

Reverse Electoral Business Cycles and the U.S. Housing Market*

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Abstract

The literature on political business cycles suggests various types of electoral cycles, none of which predict a decline in economic performance immediately before an election. We argue that for certain sectors of the economy, such a decline will regularly occur because the political uncertainty generated by elections will encourage consumers and businesses to delay investments until the race is over. The relevant sectors are dominated by what others have termed “irreversible investments,” or investments associated with high costs of reversal. We test this argument, which we name the Reverse Electoral Business Cycle (REC) theory, in the context of the housing sector. Analyzing data on home prices in over 350 U.S. metropolitan areas from 1975 through 2006, we find strong evidence for RECs. These results are corroborated by Zillow.com data on home purchases and a survey on individual preferences over home buying.

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An enduring topic in the study of political economy is the effect of elections on economic performance. In the canonical “opportunistic” political business cycle, policymakers induce short-term gains in the economy immediately before an election with the expectation that the gains will subside soon after votes have been cast (e.g., Tufte 1978). A rich theoretical literature offers a range of explanations for this cycle.¹ However, empirical evidence has not matched the theoretical appeal. Indeed, numerous studies cast doubt on the existence of opportunistic political business cycles, particularly within OECD countries (e.g., Alt and Chrystal 1983; Golden and Poterba 1980). Schultz (1995) suggests that only unpopular governments will attempt to generate such cycles, and supports this argument with data on British transfer payments.² Even Schultz (1995, 99), however, admits that the result “in no way constitutes proof” that his theory explains the general lack of evidence. More recently, Drazen’s (2000, 76) extensive literature review concludes that “at least for the opportunistic model in developed countries, there is much less hard evidence than both the theoretical models and the conventional wisdom about the prevalence of ‘election-year economics’ would suggest.”³

The major alternative to the opportunistic cycle is a set of “partisan theories” that center on differences between the major parties regarding preferences over unemployment versus

¹ See Drazen (2000) for an excellent review. Some of these studies focus on monetary policy (e.g., Nordhaus 1975; Lohmann 1999) while others on fiscal policy (e.g., Rogoff and Sibert 1988).

² Price (1998) points out that opportunistic behavior should not occur when the incumbent is so unpopular that he or she will lose regardless of short-term economic performance.

³ Treisman and Gimpelson (2001) suggest that different contexts encourage different pre-electoral manipulations, and therefore any given indicator will tend to underestimate opportunistic political business cycles. The authors support this argument with data from Russia during the 1990s.

inflation. Hibbs (1977), for instance, suggests that left-wing governments tend to pursue low unemployment-high inflation policies while right-wing governments pursue low inflation-high unemployment policies. Alesina and Rosenthal (1989) assume such a difference between left- and right-wing parties and find that voters' uncertainty about electoral outcomes will generate economic cycles. In particular, electoral uncertainty causes voters to expect inflation between what a left- or right-wing party would enact. Therefore if the left (right) -wing party wins, inflation is higher (lower) than expected and unemployment declines (increases) immediately after the election. As the term proceeds, the economy is steady regardless of which party holds office.

While the opportunistic and partisan electoral cycles differ on many dimensions, they each focus on the economy as a whole rather than differentiate among various sectors. By comparison, we argue that certain sectors of the economy experience an entirely distinct electoral cycle, what we call a *Reverse Electoral Business Cycle* (REC) because it exhibits the opposite pattern to the opportunistic political business cycle. In particular, in a REC economic performance *worsens* in relevant sectors immediately prior to an election because the political uncertainty encourages businesses and consumers to delay investments and contracts until after the race concludes. For instance, if presidential or gubernatorial candidates differed on potential environmental regulations, a firm that would suffer (or benefit) from the regulations might postpone new investments and contracts until the election results become known; at that point, the firm would have a better sense of the likely regulatory environment for the next few years. Thus like the partisan model of Alesina and Rosenthal (1989), electoral uncertainty plays a role. However, in contrast to the partisan model, in a REC downturns in the relevant sectors occur immediately *before* the elections, and do not depend upon which party is holding office. The

relevant sectors are ones dominated by purchases that would be impossible or quite costly to “return” or “undo” following the election. Scholars have termed such purchases “irreversible investments” (e.g., Bernanke 1983).

We analyze this argument for a sector, the housing market, which is dominated by purchases with such high costs of reversal. If RECs exist, housing should be affected both indirectly and directly. At the indirect level, if businesses delay salary-related and other contracts until after an election, then prospective home buyers in such industries have an incentive to postpone buying a home until the details of the contracts are known. More directly, a wide range of government policies—from tax to education to trade policy—can affect the desirability and affordability of a particular home to a prospective buyer. We develop these arguments more fully in the theoretical section of the paper.

The empirical analysis tests the implications of these arguments with data on home prices in over 350 metropolitan statistical areas (MSAs) from 1975 through 2006. In particular, we assess the extent to which electoral cycles have affected home prices in these areas. The breadth of the data facilitates exploiting the staggered timing of gubernatorial elections in addition to examining presidential elections. To supplement this analysis, we also examine data from Zillow.com on home sales and a survey we conducted in the summer of 2008.

The paper proceeds as follows. Section I reviews the literatures on irreversible investments and housing markets. Section II develops the theoretical argument, and Section III the main empirical analysis. In particular, Section III describes the dataset on home prices, the econometric model used to analyze these data, and the results. Section IV then turns to the survey data. Section V concludes with a discussion of the implications of the findings, both for housing markets and electoral business cycles more generally.

Related Literatures

The literature on irreversible investments highlights the potential value of delaying purchases and investments under certain conditions (e.g., Bernanke 1983; Cukierman 1980; Dixit and Pindyck 1994).⁴ The basic assumptions, following Bernanke (1983), include that: 1) some projects are irreversible, in that they would incur a high cost of reversal or cannot be undone; and 2) information about the desirability of a project may arrive over time. The original work focused on the decision making of firms, and accordingly, the central conclusion was that a firm may optimally choose to postpone decisions regarding “costly to reverse” investments when it can expect new information about the advisability of the investments in the near future.

