

What Economy Matters? Contemporaneous and Refined Economic Measures, Perception of Economic Conditions, and Political Evaluation

by

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Abstract

Many previous studies have found a significant positive relationship between the electorate's perceptions of the condition of the economy and both the public's approval of the president and their division of the parties' shares of the popular vote. One of the questions political scientists have tried to answer is "What exactly are the economic outcomes to which voters respond?" (Kiewiet and Rivers 1984: 371). Measures of economic conditions by the Bureau of Economic Analysis (BEA) are constantly being improved and therefore are routinely changed. This study finds sometimes there are big differences between the contemporaneous and refined measures of economic growth by the BEA. The central question posed in this dissertation is which reading of economic conditions the electorate is responding to in forming their perceptions of the economy and their evaluations about the political leaders presiding over the economy, the contemporaneous economic reports by the BEA, or the real economy as measured by the refined measures of economic growth by the BEA? Ordinary least square regression helps answer the question, especially time series regression techniques of partial difference transformation and full difference transformation, based on data sets consisting of (1) the Consumer Sentiment of the University of Michigan from Economic Research, Federal Reserve Bank of St. Louis, (2) Approval Rates of Presidents from Public Opinion Archives, Roper Center, (3) Popular Vote of In-parties' Presidential Candidate, (4) "Advanced," "Preliminary," and "Final" Estimates of Annual Growth Rate of real GNP from the Survey of Current Business by the BEA (Bureau of Economic Analysis), and (5) Revision Estimates of Annual Growth Rate of real GNP from National Economic Accounts in the BEA. In my findings, (1) both the contemporaneous measures of economic growth and the real economy indirectly influence the electorate's political attitudes and political behavior via their economic perceptions; (2) the electorate responds not only to the economy as the contemporaneous experts at that time describe it to be, but also to the real economy as later experts were able to determine it more accurately to have been; and (3) between the two, the real economy holds a more significant influence over the electorate's economic perceptions than does the contemporaneous governmental statistical index. In implication, it should be emphasized that the limited reliability of contemporaneous measures of economic growth may cause mistakes in presidential election forecasts, and politician and campaign strategy designs.

Introduction

There is no doubt that the economy affects the vote. Several aspects of economic voting are beyond contention. The economy matters to elections because it matters to voters. But what is not so clear is what aspect or reading of economy is the electorate responding to, and what links real economic activity to the vote. It is important to understand *how the economy affects the electorate's political attitudes and political behavior*. Political scientists have looked into what goes on in the black box between the economy and the electorate's political attitudes and political behavior. One of the questions political scientists have tried to answer is "What exactly are the economic outcomes to which voters respond?" (Kiewiet and Rivers 1984: 371).

The rate of real growth in the economy is thought to strongly affect the electorate's perceptions about how healthy the economy is. In turn, voters' perceptions of the economy affect their evaluations of the president and, ultimately, their decisions of whether to vote for or against the president's party in the next presidential election (Campbell 2008, Lewis-Beck 1988, Weatherford 1983, and Tufte 1978). When economic growth rates are strongly positive, Americans are more likely to have more positive impressions of the economy, and therefore are more likely to credit the incumbent president for a job well done. When economic growth rates are weak or the economy is actually shrinking, Americans are more likely to have more negative views about the economy and are, therefore, more likely to blame the incumbent president for not pursuing policies that would have promoted healthier economic conditions.

The link of the real economy to perceptions of the economy to evaluations of incumbent presidents has been the core of an extensive established literature on retrospective economic voting. The basis of retrospective voting theory is that voters look to the past performance of the parties and candidates in deciding their votes. The theory of retrospective economic voting has been important both to general explanations of voting and elections (Bartels 2008, Campbell 2008, Lewis-Beck et al. 2008, Erikson et al. 2002, Brace and Hinckley 1992, Brody 1991, Lewis-Beck 1991, Kiewiet and Rivers 1984, Edwards 1983, Kramer 1983 1971, Fiorina 1981, Monroe 1979, Tufte 1978, Weatherford 1978, Meltzer and Vellrath 1975, Stigler 1973, V.O. Key 1968) and to many presidential election forecasting models (Abramowitz 2004, Campbell 2004, Holbrook 2004, Lockerbie 2004, and Lewis-Beck and Tien 2004).

Perceptions of the economy are a critical intervening consideration between real economic conditions and their impact on presidential evaluations. But there exist obstacles that affect and may distort how economic reality is translated into economic perceptions. Among these obstacles, there are information costs, partisanship, personal finances and local variations in economic conditions. Information shortcuts, such as political partisanship, interpersonal influence, and reliance on different experts, may cause economic perceptions among voters to vary (Popkin 1994). Personal financial conditions may also affect people's economic perceptions directly and indirectly (Campbell 2008, Lewis-Beck 1988, and Edwards 1983). Finally, different local and sectoral economic performance may serve as the very reference point voters use when evaluating the economy to form their economic perceptions (Anderson and Roy 2011, Campbell 2008, and Conover 1985).

Researchers often assume that these obstacles balance out. The measurements of economic conditions have been taken for granted in studies of economic voting. As Lewis-Beck

(1988) summaries that much research on economic voting assumes “a rational actor model” under “the decision-making processes.” He sums up that “The voter is portrayed as a logical and efficient calculator who carefully weighs the economic performance (realize and expected) of the different parties, then chooses the one that yields the most benefits” (Lewis-Beck 1988:41). He also admits that “many voters may behave this way.” However, the economic information that a well informed and objective citizen processed at that time is not necessarily accurate. For example, Hetherington’s (1996) study shows us the effect of inaccurate economic information. In the presidential election of 1992, the real economic conditions at that time were helpful to George H. W. Bush. According to the National Bureau of Economic Analysis (NBEA), the economy experienced a recession from July 1990 to March 1991, and recovered from a recession in March of 1991.¹ None of the real GNP and/or GDP growth rates, inflation and unemployment rates could make the electorate easily blame the president for a weak economy. The actual GNP increased at the rate of about four percent in the first three quarters of 1992. Hetherington cites data compiled by Stanley and Niemi (1994), GNP growth rate in 1992 was above 2%, “far better than the -13.2% registered in 1932, the last time a Democratic challenger unseated an elected Republican incumbent” (Hetherington 1996: 372). None of the reported inflation rates and unemployment rates showed any problem. Both were better than in 1984 when Reagan won reelection. But the mass media, the most informed group, conveyed to the public that the economy was in bad shape, and this may have negatively shaped the electorate’s economic perceptions. During 1992 campaign season, “more than 90 percent of the references to the economy were negative” (Patterson 1993: 113). This may have been instrumental in President Bush’s defeat by Bill Clinton. Hetherington (1996) builds the vote choice model to examine the effect of media consumption on economic evaluation, and the effect of economic evaluation on

¹ Also see Table 2-1. US Business Cycles Expansions and Contractions 1959-2008 in Chapter 2.

the votes for President Bush based to NES data. In his findings, mass media's poor depiction on the economy poisons heavy media consumers' economic evaluation, and then draws Bush's potential supporters away. He also compares his Bush-Clinton vote choice model and Bush-Clinton-Perot model, and finds that "economic evaluations were important determinants of vote choice for" all candidates equally. Referring to his comparison, Ross Perot's showing was not the major reason why President Bush was defeated by Clinton in 1992. In this case, the mass media, the most informed citizens, reported inaccurate economic information to the public. Because the inaccurate economic information caused the wrong economic perceptions in the electorate, the incumbent presidential candidate failed in winning his second term, although the real economic performance was favorable to an incumbent.

The 2000 election offers another example of economic conditions that differed from what they were thought to be. The contemporary economic index in 2000, like real GNP and/or GDP growth rates, was satisfactory. Real GNP grew at 5.45% and 5.38% in the first and second quarter of 2000. And real GDP increased 5.43% and 5.37% in the first and second quarter of 2000. Based partly on these good economic indicators, election forecasters predicted that Al Gore—the in-party candidate—would win the presidential election. However, this time the in-party candidate was again defeated. One of the explanations attributes this to the difference between the real economy and the inaccurate reported economic measures at that time. The real economy was not as good as the reported economic measures used by prediction models indicated that it was (Campbell 2001). In the first quarter of 2000, while the real economy performed actually unsatisfactorily, (a real GDP increase of one percent), the economy was reported to have been booming according to the measure of real GDP at that time. It indicated that the economy was growing at a rate of nearly five percent. Even though both the actual and

contemporary measures show that the economy boomed in the second quarter, in the third quarter the actual rate of increase was nearly zero (0.33%), while the measure at that time indicated a sluggish but not horrible rate of 2.19%. Thus, in the first three quarters of 2000, the economy was far from satisfactory, but was thought to be significantly better than that at the time. In this case, the inaccurate measures of the economy provided misleading economic information to the election predictors. In light of the fact that the real economy was not doing as well as the statistics released about it at the time suggested, it is less surprising that the in-party candidate Al Gore narrowly lost his bid to extend the Democrats' hold on the White House.

If economic perceptions are important to political evaluations and if those perceptions are or should be reflective of economic reality, then we need to know what that economic reality is and how it is measured. The best available and most authoritative measures of economic conditions are produced by the Bureau of Economic Analysis (BEA). As BEA describes itself that it is “an agency of the Department of Commerce. Along with the Census Bureau and STAT-USA, BEA is part of the Department's Economics and Statistics Administration.”² Its job is to “produce economic accounts statistics that enable government and business decision-makers, researchers, and the American public to follow and understand the performance of the Nation's economy.”³ The Department of Commerce developed the estimates of gross national product (GNP) to depict the economy in detail in 1942. The BEA defines GNP as “the market value of the goods and services produced by labor and property supplied by U.S. residents.”⁴ The BEA estimated U.S. production by GNP in its standard National Income and Product Accounts (NIPA)

² BEA (2007). “Measuring the Economy: A Primer on GDP and the National Income and Product Accounts.”
http://www.bea.gov/national/pdf/nipa_primer.pdf

³ Ibid

⁴ BEA. “A Guide to the National Income and Product Accounts of the United States”
<http://www.bea.gov/national/pdf/nipaguid.pdf>

tables until 1991, when BEA changed its featured measure from GNP to GDP. BEA defines GDP as “the market value of the goods and services produced by labor and property located in the United States.”⁵ The BEA calculates real GNP (GDP) in “chained dollars”—in a particular base year, prices are held fixed. They do so on a quarterly basis, measuring economic activity over spans of three months, a quarter of a year. Their measures of economic conditions are constantly being improved and therefore are routinely changed. In effect, the understanding of those who are most knowledgeable about economic conditions changes over time.

What we thought we knew about economic conditions in the months immediately following a quarter may differ greatly from what is later estimated to be the economic conditions of that period after all of the measurements are reconsidered and refined. Different readings of economic conditions may cause different economic perceptions among different people. Presumably contemporaneous measures might affect what is being reported about the economy and what knowledgeable citizens are saying to each other about the economy. The refined measures should better reflect what citizens are actually experiencing in the economy, what they actually see around them rather than what they are hearing about economic conditions.

The central question posed in this dissertation is which reading of economic conditions the electorate is responding to in forming their perceptions of the economy and their evaluations about the political leaders presiding over the economy? Is the electorate responding to the economy as the contemporaneous experts at the time thought it was or is the electorate responding to the real levels of economic conditions as later experts were able to determine?

The dissertation is organized in five chapters. The first chapter introduces the dissertation’s research question. There are two major parts to this chapter. The first part discusses the importance of the research question. I review the importance of the economy and economic

⁵ Ibid

perceptions in influencing presidential approval ratings and vote share of the in-party candidate in presidential elections, and how general economic conditions are related to various more specific measures of the economy such as inflation, unemployment, the misery index, and so on, in order to establish the importance of the research question. The second part frames the context of the research question. I offer a framework linking the real economy to economic measures, to economic perceptions, and further to political attitudes and political behavior. The framework presents the difference between contemporaneous and refined measures of the economy, and reviews (1) how the electorate forms their perceptions of the economy, referring to contemporaneous measures of the economy and to the real economy, and (2) factors that may intervene between the real economy and economic perceptions. The research question is this: to what picture of the economy does the electorate respond to in shaping their economic evaluations, their political attitudes, and their political behavior? Are their economic evaluations affected more by the picture of the economy painted by contemporaneous measures of the economy available at the time to voters, the media, and opinion leaders or more by the real economy experienced by voters as measured more accurately by the later refined economic measures?

In order to answer the above research questions, the second chapter first discusses the history of the contemporaneous and refined measures of economic growth, introduces when they started, when they are released, why they are revised, and discusses their differences. Since the Bureau of Economic Analysis (BEA) released their monthly *Survey of Current Business*, at least two pictures of the economy have been accessible to the electorate. One is painted by contemporaneous measures of the recent past economy estimated by the BEA. The other is the current and recent real economy the electorate has been experiencing, as measured more accurately by the later refined economic measures. Based on above fact, I propose three b

hypotheses about the nature of the suspected effects of real economy and economic measures on economic perceptions. Two major independent variables include the contemporaneous economic measures available shortly after the time being measured, and the real economy, which is measured by economic measures refined by the BEA well after the time being measured. The hypotheses address how the electorate may respond to the contemporaneous and/or refined economic measures to form their economic perceptions. The contemporaneous and refined economic measures are two key independent variables appearing throughout the hypotheses. The final part of Chapter 2 presents the basic descriptive statistics of the contemporaneous and refined measures of real GNP growth rate, their differences and the strength of the correlation between them.

