important information about future consumption.

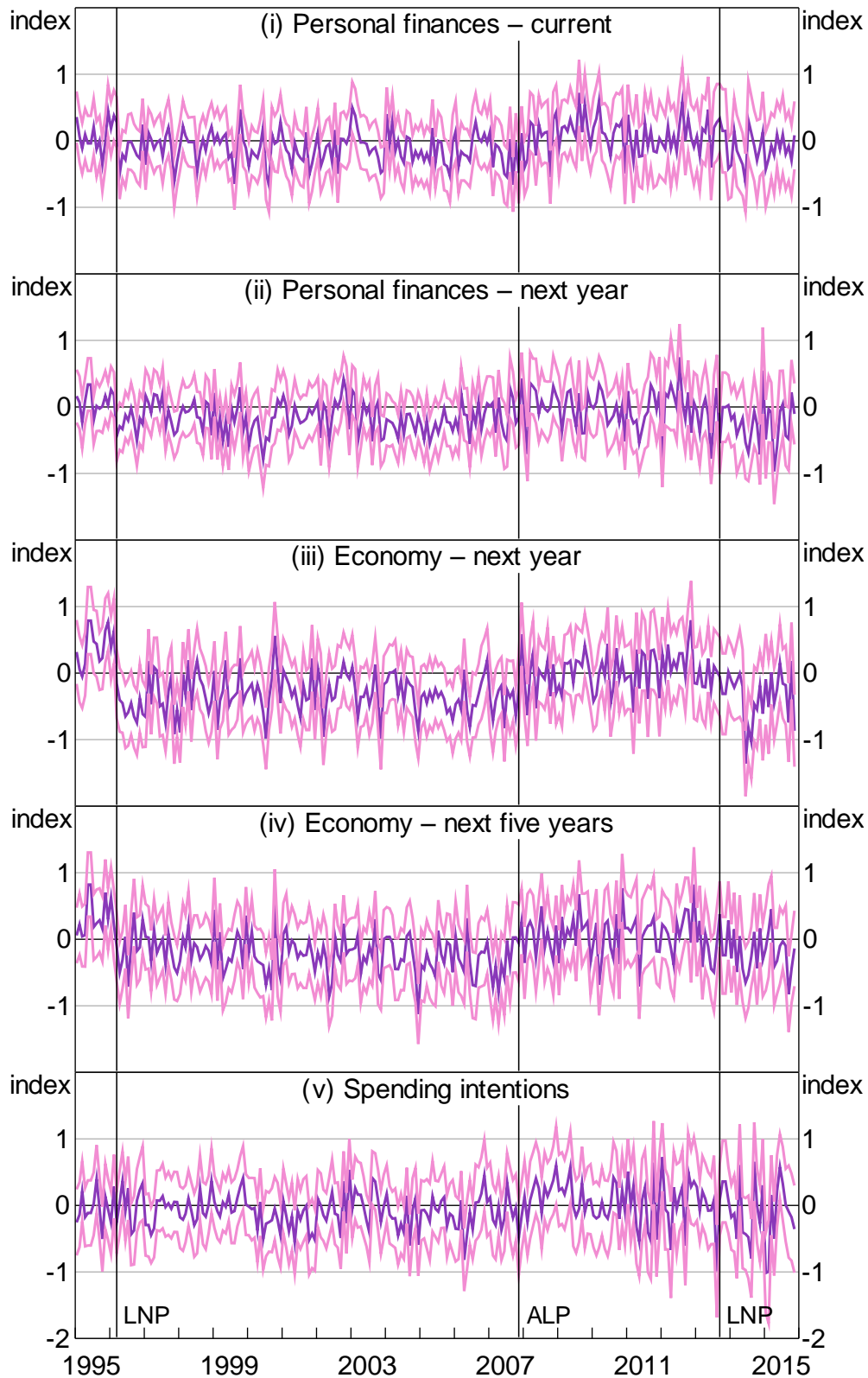
The cross-sectional variation in sentiment around changes of government that we have used is not visible in aggregate sentiment data because the different views held by supporters of each of the major political parties largely cancels out. Thus, our results do not imply that changes of government have any noticeable effect on aggregate consumption. Because much of the variation in aggregate-level sentiment reflects variation in fundamental drivers of consumption that are common to macroeconomic time series and sentiment, separating meaningful variation in aggregate sentiment from measurement error is difficult. We leave to further work the challenge of identifying specific episodes similar to that we have studied at the individual level in aggregate data.