Several studies provide evidence for this prediction with respect to uncertainty about economic factors, including interest rates (Ferderer 1993) and the stock market (Pindyck 1991). Other work has extended the theoretical logic to consumers, and found they delay purchasing durable goods when economic uncertainty is high. For instance, Romer (1990) shows that the economic uncertainty generated by the stock market crash of 1929 caused a decline in consumer spending on durables even as spending on perishables slightly rose. According to Hassler (2001), stock market volatility decreases automobile purchases. Finally, Carroll and Dunn (1997) demonstrate that home sales decline as uncertainty about the unemployment rate rises.

While the focus of the literature on irreversible investments is on economic rather than political uncertainty, some studies note that the latter may cause the former (e.g., Friedman and Schwartz 1963; Bernanke 1983). However, these studies do not demonstrate that political

⁴ The earliest theories are Cukierman (1980) and Bernanke (1983), who developed the logic independently.

uncertainty, let alone electoral cycles, routinely leads to declines in investment. Indeed, as Bittlingmayer (1998, 2245) surmises, the possibility that political uncertainty drives economic uncertainty “has often been discussed casually and in the context of specific [historical] episodes.”⁵ Bittlingmayer himself suggests that this relationship may be stronger than many suppose, and assesses this claim in the context of the switch from Imperial to Weimar Germany. His analysis finds that the uncertainty caused by the switch induced both stock market volatility and output declines. However, even Bittlingmayer does not offer evidence that more routine political uncertainty affects economic performance.

The literature on irreversible investment thus does not take on the subject of electoral cycles. Nor does it offer evidence that political uncertainty regularly affects economic outcomes. In addition, while Carroll and Dunn (1997) suggest that housing is an important type of irreversible investment, research on irreversible investments has not typically examined housing markets. Instead, these literatures have developed largely independently.

Research on housing markets has largely focused on economic influences. For instance, it provides a wealth of insight into factors such as personal income (e.g., Poterba 1991; Glaeser and Gyourko 2007), interest rates (e.g., Himmelberg, Mayer, and Sinai 2005), and the user cost of housing (e.g., Rosen and Rosen 1980; Poterba 1992). Supply-side factors, such as construction costs and builders’ response to price dynamics, have also received attention (e.g., Glaeser and Gyourko 2007). Additionally, a debate exists about the impact of demographics, with certain studies suggesting demographic demand is a strong predictor of housing prices (e.g., Mankiw

⁵ See Bittlingmayer (1998) for a review of studies that note the possible importance of political uncertainty and/or examine this possibility within the context of a particular historical episode such as the Great Depression.

and Weil 1989) and others casting doubt about the importance of this factor (e.g., Poterba 1991). Separately, empirical work consistently demonstrates persistence in the rate of change of home prices; if prices rise (decline) in a city in a given year, they are apt to rise (decline) in that city in the following year (e.g., Case and Shiller 1989; Cutler, Poterba, and Summers 1991).

While government policy clearly affects certain factors that the housing literature identifies as important, our argument about the impact of the political uncertainty induced by elections goes beyond a claim that elections matter with respect to public policy decisions about housing. Instead, we will suggest that elections matter for a wide range of policies that could reasonably affect the type and location of home a prospective buyer might seek. Moreover, at the most general level, our argument is not only about the housing market but about the effect of elections on all sectors comprised of irreversible investments.

Reverse Electoral Business Cycles

Because others have already developed formal theories of irreversible investments and applied these theories to consumer behavior, we do not take up space replicating these theories or applications. The distinctive argument here is that elections are regularly a key source of uncertainty for sectors involving such investments. For instance, with respect to housing, we suggest that elections encourage prospective home buyers to delay purchasing a home until the electoral results become known. The theoretical discussion accordingly focuses on why elections should have such an effect.

A critical assumption underlying this argument is that elections have policy consequences that affect the desirability of certain investments and purchases versus others. Nothing about this claim is particularly controversial. For instance, a recent paper by Mattozzi (2008, 43) begins,

“Political uncertainty is a pervasive phenomenon which is inherent to the political process. It naturally arises because different candidates running for office, if elected, will implement different policies ...”

Arguably the most obvious electoral consequences entail differences in economic policies between the major parties. For instance, in the United States the Democratic Party is associated with higher levels of taxation and expenditures than is the Republican Party at both the state-level (e.g., Alt and Lowry 1994; Ringquist and Garand 1999) and the national level (e.g., Cox and McCubbins 1992; Su, Kamlet, and Mowery 1993).⁶ In addition, around the globe political parties differ over regulatory policies that favor certain industries and goods. Say that an incumbent party or leader favors environmental policies that increase the cost of fuel and heating, while the opposition does not support these policies. The cost of fuel affects the size of home and car that people desire, with customers preferring smaller homes and cars if, but only if, the new policies are enacted. Accordingly, electoral outcomes will favor certain types of cars and homes versus others.

Numerous studies suggest the U.S. stock market recognizes these sorts of industry-specific policy differences. Herron et al. (1999) examine the 1992 presidential election, and show that sectors associated with the Democratic candidate performed better as the Iowa political market increasingly indicated Bill Clinton was likely to win the election. Likewise, for the 2000 presidential campaign, Knight (2006) and Mattozzi (2008) demonstrate that industries likely to fare better under Bush had higher stock prices as the probability of a Bush victory rose. These effects extend to state-level elections. For example, stock prices for energy utilities have

⁶ See Nicholson-Crotty (2008) for a review of the literature regarding U.S. state taxation.

responded to gubernatorial races in which the candidates proposed different levels of environmental regulation (Butler and McNertney 1991).