The focus of Chapter 3 is economic perceptions, which are measured by The *Index of Consumer Sentiment* of University of Michigan. First, Chapter 3 introduces the history, context, tendency and variations of the *Index of Consumer Sentiment*. Chapter 3 also presents (1) basic descriptive statistics of consumer sentiment in quarterly and semi-annual measurement of consumer sentiment, and (2) the correlation among consumer sentiment, the contemporaneous and refined measures of real GNP growth rate, in order to examine whether consumer sentiment is the same variable as the contemporaneous or refined measures of real GNP growth rate. I find that consumer sentiment is different from either measures of real GNP growth rate. Finally, Chapter 3 implements preliminary empirical analyses on the effects of the contemporaneous and refined measures of real GNP growth rate and economic perceptions on presidential approval rate and the vote share of in-party's candidate in presidential elections. The analysis indicates that once economic perceptions are considered, neither the contemporaneous nor the refined measures of real GNP growth rate directly affect presidential approval rate and the vote share of

in-party's candidate in presidential elections. As a result, the dependent variable in further analyses can focus only on the electorate's economic perceptions in this research.

Chapter 4 examines and compares the effects of the contemporaneous and the refined measures of economy growth on perceptions of the economy. Due to the high internal autocorrelation in each of three above variables, time series analysis regression techniques are employed in this chapter. Two methods of time series analysis regression techniques are to process partial difference transformation and full difference transformation on all variables before regression. The findings show that the real economy as measured by the refined measures of economic growth have larger effects on perceptions of economic conditions than the contemporaneous measures released at the time, although both measures significantly influence perceptions of the economy.

These findings are illustrated through the discussion of two groups of case studies. In the first group, there are six pairs of cases. In each pair, both cases have the same growth rate as indicated by the contemporaneous measures of real GNP growth rate, but different growth rates according to the refined measures. In the other group, four pairs of cases show the impact on consumer sentiment when the refined measures of real GNP growth rate are the same, but when the contemporaneous measures of growth are different.

Finally, the concluding chapter, Chapter 5, takes stock of the findings and implications of evaluation consistency with the contemporaneous or refined economic growth measures. Since monthly *Survey of Current Business* by the Bureau of Economic Analysis started estimation of national economic growth, the contemporaneous measures of recent past economic growth have been available to the electorate. Meanwhile, the electorate also experiences current real economy in their day-to-day lives, which is indicated by the refined measures of economic growth,

although the refined measures become available a long time later. In the process in which the electorate forms their economic perceptions, they respond not only to the contemporaneous measures of recent past economic growth, but also the current real economy. But the current real economy holds larger effects over the economic perceptions of the electorate.

Regarding implications, there are at least two aspects. First is that it is not very wise to mix up the economy or the economic perceptions with the contemporaneous measures of economic growth, due to their relative weaker effects of over economic perceptions. Second, because of the relatively stronger effects of the real economy over the economic perceptions, “the reasoning voter” (Popkin 1994) theory is supported by more confidence found in this research. The uninformed electorate “successfully uses cues and information shortcuts” to form their economic perceptions “as if they were fully informed” (Bartels 1996).

Chapter 1

Research Question: Perceptions of Economy, Presidential Approval and Retrospective Voting

This chapter introduces the research questions of this dissertation. First, the importance of the research question is established in a discussion of the connection of economic conditions and economic perceptions to presidential approval ratings and the vote share of the in-party candidate in presidential elections. I then offer a theoretical framework linking the real economy to economic measures, economic perceptions, and both political attitudes and political behavior. The difference between the contemporaneous and refined measures of the economy is also introduced briefly.

There are several research questions in this dissertation. What or which economy matters? What picture of the economy does the electorate respond to in shaping their economic evaluations, their political attitudes, and their political behavior? Are their economic evaluations affected more by the picture of the economy painted by the contemporaneous measures of the economy or more by the real economy they experience and as later measured more accurately by the refined economic measures?

1. Economy, Political Attitudes and Political Behavior

Many previous studies have found a significant positive relationship between the electorate's perceptions of the condition of the economy and both the public's approval of the president and their division of the parties' shares of the popular vote (Campbell 2008, Lewis-Beck et al. 2008, Erikson et al. 2002, Brace and Hinckley 1992, Brody 1991, Lewis-Beck 1991, Edwards 1983, Fiorina 1981, Tufte 1978, and V.O. Key 1968). There is a consensus in these studies that economic performance affects presidential popularity and the vote share of the in-party candidates in presidential elections. Good evaluations on economic performance help to raise both presidential approval rate and the in-party vote share in presidential elections.

A. Economic Voting

According to democratic theorists (Key 1966, and Lippmann 1925), retrospective voting is one of the most important mechanisms of modern democratic accountability. Depending on retrospective voting, democracy can function in a healthy way, even when the electorate has only modest levels of information and sophistication. Compared to prospective voting, in which the electorate needs to know, evaluate, contrast the sometimes complicated or ambiguous positions of parties and candidates, retrospective voting poses less demanding requirements on the electorate. It requires them only to evaluate the in-party's job, and then decide to reward or punish the in-party in elections. On the one hand, when voters approve of the in-party's job performance well, they vote to maintain the in-party in office. On the other hand, when voters evaluate conditions to be unacceptable, they use their vote to kick the in-party out of power (Campbell et al. 2010, Campbell 2008, Lewis-Beck et al. 2008, Fiorina 1981, Tufte 1978, and V.O. Key 1968).

Since the economy is perennially of critical interest to voters, one of the most significant elements of retrospective voting is economic voting. There are strong positive relationships

between the economic performance and the electoral fortune of the in-party (Fair 2007 and 1996, Nadeau and Lewis-Beck 2001, Kietwiet and Udell 1998, Markus 1990 1989 and 1988, Tufte 1978, Stigler 1973, and Kramer 1971). The economic performance the electorate considers focuses primarily on what happened in the recent past. For instance, Fair (1978) finds that the economic conditions in the second quarter of the election year predict best the voting results of presidential elections.

Simply speaking, each four years the electorate is given the opportunity in the presidential election to evaluate the president's job performance on the economy, to attribute a prosperous or a poor economy to the administration, and to hold a referendum on the in-party.

B. Economic Influences on Presidential Approval

Beyond economic voting, modern presidential popularity polling provides "a continuing referendum on the president's public support" for the electorate, as Brace and Hinckley (1992) comment on presidential popularity polling. This is a referendum that is influenced by perceptions of how well the economy is doing.

The critical measure of a president's standing with the public is his job approval as measured by surveys of a nationally representative sample of adult registered voters or likely voters. The Gallup poll pioneered in modern presidential popularity polling. Gallup has asked a presidential approval question since 1938. In more recent years, a wide variety of polls ask a similar question about the president's job performance. The wording of the standard question is "Do you approve or disapprove of the way that [president's name] is handling his job as president?" *Presidential Approval* is usually defined as the percentage of all interviewees who indicate that they "approve" of the president's job performance.

Whether Americans approve of a president's job performance depends on whether they are satisfied with the basic conditions in the nation, including the health of the economy (Erikson et al. 2002, Brace and Hinckley 1992, Brody 1991, Edwards 1983, and Kernell 1977). Edwards (1983) finds a strong positive relationship between the public's evaluation of the president's current job performance concerning the economy and their approval of the president. Brody (1991) also finds that macroeconomic indicators can explain presidential popularity. Americans tend to approve of presidents who promote economic prosperity, and they disapprove of those who do not. The perceptions of economy "affect *Approval* within specific administrations." (Erikson et al., 2002: 44)

C. Economic Perceptions

Since the economy affects the presidential vote and the approval ratings of the president, it is important to understand how the economy exerts an impact on the electorate's political attitudes and political behaviors. Political scientists have investigated what goes on in the black box between the economy and the electorate's political attitudes and political behaviors. One of the questions political scientists have tried to answer is "What exactly are the economic outcomes to which voters respond?" (Kiewiet and Rivers 1984: 371). In analyzing economic voting and economic influences on presidential approval, many variables concerning the economy have been examined. In time series analysis at macro-level, they include real per capita income (Hibbing and Alford 1981, Tufte 1978 and 1975, and Bloom and Price 1975), unemployment (Brody 1991, and Fair 1978), inflation (Brody 1991, and Meltzer and Vellrath 1975) and the misery index (Brace and Hinckley 1992). "The misery index was initiated by economist Arthur Okun."⁶ It is the simple sum of the unemployment rate and the inflation rate, because both high unemployment rate and high inflation rate represent poor economic conditions. Most survey

⁶ US Misery Index, <http://www.miseryindex.us/>.

analyses at micro-level select variables about personal finance (Edwards 1983, Kiewiet 1983, Kinder and Kiewiet 1981 and 1979, Fiorina 1981 and 1978, Tufte 1978, Klorman 1978, and Wides 1976), and business conditions (Edwards 1983, Kiewiet 1983, and Kinder and Kiewiet 1981 and 1979).

Nevertheless, not all micro-level studies reach same strong findings of economic voting as macro-level ones (Kramer 1983). Kramer (1983) emphasizes two reasons in micro-level studies for that. First, change of personal finance is only partly connected with government performance. As a result, individuals' personal finance may misrepresent the impact of government performance. Second, individuals' economic perceptions may be biased by many other factors besides the economy, like their political standings. He concludes that "an aggregate-level time-series analysis will often yield reasonably good (if somewhat attenuated) estimates of the underlying individual-level effects of interest" (Kramer 1983: 92), based on his empirical comparison between macro-level studies and micro-level ones. To his advice, macro-level studies of economic effects are better choice than micro-level one for political scientists. Erikson (2004) reaches a similar conclusion. "Economic voting is best studied at the macro-level rather than the micro-level" (Erikson 2004: 0). Referring to their conclusions, this research also explores the black box between the economy and the electorate's political attitudes and political behaviors at macro-level to further our understandings of economic voting.

As one might expect, studies have found that the electorate's response to economic conditions depends on their perceptions of those conditions (Holbrook and Garand 1996, and Lewis-Beck 1988). Along these lines, when Lewis-Beck fails in finding evidence that personal finance has statistically significant main effects on legislative election results in six countries: Britain, France, Germany, Italy, Spain, and the United States, he turns to the electorate's

evaluations of the economy. Based on his study of the economy and elections in major western democracies, he concludes that voters respond to candidates and parties based on their economic perceptions, their “past assessments, both simple and complex, of national economic performance” (Lewis-Beck 1988: 50). When the electorate’s economic perceptions shift, the probability of voting for the in-party’s candidates also changes.

By the same token, the electorate’s response to economic outcomes in evaluating their approval or disapproval of a president’s job performance depends also on their perceptions of economic conditions. Erikson et al. (2002) produce evidence that good economic performance helps to raise levels of presidential popularity, whereas presidential popularity is hurt by poor economic performance. They conclude that presidential “approval is a function of” the electorate’s economic perceptions as they have “performed over several months” (Erikson et al. 2002: 44).

D. From Real Economy to Economic Perceptions

Though the real economy is the original object of the electorate’s economic perceptions, the electorate’s economic perceptions are not simple and perfect reflections of the real economy. For instance, Conover and Feldman (1986) distinguish economic voting on two dimensions: (1) cognitive and (2) affective dimensions, emphasizing “the emotional side of life” of the voters. On the one hand, many voters may behave like rational actors, recognizing the real economy as objectively as possible. On the other hand, many other voters are affected by their feelings, sentiments, and passions, when they form their economic perceptions. As a result, the perceptions of these voters may at times depart from the objective economic conditions. Lewis-Beck (1988) also finds that affective components block the procedure from economic reality to economic perceptions in economic voting.

There are many factors that affect how real economic conditions are perceived, including local economic conditions, personal finances, party identification, information costs, and uncertainty about economic performance. Voters' perceptions of economic conditions may be heavily influenced by what they experience and see in local economic conditions, in which they live, and in the sector of the economy with which they have routine contact (Anderson and Roy 2011, Campbell 2008, and Conover 1985). These may or may not be reflective of the whole national economic conditions. Stronger local and sectional economic conditions increase the voters' exposure to favorable economic observations, from which they gain more positive impressions of the economy; whereas poor local and sector economic conditions may lead voters to experience and observe weaker economic conditions, and form more negative impressions of the economy (Campbell 2008, and Conover 1985). Personal finances may also affect voters' economic perceptions directly and indirectly (Campbell 2008, Lewis-Beck 1988, and Edwards 1983). The impact of personal finances on voters' economic perceptions becomes more detectable, when voters' financial situations have changed (Lewis-Beck 1988). Partisanship also affects the economic perceptions. Republicans are more likely to have more positive evaluations of the economy than Democrats under Republican administration, whereas Democrats are more likely to have more positive evaluations of the economy than Republicans under Democrat presidents (Lewis-Beck et al. 2008, Abramson et al. 2007, and Popkin 1994).

When voters collect, process, analyze and evaluate information, it costs their time and energy. In order to reduce these costs, they turn to information shortcuts, such as political parties, others whose opinion they trust, and experts (Popkin 1994). All of these information shortcuts may cause variations in economic perceptions among voters. Voters may also process information from information shortcuts combining with what they learn from past experience,

day-to-day life, and the media, and then form their own economic perceptions. And referring to Kramer's (1983) study, voters' economic perceptions can also be studied pretty well at the macro-level even though information shortcuts and economic interests reside at the micro-level.

E. What are Economic Conditions?

One overlooked factor affecting economic perceptions is uncertainty about the actual condition of the economy. This voter uncertainty is reflected in the uncertainty in the actual statistical measurements of the economy. Even those whose job is to evaluate economic conditions, authorities like the Bureau of Economic Analysis (BEA), can only do so imperfectly.