Appendix A: Reconciliation with Mian *et al* (2015)

Our paper is most closely related to Mian *et al* (2015). They use US data to investigate whether changes in county-level consumption following a change in the party occupying the US presidency are related to county-level voting outcomes. While we find that an increase in sentiment leads to higher consumer spending, they find no statistically significant relationship between sentiment regarding government economic policy 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 voting intentions. In contrast, Mian *et al* have to impute an individual's partisanship based on the county where they live. 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 outlined in Section 2.3, but instead of using an individual's self-reported voting intention we use the postcode-level ALP vote share in their postcode of residence at the 2007 election. Comparing the results in Figure A1 where partisanship is imputed to that in Figure 3 of our paper, where we observe partisanship, we can see that imputing partisanship introduces noise into the data. Nonetheless, these estimates do suggest that ALP voters are more pessimistic about the national economy (sub-indices (iii) and (iv) in Figure A1) when the Liberal/National party is in government. But the effect of partisanship on spending intentions is too small to detect when voting intention is imputed from postcode-level vote shares. These results using the imputed measure of partisanship mirror the findings of Mian *et al* for the United States, and so provide a reconciliation between our findings.

Figure A1: Components of Consumer Sentiment – Imputed Partisanship
ALP minus Liberal/National voters



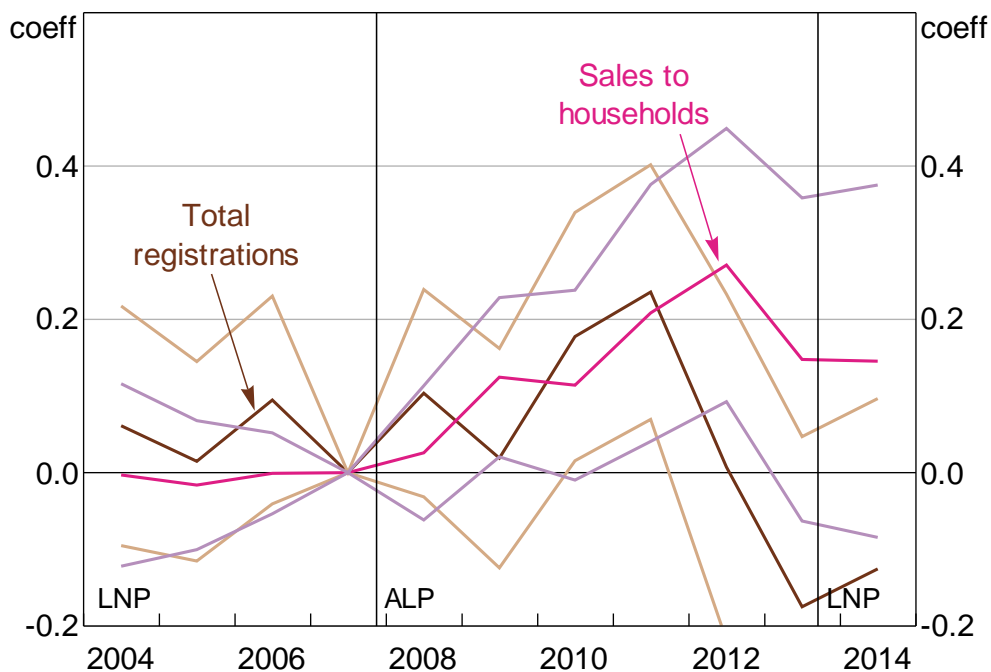
Notes: Estimates repeat those of Figures 5 and 8 using imputed rather than self-reported partisanship as the dependent variable; the measure of partisanship is the ALP vote share at the 2007 Federal election in the postcode of residence for each survey respondent; see notes to Figures 5 and 8

Sources: Authors' calculations; Westpac and Melbourne Institute

In terms of how motor vehicles are measured, because we are interested in the effect of consumer sentiment on household consumption, we use motor vehicle sales to households. Mian *et al* (2015) use registration data which includes motor vehicle sales to businesses and governments in addition to households. To see the effect of using total motor vehicle sales data we re-estimate Equation (7) from our paper using Australian motor vehicle registration data. The data are sourced from the Australian Bureau of Statistics and are available on an annual basis. Figure A2 shows the effect of an increase in the ALP vote share on motor vehicle sales. As the figure indicates, the standard errors are larger when we use registration data rather than just sales to households. It also now becomes unclear whether changes in sentiment affect consumption, with the estimated coefficients having a saw-toothed pattern around the 2007 election.¹⁵

Finally, voting in Australia is compulsory. In contrast, voting in the United States 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.