Consistent with these findings, Garfinkel and Glazer (1994) find that elections affect the timing of contract negotiations. In presidential election years, firms tend to postpone contract negotiations until after the election has occurred. Notably, this evidence suggests that the uncertainty generated by elections may affect home prices and other consumer-oriented irreversible investments *even if voters/consumers are not following the campaign*. If firms delay contract negotiations until after an election, then workers have an incentive to defer purchases that depend upon their income until after the election even when the workers are not following the electoral race.

All of this work about the effects of elections—on fiscal policy, stock prices of specific industries, and contract negotiations—supports the argument that elections should induce RECs in sectors dominated by irreversible investments. And while the literature does not identify RECs, a recent *New York Times* article suggests at least one automobile dealer believed the 2008 presidential election produced one. “People want to buy but they just don't want to pull the trigger until they know who's going to be in office...” the dealer is quoted as observing.⁷ The *Times* article surmises that “uncertainty surrounding the presidential election” was a factor in the weakness of the 2008 automobile market.⁸

Presumably, the impact of electoral uncertainty on the housing sector should be at least as great as that for the automobile sector. Moving homes typically entails enormous transactions

⁷ Bill Vlasic and Nick Bunkley, “Hazardous Conditions.” *New York Times* (Correction Appended, Late Edition). October 2, 2008, C1.

⁸ *Ibid.*

costs. Real estate brokerage fees, the costs of moving items from one location to another, and the time involved in getting a home ready to show to prospective buyers all create incentives to avoid moving frequently. Furthermore, the policies associated with a particular candidate or party may not only affect the type of home an individual can afford, but also the desirability of one location versus another.

Take, for instance, state-level education policy. In several gubernatorial elections in 2008, school choice became a major campaign issue. The Republican candidate, more than the Democratic one, favored state policies that expanded choice through nontraditional options such as charter schools, vouchers, or tax credits for private school scholarships.⁹ Parents of school-aged children therefore had an incentive to delay moving to a particular school district before learning whether a pro-school choice governor would be in office. Moreover, because the quality of publicly-funded schooling for a given home affects its price, these policy differences had ramifications for prospective homebuyers regardless of whether they had school-aged children; in particular, if charter schools or vouchers were expanded in a state then the relative value of a location with strong traditional public schools would decline (e.g., Reback 2005; Taylor 2005). Research suggests people recognize this link among home values, the quality of their schools, and the quality of other communities' schools (e.g., Fischel 2001; Brunner and Sonstelie 2003).

Nor is education the only policy that people recognize affects home values. For instance, Scheve and Slaughter (2001) demonstrate this effect for trade policy. They establish that homeowners in manufacturing communities adversely affected by free trade tend to hold protectionist attitudes, even when the homeowners' jobs are not related to manufacturing. By

⁹ E.g., for North Carolina see Lynn Bonner, "Allow More Charter Schools? McCrory Says Yes, Perdue No." *Charlotte Observer*. October 25, 2008, 1B.

comparison, analogous renters do not have a higher likelihood of favoring protectionist policies. Scheve and Slaughter (2001, 289) interpret these results to suggest that “individuals care about trade’s effect on the price at which their homes can be transacted.”

In sum, in sectors where investments cannot readily be reversed, the political uncertainty generated by elections can induce economic slowdowns for a variety of reasons. Differences between candidates and parties on policies ranging from taxes to the environment to education to trade can give consumers and businesses incentives to postpone investment-related decisions, thereby reducing demand for such goods. Moreover, because businesses tend to defer contract negotiations until after an election, RECs can occur in consumer-oriented sectors such as housing even when voters are not paying close attention to the campaign. Of course, we are not claiming that every single person or business waits to make investments until after an election, only that enough have incentives for delay such that economic performance declines relative to other years (holding all else equal). Accordingly if our arguments are correct, we should find evidence that housing markets decline in election years relative to other years.

Electoral Cycles and Home Prices

We analyze data on home prices from 353 metropolitan statistical areas (MSAs) from 1975-2006. These data are from the annual Conventional Mortgage Home Price Index (CMHPI), which is published by the Federal Home Loan Mortgage Corporation (Freddie Mac). The index is constructed from over thirty million “repeat transactions,” including sales and appraisals; a particular home’s value must be observed at least twice in order for that home to contribute to the price index. Accordingly, it is not based on comparing the prices of different homes. This feature and the breadth of the data make the CMHPI, along with the almost identical index

published by the Office of Housing Enterprise Oversight (OFHEO), attractive to scholars (e.g., Stephens et al. 1995). We have also conducted our analyses with the OFHEO data, and the results support those presented.¹⁰

The home price indices encompass not only high profile metropolitan statistical areas such as Phoenix-Mesa-Scottsdale and Boston-Quincy, but also less high profile areas such as Altoona, Pennsylvania and Stockton, California. Forty-one of the fifty states are included. A major advantage of this regional variation is that it facilitates analyzing the impact of state-level elections in addition to national ones. As discussed in the previous section, a range of state-level policies, from environmental to education to tax policies, should affect the desirability and affordability of a particular home. Also, because gubernatorial elections are staggered across all four years of the presidential election cycle, in any given year only a subset of the forty-one states experience a gubernatorial election.¹¹

¹⁰ Detailed results available upon request. (*See the For Referees Appendix for these and other results described in the text as available upon request.*) The CMHPI and the OFHEO home price index differ in the weighting of the repeat-sales data. Given that the series are correlated at 0.99 for each MSA, we use the CMHPI because it has slightly larger coverage.

¹¹ While the previous section describes many national and state-level policy areas that affect home prices, we do not mean to suggest that local elections are necessarily irrelevant. However, Ferreira and Gyourko (2009) find that partisan differences in mayors do not significantly affect policies. Moreover, many local elections are nonpartisan. Analysis of the effects of local elections would be particularly difficult given that many MSAs cover a multitude of cities, townships, or other types of localities. Thus we leave for future research the question of whether RECs exist with respect to local elections.