When the BEA reports its estimate of economic conditions in an accurate and timely way, the accuracy of its measures is constrained by the availability of source data. "The source data used by BEA are often available only after some lag" (Bureau of Economic Analysis 2007: 14). But the BEA is required to provide immediate available estimates of the economy. In the BEA's practices in estimating the economy, there is a "tradeoff between estimates that are the most timely possible and estimates that are the most accurate possible" (Bureau of Economic Analysis 2009: 1-7). The longer the lagged time, the more reliable and accurate the data used by the BEA. Generally, as BEA contends, the later the estimation is released, "the better the data are in terms of coverage and detail" (Bureau of Economic Analysis 2007: 14), and the more accurate statistical measurements on the economy. As a consequence, the BEA revises its *National Income and Product Accounts (NIPA)* estimates of the economy constantly, when more reliable and more accurate statistical source data becomes available. Accordingly, the BEA continually releases and updates their *NIPA* estimates. The release of the estimates could be summarized into two categories as follows:

- Current quarterly estimates. The BEA releases the monthly, quarterly, and annual estimation in one quarter after a given period. At the end of each following month of a given quarter, the BEA releases “Advance,” “Preliminary” and “Final” quarterly estimates⁷.
- Comprehensive revisions. The BEA also conducts comprehensive revisions each year and each five years or so. Each summer, the BEA conducts annual comprehensive revision to re-estimate the economic conditions in the past three years. And five-year comprehensive revision covers the economy many years in the past.

Different estimates are built on different source data, and may describe different pictures of the economy. The estimates of the first category are “based on sample surveys” (Bureau of Economic Analysis 2007: 14). Most of “Advance” estimates refer to “previous trends and judgment” (Bureau of Economic Analysis 2009: 1-7). “Preliminary” and “Final” quarterly estimates take into account “new and revised data from the monthly surveys and other monthly and quarterly source data that have subsequently become available” (Bureau of Economic Analysis 2009: 1-7). At the same time, comprehensive revisions refer to censuses of economic activities, like the U.S. Economic Census (Bureau of Economic Analysis 2007: 14), which “provides a detailed portrait of the United States' economy once every five years, from the

⁷ When the BEA made changes on *NIPA*, or made five-year comprehensive revisions, the release schedule also was lagged for one or two, or at most three months. For example, for real GNP, the release is lagged one more month from the third quarter of 1959 to the first quarter of 1964, in the most time from fourth quarter of 1991 to the present, and lagged two months from the third quarter of 1995 to the second quarter of 1996, and lagged three months in the third quarter of 1996.

Since the fourth quarter of 1991, the BEA has released only “Preliminary” and “Final” quarterly estimates of real GNP of each quarter.

As a whole, however, the BEA released the quarterly estimation of real GNP from the second quarter of 1964 to the second quarter of 1991, and real GDP from the fourth quarter 1991 to the present according to this schedule.

Appendix I shows the estimates of GNP and GDP released by the BEA from Aug 1947 to Dec 2010.

national to the local level.”⁸ Annual revisions are “based on more extensive annual surveys, on annual data from other sources, and on later revisions to the monthly and quarterly source data” (Bureau of Economic Analysis 2009: 1-7). Finally, five-year comprehensive revisions “incorporate all of the best available source data, such as data from the quinquennial U.S. Economic Census” (Bureau of Economic Analysis 2009: 1-8). Regarding the estimates of the economic conditions of certain period, the available source data change quite a bit from “previous trends and judgment” (Bureau of Economic Analysis 2009: 1-7) to the U.S. Economic Census. Accordingly, the BEA’s continual revisions change the picture of economic conditions quite a bit from the economy as contemporarily measured with possibly flawed but current information to an improved estimate of the real economy measured much later with all the best available information. The BEA revised estimates also benefit from improved definition and methods (Bureau of Economic Analysis 2007). As a consequence, five-year comprehensive revision “estimates represent the most accurate and relevant picture of U.S. economic activity” (Bureau of Economic Analysis 2009: 1-8), which is closest to real economy.

When the electorate forms their impressions of the economy, both contemporaneous measures of economic estimates and real economy as measured by five-year comprehensive revision can become the electorate’s economic information sources. They may draw economic information directly or indirectly from the contemporaneous reports by the BEA in the process of forming their impressions of the economy. Or the electorate may form their own direct or indirect impressions of the real economy in their day-to-day lives. In this research, the contemporaneous measures of economy are presented by the average of all available

⁸ U.S. Census Bureau, User Guide. http://www.census.gov/econ/census07/www/user_guide.html

contemporaneous “Advance,” “Preliminary,” and “Final” current quarterly estimates⁹, though less accurate, may affect how people and the media talk about the economy at the time and that would plausibly affect perceptions of the economy. The later refined measures from comprehensive revisions, though not available at the time, should be more accurate reflective of the real economy that people were actually experiencing, and their experience may affect their perceptions of the economy. The most important is that the contemporaneous measures of economic growth “at any time particular time can differ substantially from” the refined measures, referring to Runkle’s (1998) comparison between them.

2. From the Real Economy to Economic Measures, to Economic Perceptions, and further to Political Attitudes and Political Behavior

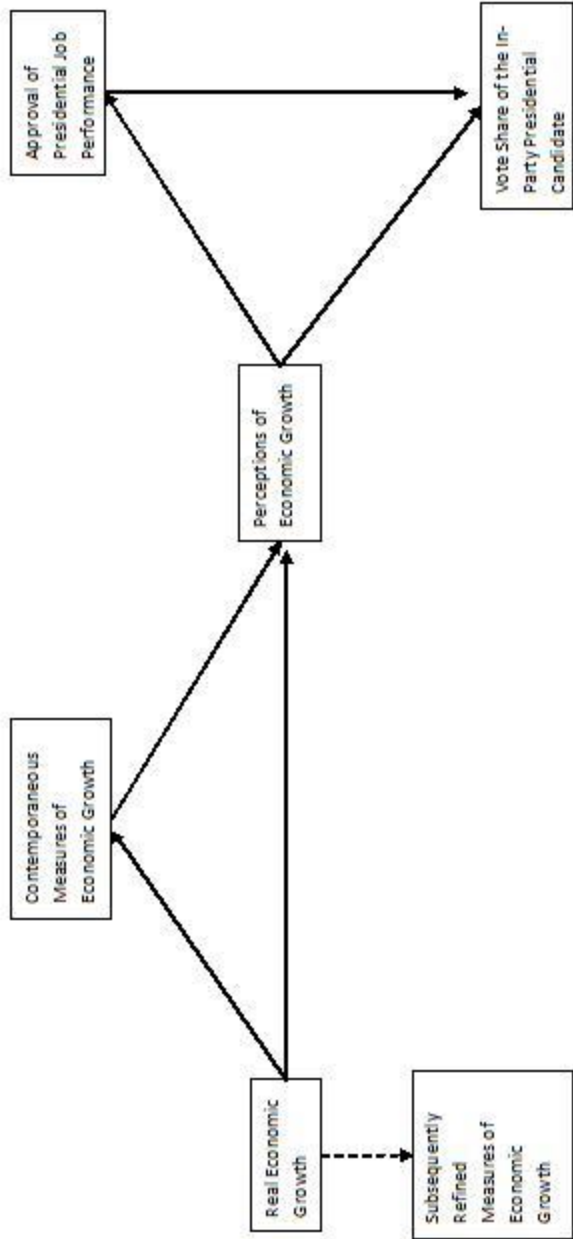
This uncertainty about the condition of the economy affects how the real economy is perceived by voters. The suspected relationships among the two readings of economic conditions and the electorate’s economic perceptions, and their political attitudes and behavior are described in Figure 1-1. The construction of the model is based on a good deal of study on presidential popularity and economic voting, especially in Lewis-Beck’s *Economics and Elections* (1988).

/Figure 1-1 about here/

Figure 1-1 is designed to explain a framework for understanding how the variables of (1) *Real Economic Growth*, (2) *Contemporaneous Measures of Economic Growth*, (3) *Refined Measures of Economic Growth*, (4) *Perceptions of Economic Growth*, (5) *Presidential Approval*

⁹ “Advance,” “Preliminary,” and “Final” quarterly estimates of real GNP are not available for each quarter. For example, after 1991, only “Preliminary,” and “Final” quarterly estimates of real GNP are available in most cases. For the releases of “Survey of Current Business” see Appendix I.

Figure 1-1. Contemporaneous and Refined Measures of Economic Growth Effects on Economic Perceptions and Political Evaluations



and (6) *Vote Share of the In-Party Presidential Candidate* are related to one another and their measurement. *Real Economic Growth* is the real world economic conditions as reflected in a vast array of economic decisions. A good economy usually means expansion of businesses, more employment opportunities, lower prices and interest rates, and more promotions; whereas in a bad economy voters witness contractions of businesses, fewer employment opportunities, higher prices and interest rates, fewer promotions, and lay-offs (Campbell 2008). *Real Economic Growth* is also often measured by the change of the market value of the goods and services produced by Americans or labor and property located in America in chained dollars of the period being examined.¹⁰ Excluding the unobserved *Real Economic Growth*, each of the other five variables has their own measurements. The measurements and data sources of all five variables in this research are listed in Table 1-1.

/Table 1-1 about here/

There are two key independent variables in this analysis: (1) *Contemporaneous Measures of Economic Growth*, and (2) *Refined Measures of Economic Growth*. They are both measures of the real level of growth in the economy. On the one side, *Contemporaneous Measures of Economic Growth* are the available statistical measures reported by the government shortly after the period being examined (usually several months later). This is as contemporary as the measures get. These are the measures which are the best available measures at the time that the

¹⁰ BEA. "A Guide to the National Income and Product Accounts of the United States"
<http://www.bea.gov/national/pdf/nipaguid.pdf>

Table 1-1. Measurements and Date Resources of Major Variables

<i>Variables</i>	<i>Measures</i>	<i>Data Sources</i>
Perceptions of the economy	Consumer Sentiment of University of Michigan	Economic Research, Federal Reserve Bank of St. Louis
Presidential Popularity	Approval Rates of Presidents	Public Opinion Archives, Roper Center
Vote for In-party's presidential candidate	Popular Vote of In-parties' Presidential Candidate	Dave Leip's Atlas of U.S. Presidential Elections
Contemporary Measures of Economic Growth	Average of "Advanced," "Preliminary," and "Final" Estimates of Annual Growth Rate of real GNP of Given Quarter or Half a Year	<i>Survey of Current Business</i> by Bureau of Economic Analysis (BEA)
Refined Measures of Economic Growth	Revision Estimates of Annual Growth Rate of real GNP of Given Quarter or Half a Year in Dec, 2010	National Economic Accounts in BEA

press, political commentators, and the most informed elements of the public may be forming evaluations of the economy. Due to the fact that real GNP is available from the third quarter of 1958 to the present, whereas real GDP has been estimated since the third quarter of 1991, real GNP growth rate has a much longer time span than real GDP rate. Because of the longer length of this data series, real GNP annual growth rate is employed in this analysis to measure economic growth. The contemporaneous measures of economic growth are measured by the average of all available contemporaneous “Advance,” “Preliminary,” and “Final” quarterly estimates of real GNP annual growth rate, which are collected from *Survey of Current Business* issued by the Bureau of Economic Analysis (BEA). At the end of each three month following the reference quarter, the BEA releases “Advance,” “Preliminary,” and “Final” quarterly estimates of the reference quarter’s economy based on “newly available monthly and quarterly data” in each monthly issue of *Survey of Current Business*. The original copies of *Survey of Current Business* before 1994 are collected from FRASER, St. Louis Fed¹¹, and the original copies of the *Survey of Current Business* after 1994 are collected from Survey of Current Business Online at the BEA¹². On the other side, more time, more sufficient statistical material, and improved statistical definitions and methods make it possible for government agencies to revise their statistics and release more accurate and improved economic measures years later, which is defined as *Refined Measures of Economic Growth*. While not available to anyone assessing economic conditions at the time, with the benefit of hindsight it better reflects the actual

¹¹ <http://fraser.stlouisfed.org/publications/SCB/>

Fraser also lists “Survey of Current Business. National Income and Product Accounts” in <http://fraser.stlouisfed.org/statereleases/nipa/>. However, I found at least three mistakes in their linkages, and sent emails to them to confirm their mistakes. For example, April 1974 is linked to a PDF file labeled April 1973, May 1967 is linked to a PDF file labeled April 1967, and October 1966 is linked to a PDF file labeled July 1966. All their mistakes finally were confirmed and corrected partially. As a result, I turned to original versions of “Survey of Current Business” (on <http://fraser.stlouisfed.org/publications/SCB/>) to collect all contemporary measures of real GNP from 1959 to 1991.

¹² http://www.bea.gov/scb/date_guide.asp

economic conditions that Americans were experiencing. Refined estimates of the economy are measured by refined estimates of real GNP growth rate. These are gathered are from *Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars* in the National Economic Accounts in the BEA, released on December 22, 2010.¹³ The percent change in GNP between two periods is annualized using the BEA's recommended formula.¹⁴ The BEA started to release their estimates of GNP in constant dollars without interruption in October 1959. Since this is an exploration of the difference between what was thought to be economic growth in a period and what was later determined to be a more accurate reading of that growth rate, data was excluded in which there was an insufficient time difference between the contemporaneous and refined measures. After comparing the contemporaneous and refined measures of GNP growth, it was determined that the last two years in the series had not been enough time for these to have been a significant difference between the two measures. As a result, the data of the last two years, 2009 and 2010, are not included in the analysis. In this research, the data of real GNP of each quarter covers from the third quarter of 1958 to the fourth quarter of 2008¹⁵.