Figure A2: Partisanship and Motor Vehicle Purchases
By total registration and sales data to household



Notes: Shows coefficient estimates β_i for Equation (7), using annual vehicles data and vote share data from the 2007 Federal election; the coefficient estimates β_i are relative to the omitted year 2007, when the ALP won government; we measure per capita motor vehicle purchases in two ways: from sales to households and from registration data that includes sales to households, businesses and government; registration data are available only at an annual frequency; the lighter lines are 95 per cent confidence bands; vertical lines show dates when government changed hands

Sources: ABS; Authors' calculations; VFACTS

¹⁵ Mian *et al* also use credit card data in their analysis. Unfortunately we do not have access to credit card data.

Table A1: Bai and Perron (1998) Break Test Results – Spending Intentions

ALP minus Liberal/National voters

| Double maximum test | Information criteria | SupF test | Sequential test | Break dates | | | Changes of government |
|---------------------|----------------------|-----------|-----------------|-------------|----------|----------|-----------------------|
| | | | | 3 breaks | 4 breaks | 5 breaks | |
| UD-Max | BIC | SupF(2 1) | 4 breaks | Feb 1996 | Feb 1996 | Feb 1996 | Mar 1996 |
| 81.08*** | 5 breaks | 113.80*** | | Mar 2008 | Dec 2007 | Jun 2000 | Nov 2007 |
| WD-Max | LWZ | SupF(3 2) | | Oct 2013 | Apr 2010 | Dec 2007 | Sep 2013 |
| 81.08*** | 4 breaks | 74.53*** | | | Sep 2013 | Apr 2010 | |
| | | SupF(4 3) | | | | Sep 2013 | |
| | | 33.62*** | | | | | |
| | | SupF(5 4) | | | | | |
| | | 5.16 | | | | | |

Notes: 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 UD-Max and WD-Max test statistics evaluate an F -statistic for 1–5 breaks, with the break points selected by global minimisation of the sum of squared residuals; the UD-Max statistic weights the five F -statistics equally, while the WD-Max statistic weights the F -statistics such that the marginal p -values are equal across the number of breaks; the WD-Max 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 assuming a 5 per cent significance level; the break dates are those identified by minimising the sum of squared errors conditional on the number of breaks; ***, ** and * indicate results statistically different from zero at the 1, 5 and 10 per cent levels, respectively

Table A2: ALP Vote Share Regressions

| | 2007 election | 2013 election |
|--|---------------------|---------------------|
| Log taxable income | -19.22*** (4.68) | -24.32*** (5.04) |
| Average age (yrs) | -0.20* (0.11) | -0.24** (0.12) |
| Share with Bachelor's degree or higher | 1.17*** (0.22) | 1.12*** (0.20) |
| Share who rent | 0.00 (0.05) | -0.02 (0.06) |
| Unemployment rate | 1.73*** (0.21) | 1.05*** (0.25) |
| Share in white-collar profession | -0.80*** (0.16) | -0.74*** (0.19) |
| Industry share of employment: | | |
| Agriculture | -0.64*** (0.14) | -0.71*** (0.13) |
| Mining and construction | -0.39*** (0.15) | -0.36*** (0.14) |
| Manufacturing | -0.16 (0.13) | 0.23 (0.16) |
| Retail and wholesale trade | -0.92*** (0.17) | -1.13*** (0.20) |
| Services | -0.39** (0.19) | -0.53*** (0.19) |
| Health and education | -0.60*** (0.16) | -0.42** (0.17) |
| Arts and accommodation | -0.75*** (0.25) | -0.54** (0.24) |
| Other | -1.16** (0.52) | -1.37*** (0.48) |
| Region: | | |
| Inner regional | -4.82*** (1.45) | -5.02*** (1.56) |
| Outer regional | -5.16*** (1.77) | -5.91*** (1.75) |
| Remote | -2.00 (2.50) | -3.36 (2.50) |
| Very remote | 1.87 (3.75) | 1.15 (3.87) |
| R^2 | 0.61 | 0.55 |
| Observations | 2 265 | 2 264 |

Notes: Reports coefficient estimates from a regression of the ALP vote share on postcode-level characteristics; for the 2007 Federal election, income is measured using 2006/07 taxable income data and other variables are taken from the 2006 Census; for the 2013 Federal election, income is measured using 2012/13 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; postcodes in the ACT are excluded; robust standard errors have been used and are reported in parentheses; ***, **, and * denote results statistically different from zero at the 1, 5 and 10 per cent levels, respectively

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