A few additional features of the data are worth highlighting. First, the index is based on conventional mortgages purchased or securitized by the Federal Home Loan Mortgage Corporation (Freddie Mac) or the Federal National Mortgage Association (Fannie Mae) since 1975. As such, the CMHPI does not include particularly expensive homes because these mortgages tend to be too high for the Freddie Mac and Fannie Mae underwriting standards, which are adjusted annually and depend partially on where the home is located; for most locations the mortgage limit was \$417,000 in 2007. Second, homes explicitly insured by a government agency such as the Federal Housing Administration (FHA) are not part of the CMHPI. Therefore the index excludes many of the least expensive homes. Finally, it encompasses only single unit residency houses; the CMHPI is not based on commercial properties, multi-family homes or condominiums.

Before proceeding to the analysis, it is worth highlighting why an incentive to delay purchasing homes should depress home prices. Consider the incentives of various types of sellers, starting with builders. Builders face costs from delayed sales in terms of upkeep on the property and any loan-related expenses, and therefore have the incentive to lower prices when demand falls. Indeed, research suggests construction rates are slow to respond to demand changes, resulting in short-term gluts that depress prices (e.g., Glaeser and Gyourko 2007). Consistent with such work, we find no significant effect of the electoral cycle on new construction. In particular, we have examined whether permits for new residential construction respond to electoral cycles. Appendix Table A describes this analysis.¹²

Now consider a different type of seller, a homeowner who must move in the spring of an election year (for instance, for job-related reasons). If the seller holds a mortgage, postponing the

¹² Notably, these results suggest the findings on home prices are not caused by supply-side phenomena.

sale until after the election would require additional mortgage payments. In short, delay is not “free” for many sellers, giving them an incentive to lower prices if prospective buyers have an incentive to postpone purchases. We emphasize, moreover, that a REC does not imply housing markets must exhibit zero or negative growth in an election year, just that they will exhibit less growth under this circumstance than they otherwise would.

Naturally, we also sought out data on the number of homes purchased. Unfortunately, the Census collects data on new home sales only at the regional level, not at the state- or local level. Moreover, the U.S. government series on new and existing home sales are not compatible; for instance, new home sales include initial contracts that may still be cancelled while existing home sales reflect actual purchases.¹³ Combining these series to create local or state-level data on total homes purchased is therefore not feasible. Fortunately, for recent years, Zillow.com provides data on home sales as a percentage of all homes (including ones not for sale) for a large majority of the states. Appendix Table A shows that these data on sales support the findings from the larger dataset of home prices.

Specification and Measurement

To account for the panel structure of the home price data, we utilize fixed effects models. The effects are at the MSA-level given that average home price growth varies a great deal across MSAs. For instance, in Honolulu the mean percentage change in real home prices between 1975

¹³ New home sales are estimated as part of the Survey of Construction, while the National Association of Realtors provides the data on existing home sales. Obtaining an accurate estimate of total home sales is important for inter-state comparisons because new homes are a more significant portion of some markets than others.

and 2006 was 0.033, suggesting that on average real home prices increased three percent a year. By comparison, in Erie, Pennsylvania real home price growth has averaged only 0.014, less than half of that of Honolulu. The fixed effects account for otherwise unexplained differences across MSAs in changes in home prices. We have also analyzed random effects and multilevel models that incorporate random intercepts at the MSA- and state-levels, and these results, which are available upon request, fully support the main findings.

The panel structure is helpful because it facilitates exploiting variation in the timing of gubernatorial elections. Over the course of the data, approximately 250 gubernatorial races are staggered such that in any given year some but not all states hold an election. Thus if RECs exist, we should find that home price changes are lower in locations with a gubernatorial election that year, holding all else equal. After leveraging this cross-sectional variation, we turn to examining the impact of the eight presidential elections that occurred during the three decades of the data. In the initial analysis of gubernatorial elections we include a set of year indicators, which account for national-level factors, in addition to controls that vary at the local level.

Specifically, for each MSA i and year t , we analyze:

$$[1] \quad \% \Delta \text{ Real Home Prices}_{it} = \alpha_{it} + \beta_1 \text{ Gubernatorial Election Year}_{it} + \beta_2 \% \Delta \text{ Real per Capita Income}_{it} + \beta_3 \% \Delta \text{ Demographic Demand}_{it} + \beta_4 \% \Delta \text{ Real Home Prices}_{i(t-1)} + \lambda \text{ Year Indicators}_t + \eta_i + \varepsilon_{it},$$

where η represents MSA-specific effects and ε is an i.i.d. error term. When we test for a REC in the context of presidential elections, we necessarily exclude the year indicators and therefore explicitly control for national-level factors including *30-Year Fixed Rate Mortgage*, *% Δ Inflation Expectations*, and *% Δ Unemployment Expectations*. Also, for a subset of observations, data are available for *Foreclosure Rate* and *% Δ Real Construction Costs*, and below we describe

specifications that incorporate these variables. Finally, in order to assess whether the tightness of an electoral race contributes to an REC, we run regressions that include estimates of *Gubernatorial Electoral Certainty* and *Presidential Electoral Certainty*.¹⁴

The variables are defined as follows:

%Δ Real Home Prices. The dependent variable equals the percentage change in home prices from year $t-1$ to year t in a given metropolitan statistical area. We use percentage changes in order to facilitate comparing MSAs that have quite different levels of prices. For instance, in 2006 the price of a typical Napa, California home was \$508,835 while that of Jackson, Mississippi was \$121,176. The mean percentage change is 0.018.¹⁵

Gubernatorial Election Year. This key independent variable equals one if the MSA is located in a state with a gubernatorial election that year and zero otherwise. If RECs exist at the state level, this coefficient should be negative.

%Δ Real Income. Various studies demonstrate that growth in personal income increases home prices (e.g., Poterba 1991; Case and Shiller 2003). To account for this influence, we utilize the Bureau of Economic Analysis MSA-level per capita income data.