¹³

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

¹⁴ Percentage changes in real GNP are calculated at annual rates as a formula designed by the BEA as follows:

$$r = \left(\left(\frac{GNP_t}{GNP_0} \right)^{m/n} - 1 \right) * 100 \text{ or } r = \left(\left(\frac{GDP_t}{GDP_0} \right)^{m/n} - 1 \right) * 100$$

where

r is the percent change at an annual rate;

GNP_t or GDP_t is the level of activity in the later period;

GNP_0 or GDP_0 is the level of activity in the earlier period;

m is the periodicity of the data; and

n is the number of periods between the earlier and later periods (that is, $t-0$).

¹⁵ In this time span, the BEA did not make any contemporaneous estimates on real GNP of the fourth quarter of 1958. As a consequence, when I compare contemporaneous and refined measures of real GNP of this time span, contemporaneous measures have one case less than refined ones.

The principle dependent variable in this analysis is economic perceptions. This variable measures the electorate's evaluation of how the economy is going. In their general impression, they may well feel satisfied or unsatisfied with the way the economy is going. It is measured by Consumer Sentiment of University of Michigan (from 1950 to present). The Survey Research Center at University of Michigan calls "a sample of about 500 households" and "asks a series of questions about current and expected economic conditions" (Doms and Morin, 2004: 6). Consumer sentiment index is calculated by computing averages of responses to their questions. The other two dependent variables are the president's popularity and the vote share of in-party candidate in presidential elections. The electorate's collective evaluation of the president is labeled *Presidential Approval* (Erikson et al. 2002). The Public Opinion Archives of the Roper Center¹⁶ provided the data of presidential approval rates. The *Vote Share of the In-Party Presidential Candidate* is the percentage of the electorate voting for the in-party's candidate in presidential elections. The vote data are drawn from Dave Leip's Atlas of U.S. Presidential Elections¹⁷.

In Figure 1-1, the starting point in the framework is the real economy that the electorate is experiencing. Both contemporaneous economic measures and refined economic measures attempt to measure real economic growth, although different available data, definitions, and methods may produce differences between the two groups of measures. As the BEA observes, it is more likely for the contemporaneous economic measures than the refined economic measures to deviate more from the real economy. As noted, the contemporaneous measures are based on relatively poorer information and understandings of the economic activities of that time. The electorate experiences the real economy in their day-to-day lives and observations of how others

¹⁶ http://webapps.ropercenter.uconn.edu/CFIDE/roper/presidential/webroot/presidential_rating_search.cfm

¹⁷ <http://uselectionatlas.org/>

whom they know are affected by the economy. Their direct or indirect experience in the real economy is one of the information sources they respond to in the process of forming their economic perceptions. At the same time, they can also draw economic information directly or indirectly from contemporaneous reports on the recent past economy by the BEA to form their economic perceptions. Presumably, news coverage of the economy and the informal social communication about economic conditions are strongly shaped by the contemporaneous economic measures of the recent past released at that time, the official word at the time as to how the economy is doing. The electorate may respond to either the real economy at that time or the contemporaneous economic measures of the recent past released at that time in the process of forming their economic perceptions. Furthermore, once the electorate forms their economic perceptions about how the economy is going, these influence their evaluations of the economic performance and general performance of the administration. As a consequence, when their economic perceptions are satisfactory, they may be more likely to approve of the president or vote for the in-party's presidential candidate in the presidential election. By the same token, if they are disappointed with the economy, they may be more likely to disapprove of the president or vote against the in-party's candidate in the presidential election.

The central question of this analysis is which "economy" has a greater impact on important economic perceptions. Is it the economy as measured by the contemporaneous economic measures or as measured by the refined economic measures? Is the electorate responding to the economy as the contemporaneous experts at that time describe it to be? Is the electorate responding to economic conditions as later experts were able to determine it more accurately to have been? If both economic measures affect Americans' perceptions of the economy, which one is more significant? Or do both influence perceptions equally?

The question is important, because the version of the “real economy” that influences perceptions indirectly affects presidential approval rates and the vote share of in-party’s candidate in presidential election through those economic perceptions.¹⁸ In implication, many presidential election forecasting models (Abramowitz 2004, Campbell 2004, Holbrook 2004, Lockerbie 2004, and Lewis-Beck and Tien 2004) employ contemporaneous measures of economic growth rate as one of the major references, when refined measures are not available. And politicians and campaign strategists design their campaign strategies referring also to contemporaneous measures of economic growth, when refined measures are not available at that time. When the contemporaneous measures of the economy are helpful to their party, they prefer to make more effective and efficient campaign effort; otherwise, they may choose to retire from the politicians’ career or stand away from the elections (Jacobson and Kernell 1982). The answers to the above questions are meaningful for us to evaluate these implications correctly.

¹⁸ Preliminary empirical analyses suggest that, as the model in Figure 1-1 indicates, (1) economic perceptions of the electorate influence presidential approval rates and the vote share of in-party’s candidate in presidential elections, and (2) once economic perceptions are taken into account, neither the contemporaneous nor the refined measures of the real economy directly affects presidential approval rate and the vote share of in-party’s candidate in presidential elections.

Chapter 2

The Contemporaneous and Refined Measures of Economic Growth

There are four missions for this chapter. The first and the second are to provide background knowledge on the contemporaneous and refined measures of economic growth by the BEA, like their release schedule and estimation sources. The third purpose is to explore the difference between the contemporaneous and refined measures of economic growth and correlation between them. The fourth mission is to present a set of three hypotheses about the nature of the suspected effects of the contemporaneous economic measures and the real economy as measured by the refined economic measures on economic perceptions.

1. The Contemporaneous Measures of Economic Growth

The Great Depression in the early 1930s initiated the demand for comprehensive measures on national economy. Beginning in 1934 the Department of Commerce published *National Income, 1929-32*. In order to satisfy the demand for such measures caused by wartime planning during WWII, annual estimates of gross national product (GNP) were formulated in 1942. In July 1947, the *Survey of Current Business* was published. It published economic estimates in current dollars,

including quarterly GNP. In 1951, real GNP became available by calculating it based on fixed prices of a certain year. Not until 1958 did the *Survey of Current Business* show quarterly estimates of real GNP. The *Survey of Current Business* presented quarterly estimates of real GNP consecutively since the second quarter of 1959. In 1991, GDP replaced GNP as one of the featured measures of American national economic growth, though the BEA still releases quarterly estimates of real GNP in the *Survey of Current Business*.¹⁹

Generally speaking, on the end of each of successive three months following a given quarter, since 1964 the BEA has released “Advance,” “Preliminary” and “Final” quarterly estimates of real GNP or GDP of the recent past quarter. In 1959 when the *Survey of Current Business* established its estimates in constant dollars, they estimated quarterly real GNP of the recent past quarter for only once in each quarter. From 1960 to 1964, the *Survey of Current Business* revised quarter GNP in constant dollars only once in addition to the first estimate. The release of real GNP is lagged one more month from the third quarter of 1959 to the first quarter of 1964. For example, the “Advance,” “Preliminary” and “Final” quarterly estimates of real GNP of the third quarter of 1963 were released in November 1963, December 1963, and January 1964. And the release of real GDP is lagged one more month from the third quarter of 1995 to the present. For example, the “Advance,” “Preliminary” and “Final” quarterly estimates of real GDP of the first quarter of 1997 were released in May 1997, June 1997, and July 1997. When the BEA made changes to the *National Income and Product Accounts (NIPA)*, or made their comprehensive revisions, the release schedule may be lagged more months. For example, on November and December 1995 when the BEA made a comprehensive review 1955-1995, the issues of the *Survey of Current Business* on these two months were merged in one issue, and the

¹⁹ Bureau of Economic Analysis. “A Guide to the National Income and Product Accounts of the United States”
<http://www.bea.gov/national/pdf/nipaguid.pdf>

Survey of Current Business was not published on February 1996. As result, the “Advance,” and “Final” quarterly estimates of real GDP of the fourth quarter of 1995 were release on March 1996, and April 1996, two more months lagged than general schedule. And since the fourth quarter of 1991, the BEA has released only “Preliminary” and “Final” quarterly estimates of real GNP in the most recent past quarter. In general, the BEA released the quarterly estimates of real GNP from the second quarter of 1964 to the second quarter of 1991, and real GDP from the fourth quarter 1991 to the present at the end of each successive three months of a given quarter as “Advance,” “Preliminary” and “Final” quarterly estimates of real GNP or GDP of the recent past quarter are released in the *Survey of Current Business*. Appendix I shows the release schedules of the estimates of GNP and GDP by the BEA from August 1947 to December 2010.

Since the BEA began collecting and reporting economic data, they have worked to improve their estimates of the economy. For example, with the help from the IBM corporation, the BEA adopted quality-adjusted price indexes for statistics on computers and peripheral equipment, because booming new products in these fields change their quality and prices very fast. As a consequence, the accuracy of the BEA’s estimates of the economy has also been improved compared to half a century ago.

As noted above, there are three successive reports of the contemporaneous measures of economic growth by the BEA. The “Advance” measure is released on the end of the first month following a given quarter, the “Preliminary” measure becomes available on the end of the second month following a given quarter, and the “Final” measure is released on the end of the third month following a given quarter. Three successive contemporaneous measures make up together the economic picture as the contemporaneous expert can tell the electorate at that time. The overall contemporaneous impression would be best captured by the average of the three releases.

I average the estimates of real GNP of each quarter from 1959 to 2008 as the contemporaneous measures of economic growth²⁰. It is presented in Figure 2-1.

/Figure 2-1 about here/

The highest estimate of the contemporaneous measures of real GNP growth rate is about 12%, and the lowest estimate is about -11%. The highest mark was in the third quarter of 1975, and the lowest point of real GNP growth was in the first quarter of 1975. And after the early 1980s the measured growth has been less volatile, normally just from -1% to 8%. Compared with “Business Cycle Reference Dates” by the National Bureau of Economic Research (NBER) in Table 2-1, Figure 2-1 reflects all recessions correctly from 1959 to 2008. It is easy to find that during all recession period listed in Table 2-1, the contemporaneous estimates of real GNP growth rates are below zero.

/Table 2-1 about here/

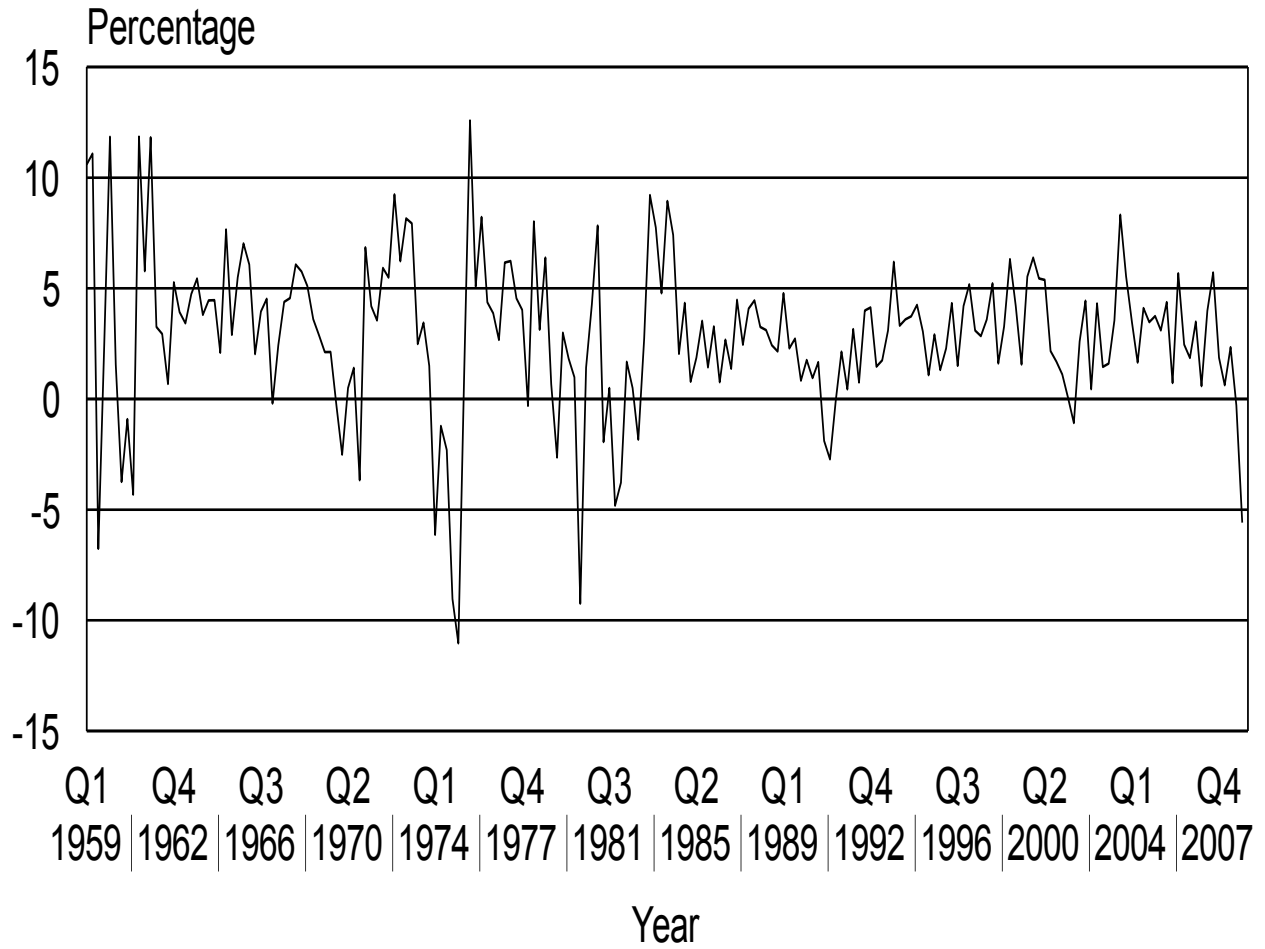
As a whole, the contemporaneous estimates of real GNP growth rate do not conflict with NBER’s accounts of recession from 1959 to 2008. At least the contemporaneous estimates of real GNP growth rate present recessions when recessions happened.