¹⁴ We have also analyzed the effect of the user cost of housing as measured by differences in state tax rates. Like Poterba (1991), we capture this user cost with data on the percentage of households who itemize their taxes and then instrument this variable with the average state income tax collections per capita. Poterba finds no effect on home prices, and neither do we. Moreover, the substantive findings hold regardless of whether this user cost is accounted for; details available upon request.

¹⁵ Using nominal price and income data produces similar results, which are available upon request.

%Δ Demographic Demand. A longstanding debate exists over the effect of demographics on home prices (e.g., Mankiw and Weil 1989; Poterba 1991). To account for the possibility that change in the age distribution of the population affects demand for housing, we use the weights for each age group recommended by Mankiw and Weil (1989). For the vast majority of the MSAs in the home price index, the Census Bureau provides decennial estimates only. However, the bureau provides state-level data each year, and we utilize these annual data.

Lagged %Δ Real Home Prices. A consistent finding in research on housing is persistence in the rate of change of home prices. Some research argues that this persistence results from irrational behavior, with social contagion overwhelming rational decision making by consumers (e.g., Shiller 2005). Regardless of the cause, we control for this well-established empirical regularity.

Foreclosure Rate. Our reading of the housing literature found that foreclosure rates are not a standard control, but we still analyze specifications that account for this factor. The National Delinquency Survey published by the Mortgage Bankers Association provides data on the percentage of loans in foreclosure for each state and year beginning in 1979.¹⁶ Because this control is not available for the earliest years of the home price index, and given that it is not a standard control, we run the analysis with and without it. Foreclosures are likely endogenous to home prices, and accordingly a two-stage least squares approach is utilized when *Foreclosure Rate* is included. The excluded instrument is *Delinquency Rate*, which equals the percentage of loans with delinquent payments. The National Delinquency Survey tracks this percentage, which should be a strong predictor of foreclosures but not otherwise affect home prices.

¹⁶ The data is provided quarterly, and we average across the quarters for an annual foreclosure rate.

%Δ Real Construction Costs. Like earlier work (e.g., Poterba 1991), we control for residential construction costs using the R. S. Means construction cost index.¹⁷ The Means Construction Cost Index covers 279 of 353 metropolitan areas, although in many cases for only a subset of the years. We accordingly conduct the analysis with and without this control.

Year Indicators. In the main tests on gubernatorial elections, we include a set of year indicators to account for national-level factors that may affect local home prices. When examining the impact of presidential elections, the year indicators obviously must be excluded.

30-Year Fixed Mortgage Rate. In the analysis without year indicators, we control for the cost of obtaining a mortgage with data from the Primary Mortgage Market Survey conducted by Freddie Mac. Specifically, we use the average 30-year fixed mortgage rate for year t .

%Δ Inflation Expectations. Poterba (1984) suggests that expected inflation affects home prices, with an increase encouraging greater investment in housing. The national Survey of Consumers conducted by the University of Michigan's Survey Research Center has measured expected inflation since 1978, and we utilize these data in the regressions without year indicators.¹⁸

%Δ Unemployment Expectations. Following the results of Carroll and Dunn (1997), we control for the possibility that unemployment expectations affect home prices. Again we use the Survey of Consumers, which provides estimates at the national level.

¹⁷ The annual index is published by R. S. Means Company, Kingston, Massachusetts.

¹⁸ We obtained the data from the Economic Research site of the St. Louis Federal Reserve Bank <http://research.stlouisfed.org/fred2/series/MICH/downloaddata?cid=98> (accessed March 23, 2009).

Gubernatorial Electoral Certainty. If the logic underlying our arguments for Reverse Electoral Business Cycles is correct, we would expect the impact of a REC to be greater the less certain the outcome of the election is. Accordingly, we run supplementary tests to assess whether the closeness of the electoral outcome is associated with home price changes during election years. Specifically, we include two interaction terms, *Gubernatorial Electoral Certainty x Gubernatorial Election Year* and *Gubernatorial Electoral Certainty x Not Gubernatorial Election Year*. Gubernatorial electoral certainty is based on the subsequent gubernatorial election, and is measured as $|0.5 - \text{winning candidate's proportion of the two-party vote}|$.¹⁹ In a perfectly tied race the variable equals zero, while it equals 0.5 if a candidate takes one hundred percent of the vote.

Presidential Electoral Certainty. In the analysis of presidential elections, we run regressions that include *Presidential Electoral Certainty x Presidential Election Year* and *Presidential Electoral Certainty x Not Presidential Election Year*. Presidential electoral certainty is measured analogously to that for gubernatorial electoral certainty.

Results

Table 1 presents the results for Equation [1] as well as for the specifications that control for the foreclosure rate and construction costs.

[Table 1 about here]

¹⁹ Generally the two-party vote concerns Democratic and Republican candidates. In the unusual case where an independent was one of the top two candidates, we use these two candidates' vote shares.

Notably, in all of the specifications, the results suggest that Reverse Electoral Business Cycles (RECs) exist. The effect of gubernatorial election years on real home prices is consistently negative, suggesting that home prices are lower in gubernatorial election years than other years. The effect is significant at conventional levels ($p \leq 0.05$, two-tailed) in each set of results. Moreover, the magnitude of the impact does not vary extensively across them.

More specifically, the estimates suggest that in gubernatorial election years the real percentage change in home prices is lower by 0.3 to 0.4 percentage points, an impact comparable to that of well-established factors. For example, the mean real per capita income change is 0.014, and the estimates suggest that this change in income leads to an increase in home prices of 0.4 percentage points. In other words, the effect of a typical change in income is offset by the typical REC engendered by a gubernatorial election. The impact of lagged home price change is also of a comparable magnitude, with a one percentage point increase in home prices predicting a 0.5 to 0.6 percentage point increase in the following year. The effect of gubernatorial elections is thus not only statistically significant, but also comparable to established determinants of home prices.