2. The Refined Measures of Economic Growth

²⁰ Due to the fact that real GNP is available from the third quarter of 1958 to the present, whereas real GDP has been estimated since the third quarter of 1991, real GNP growth rate has a much longer time span than real GDP rate.

After comparing the contemporaneous and refined measures of GNP growth, it was determined that the years after 2008 in the series had not allowed enough time for these to be significant difference between the two measures. As a result, the data of the years after 2008 were dropped from the analysis.

Figure 2-1 Contemporaneous Measures of Real GNP Growth Rate 1959-2008



— Contemporaneous Measures of Real GNP Growth Rate

Table 2-1. US Business Cycles Expansions and Contractions 1959-2008

BUSINESS CYCLE REFERENCE DATES	
Peak	Trough
April 1960(II)	February 1961 (I)
December 1969(IV)	November 1970 (IV)
November 1973(IV)	March 1975 (I)
January 1980(I)	July 1980 (III)
July 1981(III)	November 1982 (IV)
July 1990(III)	March 1991(I)
March 2001(I)	November 2001 (IV)
December 2007 (IV)	June 2009 (II)

Source: the National Bureau of Economic Research <http://www.nber.org/cycles.html>

Notes: Recession start at the peak of a business cycle, and end at the trough.

Besides the contemporaneous estimates of national economy, periodical reviews of the economic measures are also produced to deal with “the complexity and scope of the accounts to more accurately portray the U.S. economy.”²¹ As the BEA makes introduction on their economic measures, “there is a constant tradeoff between quality and timing” (Bureau of Economic Analysis 2007: 14). Earlier releases are of poorer statistical quality and a poorer level of accuracy. Later revisions are of higher quality and greater accuracy. Some users of the data desires “frequent and immediately available estimates,” while others are more interested in a more accurate and “consistent, long-term time series” (Bureau of Economic Analysis 2009: 1-7). In order to satisfy both, the BEA releases current quarterly estimates (the contemporaneous measures) for the former, and annual revisions, especially comprehensive revisions (the refined measures) for the latter. Table 2-2 shows the releases and data sources of National Income and Product Accounts (NIPA). Because current quarterly estimates refer to projections or sample surveys, it is difficult for them to describe the economy very correctly, although they provide the timely economic information to the public. On the contrary, each five-year comprehensive revision is the most accurate depiction of national economy, and the closest to the real economy, since it is based on a set of censuses. As a consequence, five-year comprehensive revision is selected to represent the real economy.

/Table 2-2 about here/

The comprehensive revisions are gathered from *Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained*

²¹ Bureau of Economic Analysis. “A Guide to the National Income and Product Accounts of the United States”
<http://www.bea.gov/national/pdf/nipaguid.pdf>

Table 2-2. National Income and Product Accounts (NIPA) Releases and Data Sources

<i>Releases</i>		<i>Release Schedule</i>	<i>Time Covers</i>	<i>Data Sources</i>
Current Quarterly Estimates	“Advance”	The end of the month that follows the close of the reference quarter	The reference quarter	BEA projections
	“Preliminary”	The end of the second month that follows the close of the reference quarter	The reference quarter	Data from Census Bureau monthly surveys based on sample surveys, but the source data, especially the data for the third month of the quarter needs further revision.
	“Final”	The end of the third month that follows the close of the reference quarter	The reference quarter	Data from Census Bureau monthly surveys based on sample surveys, incorporated with “revisions on the third month of the quarter and newly available quarterly source data for some components” (BEA 2009: 3-7)
Comprehensive Revisions	Annual revisions	July of each year	The months and quarters of the most recent calendar year and the preceding years	(1) Annual surveys by Census Bureau, (2) tabulations of income tax returns by Internal Revenue Service, (3) tabulations of employment and wage information by Bureau of Labor Statistics
	Comprehensive revisions	Every five years	Extend back for many years	(1) Benchmark input-output accounts by Bureau of Economic Analysis, (2) Economic census by Census Bureau, (3) Census of governments by Census Bureau

Sources: BEA (2009). “Concepts and Methods of the U.S. National Income and Product Accounts.” (Chapter 1-5) <http://www.bea.gov/national/pdf/NIPAhandbookch1-4.pdf>

Dollars in the National Economic Accounts in the BEA, which was released on December 22, 2010.

The refined measures of real GNP growth rate of each quarter from 1959 to 2008 are presented in Figure 2-2. The rates reach the highest point about 16%, and the lowest point about -8%. Their change extent also narrowed after mid-1980s. There is little conflict between the data in Figure 2-2 and Table 2-1. When the estimates of real GNP growth rate drop below zero in Figure 2-2, the NBER shows that recession was occurring in Table 2-1.

/Figure 2-2 about here/

3. The Differences between the Contemporaneous and the Refined Measures

In order to compare the contemporaneous and refined measures directly, I merge Figure 2-1 and Figure 2-2 together in Figure 2-3. In Figure 2-3, the dotted line represents the contemporaneous measures of real GNP growth rate of each quarter from 1959 to 2008, and the real line represents the refined measures. Two lines show us a view of jigsaw. It is not easy to define one is generally higher than the other, although some of more significant differences happened in specific years, especially when the economic growth rate reached the highest or lowest points.

/Figure 2-3 about here/

Then I turn to basic descriptive statistics of the contemporaneous and refined measures of real GNP growth rate. The distribution of quarterly and semi-annual real GNP growth rate from

Figure 2-2. Refined Measures of Real GNP Growth Rate 1959-2008

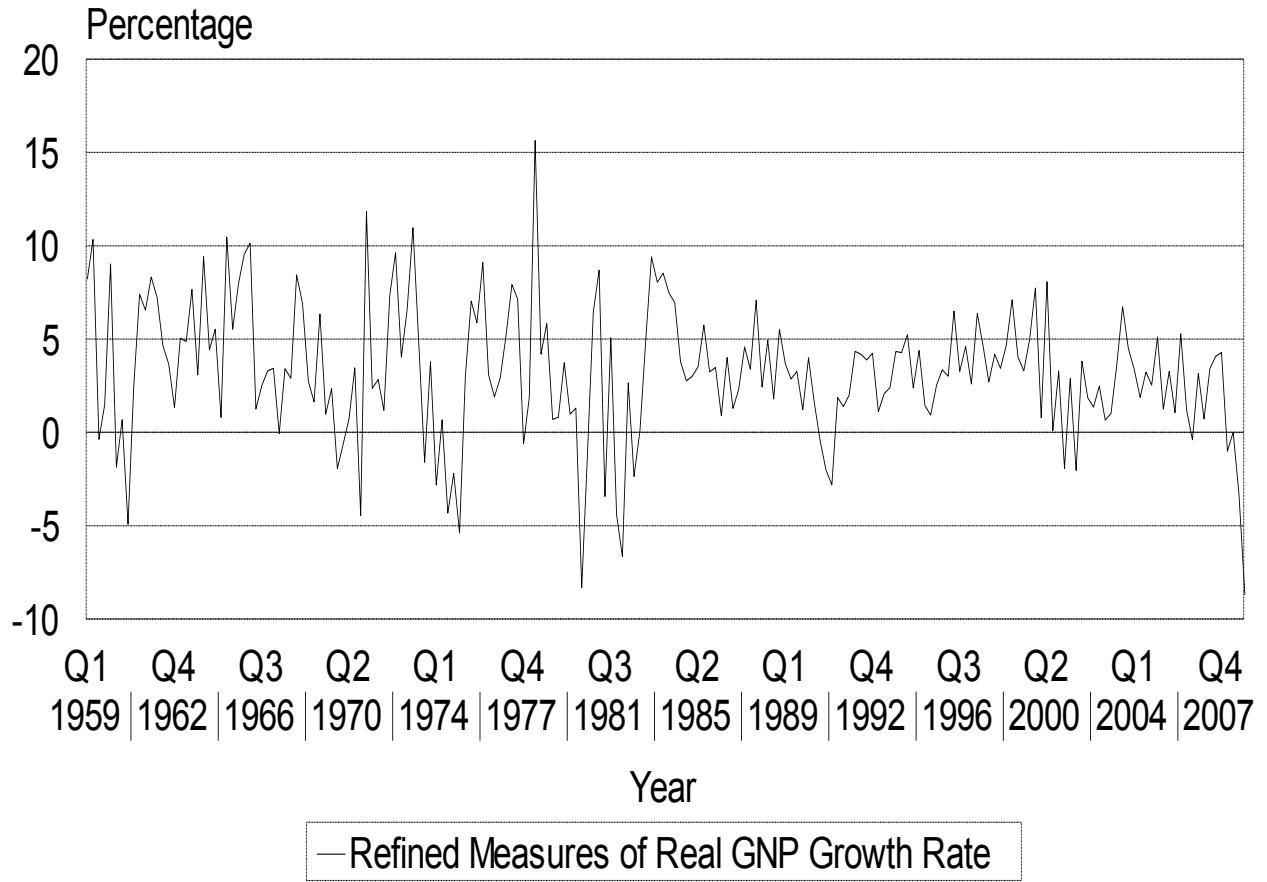
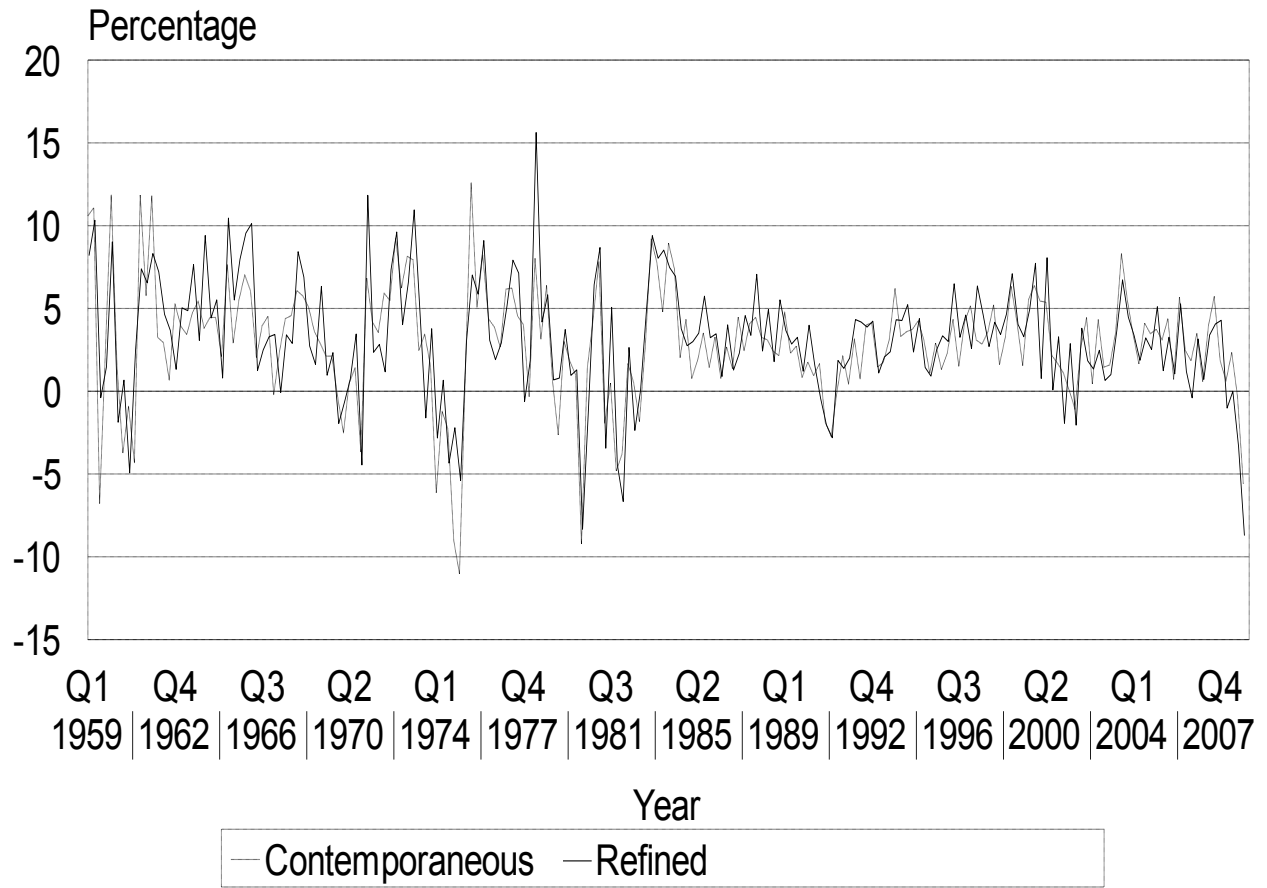


Figure 2-3. Contemporaneous and Refined Measures of Real GNP Growth Rate 1959-2008



1959 to 2008 is shown in Table 2-3. There are 200 cases of quarterly real GNP growth rate, and 100 cases of semi-annual real GNP growth rate. The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. But the BEA did not estimate real GNP for the fourth quarter of 1958 in their *Survey of Current Business*. The contemporaneous measures of real GNP growth rate of each half year became available in the first half year of 1959. As a result, basic descriptive statistics of the contemporaneous and refined measures of real GNP growth rate starts in the year of 1959.