More generally, the control variables have the anticipated effects. Home prices increase as demographic demand rises and as the foreclosure rate declines. The only control that does not have a significant impact is construction costs. Including or excluding this variable does not affect the results however. More generally, the results regarding RECs do not depend on which controls are included, or correspondingly, on whether the analysis concerns the full set of observations or instead a subset for which a particular control variable is available.²⁰

²⁰ We have also examined whether first-order autocorrelation is a problem, and found that it is not. For instance, in Column [1] in Table 1, the Baltagi-Wu autocorrelation statistic for panel data is 2.013.

Given the strong evidence for RECs in Table 1, we proceed to examine whether the competitiveness of a race affects the cycle. If the theoretical logic is correct, then we would expect a smaller REC the more lopsided the race. When voters and businesses can be reasonably confident of a particular electoral outcome, they have less of an incentive to delay irreversible investments. Consequently, we expect the coefficient on *Gubernatorial Electoral Certainty* \times *Gubernatorial Election Year* to be positive; the more lopsided the election, the higher home prices should be that year. In non-election years, electoral certainty should not similarly matter; for an electoral cycle to exist there must be years in which the election is too far away to justify delaying an investment.

Table 2 presents results regarding gubernatorial electoral certainty.

[Table 2 about here]

Column [1] of the table concerns the continuous measure *Gubernatorial Electoral Certainty*, which as predicted has a significant effect during election years ($p < 0.05$, two-tailed). Also, the main effect on gubernatorial election years remains significantly negative.

Continuing with Column [1], the coefficients involving electoral certainty and election years suggest that when a race is neck-and-neck, such that it is tied and *Gubernatorial Electoral Certainty* equals zero, home price growth in election years will be lower by about 0.8 percentage points. As the race becomes more lopsided, this effect declines. In fact, in a completely lopsided race, where the winner has a twenty-five percentage point lead over the next most popular candidate, home prices are no different than if an election had not occurred. Thus Table 2 suggests that RECs depend on electoral uncertainty.

A surprising result in Column [1] is the negative and at least marginally significant coefficient on the interaction term for off-years. We investigated whether collinearity might be

driving this result and it is indeed high ($\rho=0.7$) between the main effect for gubernatorial election years and one of the interaction terms. To assess whether the results would change with an alternative measure of electoral certainty that produced less collinearity, we created a dichotomous measure, *Gubernatorial Electoral Certainty Indicator*, which equals one if the winning margin is greater than 0.1 and zero otherwise. With this dichotomous measure the collinearity between any two terms drops below $\rho=0.5$ and, as Column [2] shows, the effect of gubernatorial electoral certainty for non-election years becomes insignificant. Moreover, the interaction term for election years remains significantly positive, and the main effect of election years continues to have the by-now familiar effect of a Reverse Electoral Business Cycle. Column [2] thus provides further support for the argument that RECs depend upon the competitiveness of the electoral race.

The last tests with the home price data focus on presidential elections. If RECs exist, we should find them not only for state-level but also national elections. Accordingly, we expect home prices to be lower in presidential election years than other years, with presidential electoral certainty alleviating this effect. Notably, national elections have been central to the literature on opportunistic political business cycles, and this theoretical perspective predicts a positive and significant coefficient on the presidential election year indicator. If instead we are correct that RECs describe sectors of irreversible investments, the coefficient should be negative.

Table 3 presents the results.

[Table 3 about here]

For space reasons, we focus on the specifications with controls that are available throughout the time series. The results for other specifications corroborate those in Table 3 and are available upon request. The analyses strongly support the existence of RECs. The coefficient on

presidential election year is negative and significant at conventional levels, with an impact even greater than that for gubernatorial elections.

Specifically, the results in Table 3 suggest that real home price growth is on average one to two percentage points lower in presidential election years than other years. This is more than fifty percent greater than the effect of the mean change in real income, as indicated by multiplying this mean ($\mu=0.014$) by either of the coefficients for income in Table 3. Moreover, according to the findings on presidential electoral certainty in Column [2], RECs depend on electoral competitiveness. As a race becomes more lopsided, the Reverse Electoral Business Cycle diminishes. The coefficients on electoral certainty are actually positive in both election and non-election years, although as expected, the effect is significantly higher in election years ($F=9.85$; $p<0.01$). Because the margin of victory in the presidential races is never greater than ten percentage points, the analog to the gubernatorial electoral certainty indicator always equals zero and therefore cannot be analyzed. For the specifications that can be analyzed, however, the results for presidential elections mirror those for gubernatorial elections.

Table 3 also shows that the RECs associated with gubernatorial elections hold even when the year indicators are replaced by national-level variables. In fact, the magnitudes of the coefficients on gubernatorial election years are strikingly similar to those in Table 1. Furthermore, the control variables typically have the expected effects. Higher mortgage rates reduce home prices and the controls with local and regional variation have the same effects as in previous tables. The coefficient on unemployment expectations consistently has the predicted sign, and is significant in Column [2]. Inflation expectations are not significant, although in specifications with fewer variables (e.g., a regression of home prices on inflation expectations) the effect is strongly positive; given that we have less than three decades of data and several

factors that vary only across time, it seems plausible that the effect of inflation expectations would be more consistent with expectations given a longer time series.

Overall Table 3, along with Tables 1 and 2, provides strong support for our arguments regarding Reverse Electoral Business Cycles. Home price growth is lower in years of presidential and gubernatorial elections. Furthermore, this impact lessens as the electoral outcome becomes more certain. These findings stand in contrast to all previous theories of electoral business cycles, and hold in a wide variety of specifications.

Declared Preferences on Home Buying

A final analysis utilizes an entirely different type of data: namely, a survey that we conducted in the summer of 2008. The survey was designed to relate individuals' preferences about buying a home to gubernatorial politics. While naturally limited in scope to one set of gubernatorial elections, the survey has the advantage of providing individual-level data. We can therefore assess whether individual-level preferences correspond to the findings from the aggregate-level data.

The evidence in earlier tables suggests that RECs should exist for races in which the gubernatorial race was at least somewhat competitive. In 2008, North Carolina and Washington were the only two states with a gubernatorial race involving a margin of victory under the ten percentage point threshold that defines the gubernatorial electoral certainty indicator from Table 2. In fact, no other race is even close to that threshold; the next closest involved a nineteen percentage point victory. We accordingly expect to observe a REC in North Carolina and Washington while place no such expectation for other states.

We contracted Polimetrix to conduct the survey, which was in the field July 18-29. The sample was structured to be representative at the state-level, with 75 respondents in each state.²¹ The first question asked respondents whether they were renting a home or living in one they had purchased.²² The renters were then asked, “How likely is it that you will buy a home by the end of this year? Almost certain, very likely, somewhat likely, not too likely, or definitely will not buy.”²³ We focus on renters to preclude complications from how recently a homeowner has purchased his or her residence. Specifically, for renters we construct the variable *Probably Buy*, which equals one if the respondent declared he or she was almost certain or very likely to buy a home by the end of the year and zero if the respondent declared she was only somewhat likely, not too likely, or definitely not buying.

Comparing the means of *Probably Buy* between those in states with competitive gubernatorial elections and those in other states, we find a substantial difference. While in the former, eight percent asserted they were likely to buy a home within the year, precisely zero did so in the states with competitive elections. This difference is significant at $p < 0.08$ in a two-tailed t-test ($t = 1.75$, 1102 degrees of freedom), and becomes even more significant in a regression with demographic controls. As Appendix Table B shows, in a regression that accounts for marital

²¹ Polimetrix interviewed 4228 subjects and proceeded to match them down to 75 subjects from each of the 50 states. The weights that Polimetrix created are based on state-level marginals from the 2006 American Community Survey. The unweighted data produce substantively similar results.

²² The question was “Do you currently rent your home, or are you buying it with a mortgage, or is it entirely paid for?” This identical question has been asked by recurring CBS/NYT polls.

²³ This wording is based to a March 2008 survey conducted by the Associated Press, except that survey asked about respondents’ likelihood of buying within the next two years.

status, age, income and gender, a competitive gubernatorial election decreases the likelihood of planning to buy a home by eight percent, and this effect is significant at $p < 0.05$, two-tailed.

In sum, the survey results provide further support for the existence of Reverse Electoral Business Cycles. Demand for homes is lower in gubernatorial election years when the race is at least somewhat competitive. In combination with the previously discussed Appendix Table A, which presented evidence regarding home sales and construction, the survey data imply that consumer demand drives the RECs observed with the price data. Of course we recognize that the survey has limited scope. However, it is striking that those living in a state with a competitive gubernatorial election are considerably less likely than others to plan to buy a home that year.

Conclusion

This paper has provided numerous tests that suggest Reverse Electoral Business Cycles (RECs) exist within the context of the U.S. economy. In presidential and gubernatorial election years, home price growth is significantly lower than it is in other years. In addition, the reduction is correlated with electoral certainty; as the winner of the presidential or gubernatorial race becomes more certain, RECs diminish. Analysis of data on home purchases and individuals' preferences about home buying provides further support for our arguments about RECs.

These findings suggest that the opposite of the conventional, opportunistic business cycle characterizes at least one portion of the U.S. economy. Instead of heating up right before an election, the housing market actually subsides. Notably, this pattern is distinct not only from the opportunistic business cycle, but also from other electoral business cycles that scholars have suggested, such as partisan cycles. To be fair, these other cycles were designed to explain the overall economy, not specific sectors. And our claim is not that the economy as a whole will follow a REC, rather that sectors dominated by irreversible investments will do so. Accordingly,

we do not view the results as a refutation of other electoral cycles, but instead as evidence that an entirely different, previously unidentified cycle exists for certain parts of the economy.

As such, the findings provoke numerous suggestions for future research. Most naturally, future studies might examine whether the patterns observed for housing markets extend to other sectors of irreversible investments such as automobiles and consumer durables. In addition, it would be worthwhile to examine sectors not dominated by irreversible investments; it may be the case, for instance, that the disjuncture between previous theory and evidence is partially caused by assuming that all sectors of the economy will experience the same type of electoral business cycle. A different line of extension would be to examine whether RECs hold in other countries. The endogenous nature of elections in many nations would necessitate additional theorizing about the precise relationship between the timing of elections and economic performance, but the broader arguments about the existence of RECs are hardly specific to the United States.

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Table 1. Reverse Electoral Business Cycles and Gubernatorial Elections

	[1]	[2]		[3]
	% Δ Real Home Prices	[a] Foreclosure Rate	[b] % Δ Real Home Prices	% Δ Real Home Prices
Gubernatorial Election Year	-0.429 (0.121)	0.578 (1.240)	-0.378 (0.118)	-0.313 (0.155)
% Δ Real Income	0.297 (0.017)	-0.010 (0.002)	0.265 (0.017)	0.282 (0.020)
% Δ Demographic Demand	0.963 (0.063)	-0.122 (0.006)	0.613 (0.074)	0.799 (0.073)
Lagged % Δ Real Home Prices	0.567 (0.009)	-0.042 (0.001)	0.456 (0.018)	0.577 (0.012)
Foreclosure Rate*	---	---	-2.240 (0.290)	---
% Δ Real Construction Costs	---	---	---	-0.001 (0.004)
Delinquency Rate	---	0.354 (0.010)	---	---
Constant	0.190 (0.431)	0.748 (0.043)	1.318 (0.604)	0.088 (0.443)
Year Indicators	Yes	Yes		Yes
Years of data	1975-2006	1979-2006		1975-2006
N	7768	7611		4872
F-test, MSA-level fixed effects	1.04 (p=0.30)	1.19 (p<0.01)		1.22 (p<0.01)
R ²	0.607	0.616		0.642

Note: Dependent variable equals % Δ Real Home Prices in Columns [1], [2a], and [3] and Foreclosure Rate in Column [2b]. Standard errors are in parentheses below coefficients. Foreclosure Rate* equals the predicted values from the first-stage equation that is reported in Column [2b].