/Table 2-3 about here/

On average, compared to the contemporaneous measures, the refined measures of economic growth indicate somewhat greater growth. The refined measures' means of both quarterly and semi-annual real GNP growth rate are over one third of percentage point greater than those in the contemporaneous measures. A comparison of the medians of the two measures confirms the more optimistic reading of the refined measures. In 54.5% of the quarters (109/200) the refined measures describe the economy more positive than the contemporary measures. And in 58% of the semi-annual cases (58/100) the refined measures indicate a better picture of the economy than the contemporaneous measures.

In order to further compare the contemporaneous and the refined measures of real GNP growth rate, the differences between them are calculated by the contemporaneous measures minus the refined measures. I plot the differences between the contemporaneous and the refined measures of real GNP growth rate in Figure 2-4. As a whole, the differences appear to be more negative. The refined measures must be higher than the contemporaneous measures. It coincides

Descriptive Statistics	Timing of GNP Growth Measurement			
	Contemporaneous Measurements of Real GNP Growth		Refined Measurements of Real GNP Growth	
	Quarterly	Semi-Annual	Quarterly	Semi-Annual
Mean	2.93	2.93	3.30	3.27
Median	3.10	3.24	3.35	3.28
Standard Deviation	3.56	2.99	3.64	2.91
Minimum	-11.04 (Q1 1975)	-5.55 (Q3-4 1974)	-8.63 (Q4 2008)	-5.98 (Q3-4 2008)
Maximum	12.59 (Q3 1975)	10.49 (Q1-2 1959)	15.71 (Q2 1978)	9.34 (Q1-2 1959)
N	200	100	200	100

SOURCE: Original GNP is from *Survey of Current Business* by Bureau of Economic Analysis (BEA). *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

Note: There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

with the fact that the refined measures describe the economy more positive than the contemporary measures do. And after mid-1980s, the change of the differences also narrowed.

/Figure 2-4 about here/

The descriptive statistics of the difference between the contemporaneous and the refined measures of real GNP growth rate are presented in Table 2-4. As a whole, the differences of quarterly growth rate are distributed much wider and higher than those of semi-annual growth rate. That is, as one would expect, there is greater volatility in the quarterly data than in the semi-annual data. While half of cases (50/100) of the differences of semi-annual growth rates are located in a narrow span (from -1% to 1%), only about one third cases (34.5% or 69/200) of the differences of quarterly growth rates are in this narrow span of only minor differences (from -1% to 1%). These are differences that are probably too small to make a difference in the perceptions of the electorate.

/Table 2-4 about here/

As Table 2-4 suggests, though there are differences between the contemporaneous and the refined measures of economic growth, in many cases these differences are small and probably would go unnoticed by observers, including voters. If the two measures essentially track each other, then we may not be able to determine the extent to which perceptions of the economy are built around the contemporaneous reports of it (which are often fairly accurate as the frequency

Figure 2-4. The Difference between Contemporaneous and Refined Measures of Real GNP Growth Rate (Contemporaneous Measures – Refined Measures) 1959-2008

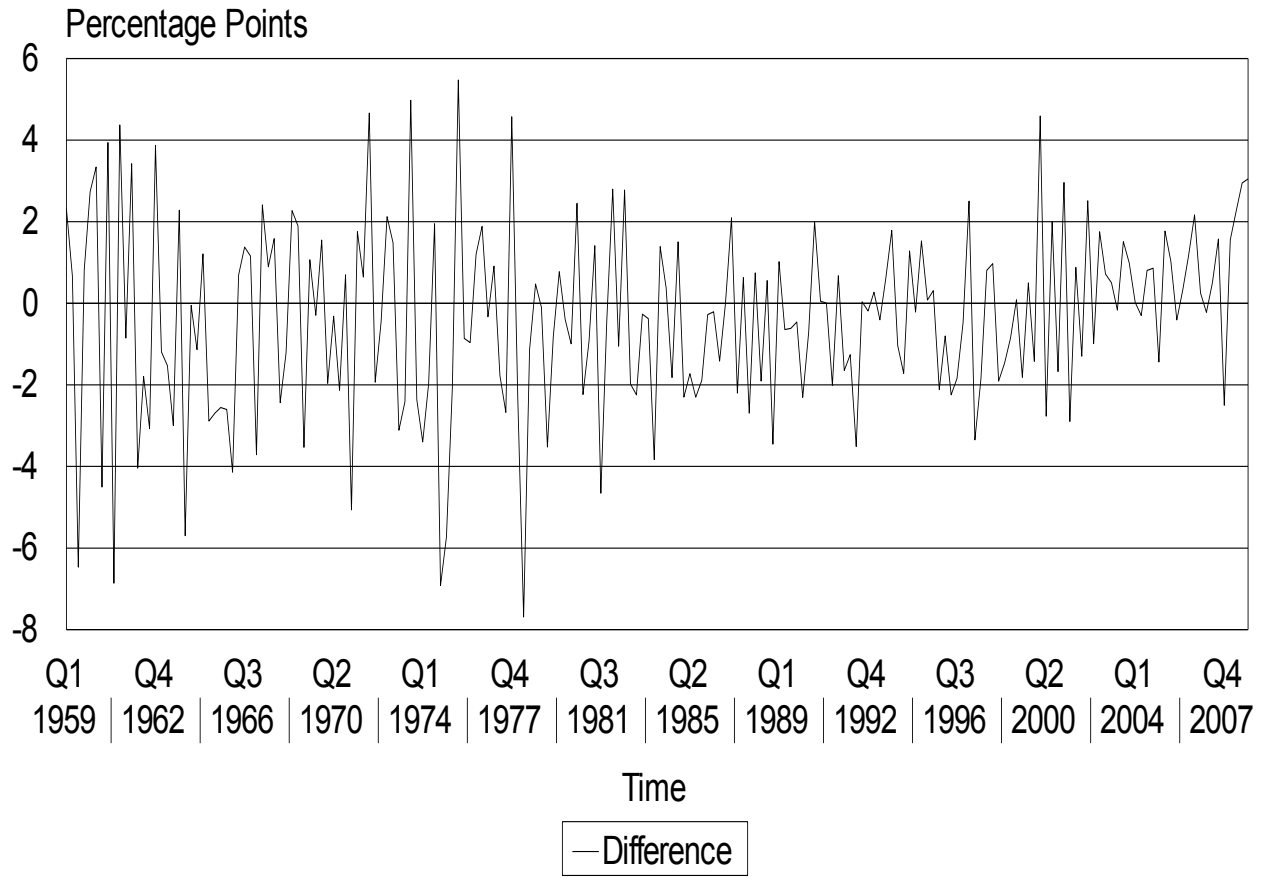


Table 2-4. The Difference Between Contemporaneous and Refined GNP Growth Measures. 1959-2008		
Difference between Contemporaneous and Refined Economic Measures		
Percentage Point Difference between Measures	Time Span of Measurements	
	Quarterly Change	Semi-Annual Change
More than 3 percent	11 (5.5%)	1 (1.0%)
2 to 3 percent	17 (8.5%)	3 (3.0%)
1 to 2 percent	27 (13.5%)	14 (14.0%)
-1 to 1 percent	69 (34.5%)	50 (50.0%)
-2 to -1 percent	30 (15.0%)	17 (17.0%)
-3 to -2 percent	25 (12.5%)	11 (11.0%)
Less than -3 percent	21 (10.5%)	4 (4.0%)
N	200	100
Case Number of Two Percentage Points Plus Absolute Difference	74 (37.0%)	19 (19.0%)
Mean Absolute Difference	1.85	1.16
Median Absolute Difference	1.58	0.99
Standard Deviation of Difference (not absolute)	2.32	1.45
Largest Absolute Difference	7.21 (Q1 1961)	4.73 (Q1-2 1978)

SOURCE: Original GNP is from *Survey of Current Business* by Bureau of Economic Analysis (BEA). *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

Note: There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

of small differences suggests) or around the real economic conditions as later assessed by the refined measures.

In order to further clarify the differences between two measures, it is better to examine the correlation between the contemporaneous and the refined measures of real GNP growth rate. Table 2-5 lists the correlation between the contemporaneous and the refined measures of real GNP growth rate. The correlation of the quarterly contemporaneous and refined GNP measures is 0.79. The correlation of the semi-annual contemporaneous and refined GNP measures is 0.88. Neither correlation equals one, but both are very strongly positive. Two sets of measures are highly correlated. But there are substantial differences in many cases between the contemporaneous and the refined measures of real GNP growth rate. And there are more differences between the contemporaneous and the refined measures of quarterly annual growth rate than those of semi-annual growth rate.

/Table 2-5 about here/

There exists difference between the contemporaneous and the refined measures of real GNP annual growth rate.

In cases with small differences, the contemporaneous and the refined measures of real GNP growth rate may not cause distinct economic perceptions. But in cases with large differences between the contemporaneous and the refined measures, it is quite plausible that observers would form different perceptions of the economy.

While a difference of one percentage point or less between economic readings may be considered as small as to not register with observers as a real difference, we assume that a

Table 2-5. First-Order Autocorrelation between Contemporaneous and Refined Measures of Real GNP Growth Rate, 1959-2008

First-Order Autocorrelation of Real GNP Growth Rate	
Quarterly	0.79
Semi-Annual	0.88

SOURCE: Original GNP is from *Survey of Current Business* by Bureau of Economic Analysis (BEA). *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

Note: There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

difference in measures of two percentage points or more is a notable difference, one large enough that it might lead to different perceptions of the economy. For example, if the contemporaneous measures indicate that the real GNP increased at an annual rate of 1.8%, it is often commented upon as a poor economic performance. If, however, there is exactly a difference of two percentage points between the contemporaneous and the refined measures, the real economy during that period might have grown at 3.8% rate. An economy growing at 3.8% is generally considered satisfactory to be good. The difference of two percentage points may lead to very different evaluations of the economy.

Using the two-percentage point assumption, the cases with difference over two percentage points are selected out from the third quarter of 1958 to the fourth quarter of 1959. There are only 19% of semi-annual real GNP growth rate (19/100) cases, whose absolute difference goes beyond two percentage points. But among cases of quarterly real GNP growth rate, there are 36.8% of all cases (74/201) whose absolute difference between the contemporaneous and the refined measures is beyond two percentage points. The mean of the absolute differences of quarterly growth rate is 1.84, close to two percentage points, which may be big enough to make difference between the contemporaneous and the refined measures.

Considering extreme cases, the largest absolute difference of quarterly GNP growth rate is 7.21 percentage points, much bigger than that of semi-annual growth rate, 4.73 percentage points. Meanwhile, the period when the largest absolute difference happened in two measures occurred at the same time (the second quarter of 1978 and the first half year of 1978). To sum up, distribution of difference between two measures shows that there are a certain number of cases qualified to be analyzed in this research (74 cases of quarterly increase rate and 19 cases of semi-annual growth rate in which the difference between the contemporaneous and the refined

measures of real GNP growth rate goes beyond two percentage points). Difference between contemporaneous and refined measures of real GNP growth rate indeed exists from 1958 to 2008.

4. Hypotheses

The central question of this research is which “economy” has a greater impact on important economic perceptions. Is it the economy as measured by the contemporaneous economic measures or as measured by the refined economic measures? Is the electorate responding to the economy as the contemporaneous experts at that time describe it to be? Or is the electorate responding to economic conditions as later experts were able to determine it more accurately to have been? If both economic measures affect Americans’ perceptions of the economy, which one is more significant? Or, do they influence perceptions equally?

In order to answer the above questions, three hypotheses are established to test the effects of the economy as measured with probably flawed but the contemporaneous information and the real economy measured later with improved information on the electorate’s economic perceptions. Since the measures of the economy do not have a direct effect on presidential approval rate or the vote share of in-party’s candidate in presidential elections, and the effect of the economy is entirely through economic perceptions as Figure 1-1 indicates, in this research dependent variable focuses on the electorate’s economic perceptions. The three hypotheses concerning perceptions of the economy are listed as follows:

H1: Economic growth as estimated by the contemporaneous measures of real GNP change²², positively affects aggregate perceptions of the economy.

H2: Economic growth as measured by the refined measures of real GNP change, positively affects aggregate perceptions of the economy.

²² GDP is not used, because it does not go back far enough (only from 1991 to the present).

H3: The refined measures of economic growth have a greater impact on aggregate economic perceptions than the contemporaneous measures of economic growth.

The preliminary analyses in this chapter present that the contemporaneous and the refined measures of real GNP growth rate are really different, although they are also highly correlated. And in concrete quarters or half years, they sometimes have big differences. Since they are different economic variables, it is possible that they have distinct effects on the electorate's economic perceptions, political attitudes and political behavior. The next chapters clarify these distinct effects by further comparison and analyses.

Chapter 3

Perceptions of the Economy

Perceptions of the economy are a critical intervening consideration between the real economic conditions and their impact on the electorate's political attitudes and behavior. This chapter first introduces the measurement of economic perceptions. The measurement used here is *The Index of Consumer Sentiment* released by the Survey Research Center of University of Michigan. I then present basic descriptive statistics of consumer sentiment. Third, before the analysis moves on to consumer sentiment's correlation with the contemporaneous and the refined measures of real GNP growth rate, I discuss the appropriate time lag for the electorate to draw economic information from the contemporaneous economic measures and the real economy. We should not expect economic activities or reports to have an instantaneous effect on public perceptions and evaluations. Four, I examine consumer sentiment's correlation with the contemporaneous and the refined measures of real GNP growth rate. Finally, simple empirical analyses demonstrate the effects of the contemporaneous and the refined measures of economic growth and economic perceptions on presidential approval rates and the vote share of in-party's candidate in presidential elections.

1. Economic Perceptions and Consumer Sentiment

Economic Perceptions measure the electorate's evaluation of how the economy is going. In their general impression, the public may well feel satisfied or dissatisfied with economy. The two most popular measures of economic perceptions are University of Michigan's *The Index of Consumer Sentiment* and the Conference Board's *Consumer Confidence Index*. Since *The Index of Consumer Sentiment* has been available since 1952, while the *Consumer Confidence Index* has been available only since 1977, *The Index of Consumer Sentiment* is adopted here to measure economic perceptions.

University of Michigan designed *The Index of Consumer Sentiment* in 1940. From 1953 to 1956, and in 1958, it was released three times every year, normally in February, May, and November. In 1957 and 1959, it was released for twice each year, in May and November.²³ And from 1960 to 1977, the Survey Research Center at University of Michigan released the quarterly index in the middle of every quarter. Since 1978, the index has been available monthly (FRED: ECONOMIC DATA).

The Index of Consumer Sentiment is based on a survey operated by the Survey Research Center at the University of Michigan. They make telephone calls to "a sample of about 500 households" and "asks a series of questions about current and expected economic conditions" (Doms and Morin, 2004: 6). Table 3-1 lists all questions they asked interviewees. All these questions cover both personal finance and the overall economy. The Survey Research Center calculates the aggregate index by computing averages of responses to the individual questions.

²³ FRED: ECONOMIC DATA <http://research.stlouisfed.org/fred2/series/UMCSENT/>

/Table 3-1 about here/

2. Descriptive Statistics of Consumer Sentiment

In order to match the separating economic data, the monthly *Index of Consumer Sentiment* since 1978 is averaged over a quarter to produce a quarterly index. I plot quarterly *Consumer Sentiment* from the fourth quarter of 1959 to the fourth quarter of 2008 in Figure 3-1.

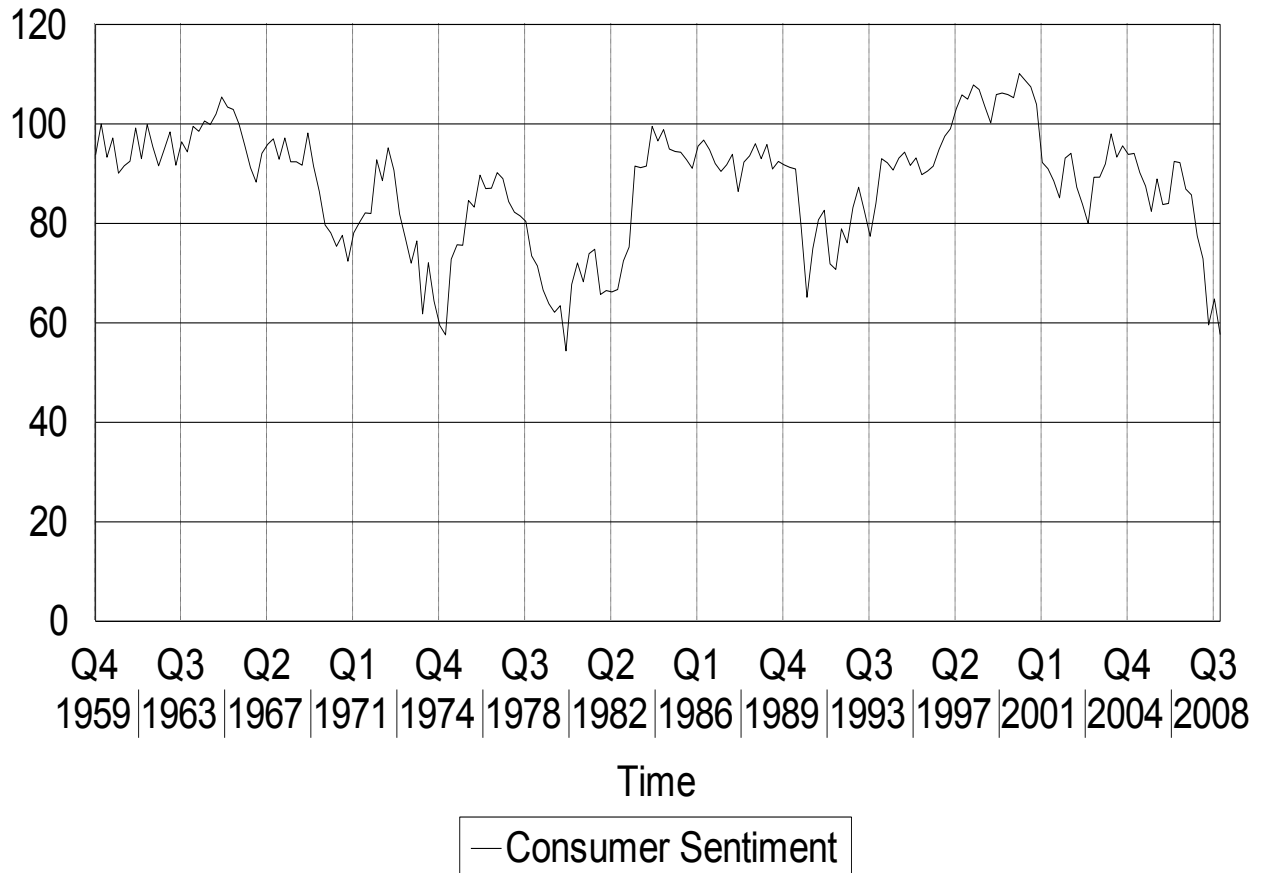
/Figure 3-1 about here/

The Survey Research Center of the University of Michigan assumes a baseline that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. In the quarter, the refined measure of real GNP growth rate was 10.2%, and the contemporaneous measure indicated that real GNP grew 6.1%. In the preceded quarter, the fourth quarter of 1965, the refined measure of real GNP growth rate was 9.7%, and the contemporaneous measure was 7.0%. The economy was abnormally strong in the quarter and the preceding quarter, when the Survey Research Center of the University of Michigan set up the baseline that *The Index Consumer Sentiment* equals 100. For most quarters from the fourth quarter of 1959 to the fourth quarter of 2008, *The Index of Consumer Sentiment* is below 100. Comparing Figure 3-1 with Table 2-1 US Business Cycles Expansions and Contractions 1959-2008, when most recessions happened, *The Index of*

Table 3-1. Questions by the University of Michigan's Survey of Consumers (Doms and Morin, 2004)

<i>Categories</i>	<i>Questions</i>
Questions about Current Conditions	(1) Are you and your family better or worse financially than you were a year ago? (2) About the big things people buy for their homes—such as furniture, a refrigerator, stove, television, and things like that. Generally speaking, do you think it is a good time or a bad time for people to buy major household items?
Questions about Future Conditions	(1) Do you think that a year from now you will be better off financially, or worse off, or just about the same as now? (2) How about a year from now, do you expect that in the country as a whole business conditions will be better, or worse than they are at present, or just about the same? (3) Looking ahead, which would you say is more likely—that in the country as a whole we will have continuous good times during the next five years or so, or that we will have periods of widespread unemployment or depression, or what?
Selected other Questions	How about people out of work during the coming 12 months—do you think that there will be more unemployment than now, about the same, or less?

Figure 3-1. Quarterly Consumer Sentiment of University of Michigan Q4, 1959-Q4, 2008



Consumer Sentiment was below 80, except during the recession from April 1960 to February 1961 and from March 2001 to November 2001.

Table 3-2 presents the descriptive statistics of consumer sentiment of University of Michigan by quarter and half-year from 1959 to 2008. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* during a given quarter. Semi-annual consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* during a given half-year. For quarterly consumer sentiment, from 1959 to 2008 the index reached the maximum value in the first quarter of 2000 at about 110.1. The lowest index value was estimated in the second quarter of 1980 at about 54.4. For semi-annual consumer sentiment, the highest and lowest index occurred almost at the same time. From 1958 to 2008 the index average is about 87.7.

/Table 3-2 about here/

3. Appropriate Time Lagged Economic Information

Before examining the possible effects of the contemporaneous reports of economic activity and the real economy on economic perceptions, and the electorate's political attitudes and behavior, we need to clarify two questions. (1) What economy, the recent past economy or the current economy, can the contemporaneous economic reports by the BEA tell the public? (2) What economy, the recent past economy or the current economy, can the real economy as measured by the refined economic measures tell the public?

Descriptive Statistics	Timing of Consumer Sentiment Measurement	
	Quarterly	Semi-Annual
Mean	87.7	87.8
Median	91.2	91.1
Standard Deviation	11.8	11.5
Minimum	54.4 (Q2 1980)	58.9 (Q1-2 1980)
Maximum	110.1 (Q1 2000)	109.5 (Q1-2 2000)
N	199	101

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1959-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

In 1959, Survey Research Center of University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

Note: Survey Research Center of University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100.

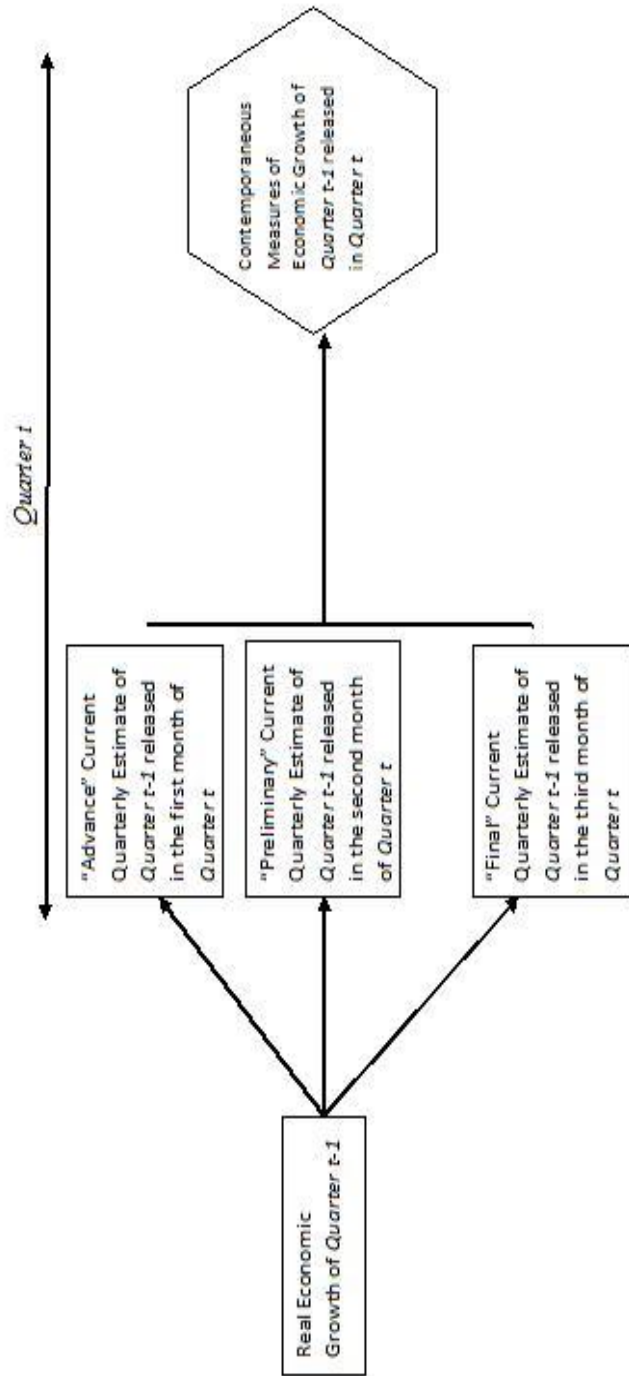
Quarterly and Semi-Annual Consumer Sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by Survey Research Center of University of Michigan during a given quarter or a given half a year.

Since the BEA releases current quarterly estimates (the contemporaneous measures) (Bureau of Economic Analysis 2009: 1-7), the analysis in this research is also based on quarterly measures to compare the contemporaneous and the refined measures of economic growth. Concretely speaking, the questions become in reference *Quarter t*, (1) what economy, the economy of *Quarter t* or quarters before *Quarter t*, can the contemporaneous economic reports tell the public in *Quarter t*; (2) what economy, the economy of *Quarter t* and/or quarters before *Quarter t*, can the real economy as measured by the refined economic measures tell the public in *Quarter t*.

Regarding the contemporaneous measures of economic growth, the release schedule of the *Survey of Current Business* is helpful in answering the first question. Table 2-2 shows us that the BEA releases current quarterly estimates on the end of each month of the quarter that follows the close of the reference quarter. Figure 3-2 describes the process in which the BEA makes the Contemporaneous Economic Reports in *Quarter t*. In *Quarter t*, the BEA makes and releases “Advance,” “Preliminary,” and “Final” current quarterly estimates of the economy of *Quarter t-1*. All three estimates are regarded as the contemporaneous economic reports of *Quarter t-1*, including the contemporaneous measures of real GNP growth rate of *Quarter t-1*. As a consequence, in *Quarter t* the contemporaneous economic reports by the BEA can tell the public the economy of quarters only before *Quarter t*. In another word, the electorate may draw the economic information describing only the recent past economy, rather than the current economy from the contemporaneous measures of economic growth directly or indirectly.