Table 2. Reverse Electoral Business Cycles and Gubernatorial Electoral Certainty

	[1]	[2]
Gubernatorial Election Year	-0.782 (0.161)	-0.634 (0.132)
Gubernatorial Electoral Certainty × Gubernatorial Election Year	0.032 (0.012)	---
Gubernatorial Electoral Certainty × Not Gubernatorial Election Year	-0.015 (0.008)	---
Gubernatorial Electoral Certainty Indicator × Gubernatorial Election Year	---	0.617 (0.172)
Gubernatorial Electoral Certainty Indicator × Not Gubernatorial Election Year	---	-0.141 (0.110)
%Δ Real Income	0.298 (0.017)	0.297 (0.017)
%Δ Demographic Demand	0.970 (0.063)	0.953 (0.063)
Lagged %Δ Real Home Prices	0.568 (0.009)	0.568 (0.009)
Constant	0.269 (0.432)	0.265 (0.413)
Year Indicators	Yes	Yes
N	7755	7755
F-test fixed effects	1.05 (p=0.27)	1.03 (p=0.37)
R ²	0.606	0.616

Note: Dependent variable equals %Δ Real Home Prices. Standard errors are in parentheses below coefficients. Data on gubernatorial certainty not yet available for states with gubernatorial elections in 2009.

Table 3. Reverse Electoral Business Cycles and Presidential Elections

	[1]	[2]
Presidential Election Year	-1.142 (0.113)	-1.984 (0.233)
Presidential Electoral Certainty × Presidential Election Year	---	0.502 (0.044)
Presidential Electoral Certainty × Not Presidential Election Year	---	0.345 (0.030)
Gubernatorial Election Year	-0.519 (0.101)	-0.494 (0.099)
30-Year Fixed Mortgage Rate	-0.491 (0.021)	-0.738 (0.027)
%Δ Inflation Expectations	0.003 (0.004)	-0.001 (0.004)
%Δ Unemployment Expectations	-0.001 (0.003)	-0.007 (0.003)
%Δ Real Income	0.468 (0.016)	0.473 (0.016)
%Δ Demographic Demand	0.781 (0.056)	1.025 (0.063)
Lagged %Δ Real Home Prices	0.489 (0.009)	0.472 (0.009)
Constant	3.856 (0.187)	4.478 (0.189)
Year Indicators	No	No
Years of data	1979-2006	1979-2006
N	7611	7611
F-test fixed effects	1.02 (p=0.39)	1.20 (p<0.01)
R ²	0.493	0.500

Note: Dependent variable equals %Δ Real Home Prices. Standard errors are in parentheses below coefficients. Data begin in 1979 due to availability of %Δ Inflation Expectations.

Appendix Table A. New Construction and Home Sales

	[1] %Δ Construction Permits	[2] % All Homes Sold	[3] %Δ % All Homes Sold
Gubernatorial Election Year	0.820 (1.083)	-0.260 (0.146)	-0.197 (0.086)
%Δ Real Income	1.907 (0.147)	0.076 (0.037)	0.051 (2.128)
%Δ Demographic Demand	3.569 (0.569)	-0.072 (0.053)	4.003 (10.961)
Lagged %Δ Construction Permits	-0.036 (0.011)	---	---
Lagged % All Homes Sold	---	0.643 (0.055)	---
Lagged %Δ % All Home Sold	---	---	-0.821 (0.196)
Constant	-10.051 (2.299)	1.298 (0.043)	0.121 (0.202)
Year Indicators	Yes	Yes	Yes
Years of data	1980-2006	1999-2006	1999-2006
N	6163	202	173
F-test fixed effects	0.98 (p=0.56)	1.85 (p<0.01)	0.54 (p=0.97)
R ²	0.258	0.866	0.151

Note: Dependent variable for Column [1] equals the percentage change in the number of new construction permits. These data, which are from the New Residential Construction Index of the U.S. Census, begin in 1980 and cover a subset of the MSA-year observations of the house price index. The dependent variable in Column [2] equals the percentage of homes sold in the state out of all existing and new homes (including homes not for sale). These data are from Zillow.com, and begin in 1999. Zillow.com describes the measure as one of “turnover” in the housing market. The dependent variable in Column [3] equals the annual percentage change in this measure of turnover. Fixed effects in Columns [2] and [3] are at the state-level.

Appendix Table B. Declared Preferences for Home Buying and Gubernatorial Elections

Competitive gubernatorial election in 2008	-0.082 (0.012)
Married	0.067 (0.021)
Age	-0.0012 (0.0006)
Income	0.004 (0.003)
Female	-0.019 (0.019)
Constant	-1.655 (3.059)
N	1026
R ²	0.028

Sample includes renters. Dependent variable equals *Probably Buy*. *Competitive gubernatorial election in 2008* equals one if the margin of victory in the 2008 gubernatorial race was at least ten percentage points and equals zero if there was no gubernatorial election in the state in 2008 or if the race was not competitive. The demographic controls use Polimetrix's standard codings: *Married* equals one if the respondent is married and zero otherwise; *Age* is the respondent's age in years; *Income* is a categorical variable based on the categories under \$10000, \$10000-\$14999, \$15000-\$19999, \$20000-\$24999, \$25000-\$29999, \$30000-\$39999, \$40000-\$49999, \$50000-\$59999, \$60000-\$69999, \$70000-\$79999, \$80000-\$99999, \$100000-\$119999, \$120000-\$149999, and at least \$150000; and *Female* equals one if the respondent is female and zero if he is male. Standard errors are in parentheses below OLS coefficients; competitive gubernatorial elections perfectly predict not buying and thus a probit cannot be estimated.