/Figure 3-2 about here/

Figure 3-2. The Process to Make the Contemporaneous Economic Reports by the B.E.A in *Quarter t*

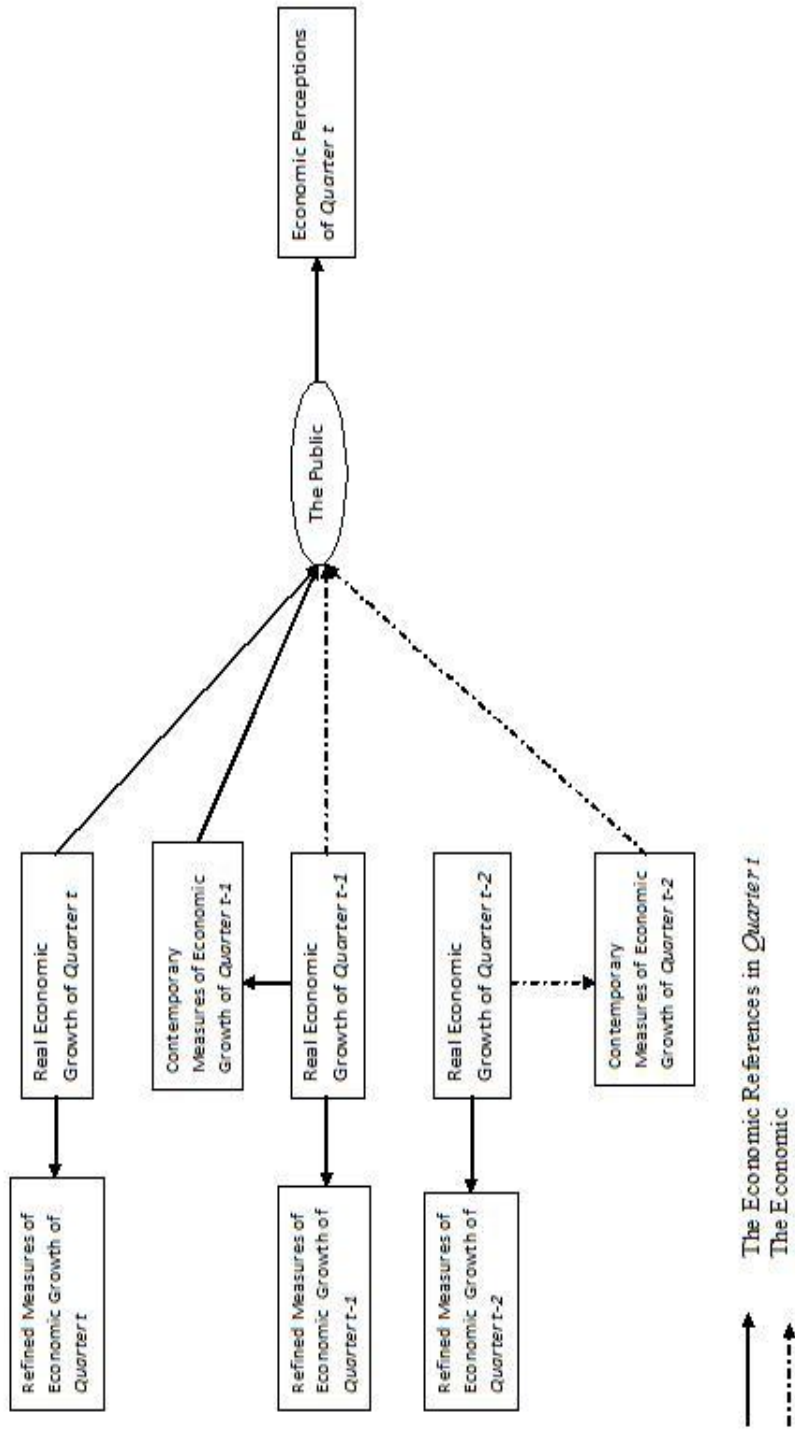


As far as the real economy as measured by the refined measures of economic growth, the electorate experiences the real economy in their day-to-day lives and observations of how others whom they know are affected by the economy. Their direct or indirect experience in the real economy is one of the information sources they respond to in forming their economic perceptions. “Daily-life information can tell us that energy shortages, price rises, and increased unemployment are conspicuous at the moment” (Popkin 1994: 27). Most Americans have to make a living on their paychecks, and have their checking and/or saving bank accounts. They pay their rent or mortgage or utility bills every month. Some of them own stocks and/or bonds. So many economic activities and observations does the electorate experience in their day-to-day lives that they can draw instant economic information from the real economy directly or indirectly. Figure 3-3 presents possible effects of the real economy of *Quarter t-2*, *Quarter t-1* and *Quarter t* on the economic perceptions of *Quarter t*. In *Quarter t* the electorate may form their economic perceptions referring to their economic experiences and observations happening from quarters before *Quarter t* to *Quarter t*. Consequently, in *Quarter t* the real economy as measured by the refined economic measures can tell the public the economy of *Quarter t* and quarters before *Quarter t*. In another word, the electorate may draw the economic information describing both the current economy and the recent past economy from the real economy directly or indirectly as measured by the refined measures of economic growth.

/Figure 3-3 about here/

In summary, in *Quarter t* regarding the availability of the contemporaneous economic reports by the BEA and the information from the real economy, Figure 3-4 indicates the

Figure 3-3. Possible Effects of the Real Economy of *Quarter t-2*, *Quarter t-1* and *Quarter t* on Economic Perceptions of *Quarter t*



difference between them. In *Quarter t*, the real economy can transfer the economic information of quarters before *Quarter t* and *Quarter t* to the public, but the contemporaneous economic reports can show the economic information of only quarters before *Quarter t* to the public. As a consequence, the electorate may draw directly or indirectly the economic information of only quarters before *Quarter t* from the contemporaneous measures of economic growth, and the economic information of *Quarter t* and quarters before *Quarter t* from the real economy.

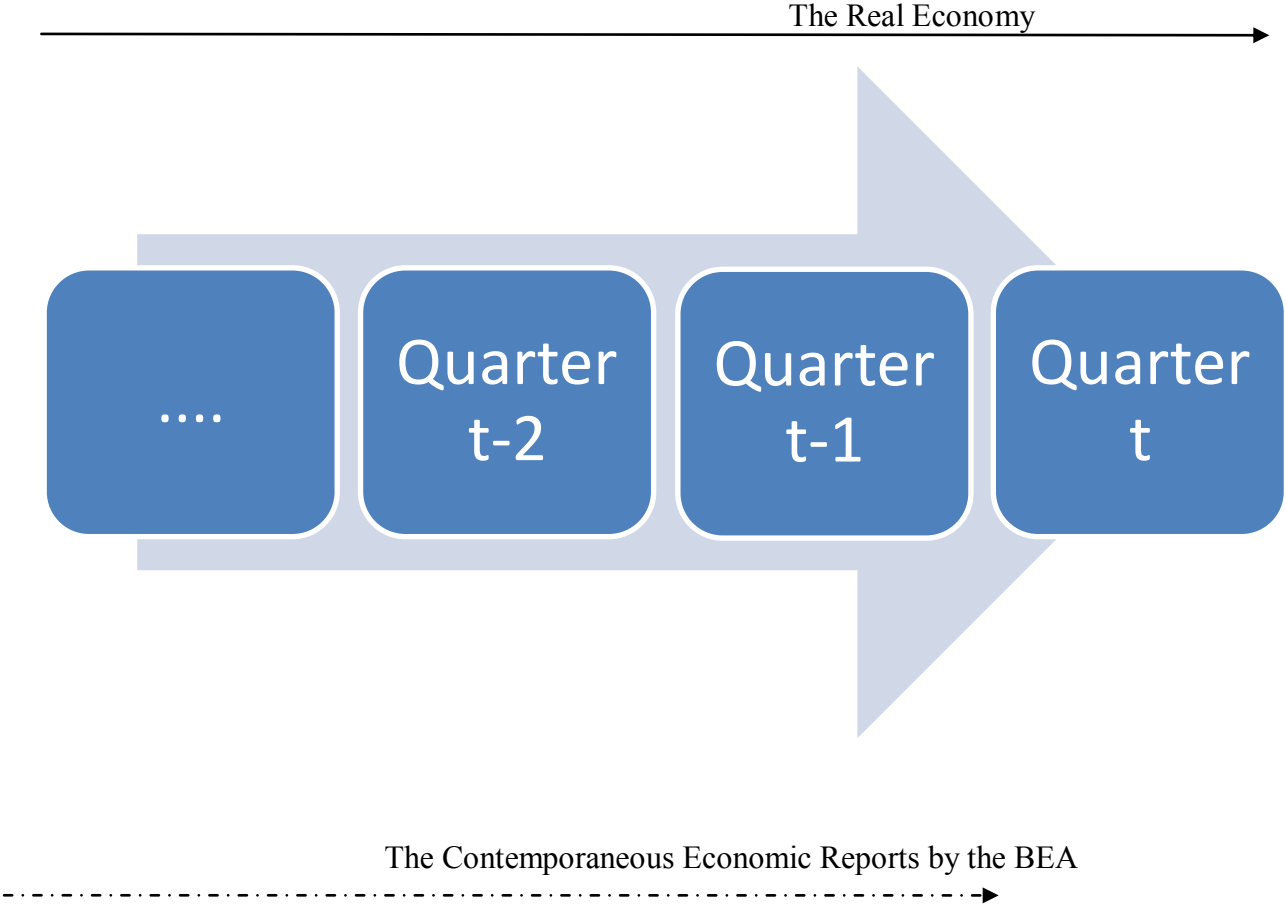
/Figure 3-4 about here/

4. Effects of Contemporaneous and Refined Measures of Real GNP Growth Rate and Economic Perceptions on Presidential Approval Rates and the Vote Share of In-Party's Candidate in Presidential Elections

After clarifying the appropriate time-lagged economic information, it becomes easier to examine the correlation between economic perceptions and the contemporaneous and the refined measures of economic growth, and build correct models to analyze the impacts of three above variables on presidential approval rates and the vote share of in-party's candidate in presidential elections.

How much do the electorate's economic perceptions correlate with the contemporaneous and the refined measures of real GNP growth rate? The correlation between *Consumer Sentiment Index* and the lagged contemporaneous measures of real GNP growth rate and the refined measures of real GNP growth rate is explored in Table 3-3. Semi-annual measures hold a little bit higher correlation relationship with *Consumer Sentiment Index* than quarterly measures (0.47

Figure 3-4. Availability of the Contemporaneous Economic Reports by the BEA and the real economy in *Quarter t*



vs. 0.42 in the contemporaneous measures, and 0.55 vs. 0.47 in the refined measures). The longer time span can cause higher correlation between *Consumer Sentiment Index* and the contemporaneous measures of economic growth and the real economy as measured by the refined measures of economic growth. The refined measures of real GNP growth also hold a little bit higher correlation with *Consumer Sentiment Index* than the contemporaneous measures (0.47 vs. 0.42 in quarterly data, and 0.55 vs. 0.47 in semi-annual data). *Consumer Sentiment Index* seems to be more correlated with the real economy rather than the lagged contemporaneous measures of economic growth. But all in all, there are some substantial difference between *Consumer Sentiment Index* and the contemporaneous and the refined measures of economic growth.

/Table 3-3 about here/

Table 3-4 analyzes the estimated effects of the contemporaneous and the refined measures of real GNP growth rate and the economic perceptions upon the presidential approval rate on a quarterly base. Each equation in Table 3-4 has nearly two hundred cases²⁴. The contemporaneous measures of real GNP growth rate of *Quarter t-1* do not influence the presidential approval rate of *Quarter t* significantly in *Equation 1*. But either the consumer sentiment of *Quarter t*, or the consumer sentiment of *Quarter t-1*, or the refined measures of real GNP growth rate of *Quarter t* individually has statistically significant effect on the presidential

²⁴Survey Research Center of University of Michigan started estimating *The Index of Consumer Sentiment* in 1952. But they did not release *The Index of Consumer Sentiment* each quarter until 1960. In 1958, *The Index of Consumer Sentiment* was released in Feb, May, and Nov. In 1959, *The Index of Consumer Sentiment* was released in May and Nov. The earliest available contemporaneous measure of real GNP happened in the third quarter of 1958. But the BEA did not estimate any contemporaneous measure of the fourth quarter of 1958. The contemporaneous measures of real GNP growth rate of each half year became available in the second half year of 1958. Due to different data availability in 1958 and 1959, case number may change across models.

Table 3-3. Correlation between Consumer Sentiment and Lagged Contemporaneous and Refined Measures of Real GNP Growth, 1958-2008

<i>Timing of Consumer Sentiment</i>	<i>Timing of GNP Growth Measurement</i>	
	Lagged Contemporaneous Measure of Real GNP Growth	Refined Measure of Real GNP Growth
<i>Quarter</i>	0.42	0.47
<i>Half-Year</i>	0.47	0.55

SOURCE: Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

Consumer Sentiment of University of Michigan is from Economic Research in Federal Reserve Bank of St. Louis. <http://research.stlouisfed.org/fred2/series/UMCSENT/>

approval rate of *Quarter t* from *Equation 2* to *Equation 4*. However, *Equation 5-10* show that once either the consumer sentiment of *Quarter t* or the consumer sentiment of *Quarter t-1* and measures of real GNP growth rate are examined together, neither measures of the real GNP growth rate directly affect the presidential approval rate of *Quarter t*²⁵.

/Table 3-4 about here/

The analysis is repeated on semi-annual data in Table 3-5. Each equation in Table 3-5 has about one hundred cases²⁶. *Equation 1* indicates that the contemporaneous measures of real GNP growth rate of *Half-Year t-1* do not have effect on the presidential approval of *Half-Year t*. But in *Equation 2*, the semi-annual refined measures of real GNP growth rate affect the presidential approval of the half year positively. Both the consumer sentiment of *Half-Year t* and the consumer sentiment of *Half-Year t-1* individually have statistically significant effects on the presidential approval rate of *Half-Year t* in *Equation 3* and *Equation 4*. When consumer sentiment and either measures of real GNP growth rate are examined together, only the consumer sentiment of *Half-Year t* or the consumer sentiment of *Half-Year t-1* affects the presidential approval rate of the half year directly. In a word, analyses find that neither measures of real GNP growth rate directly affect presidential approval rate when economic perceptions are taken into account.

/Table 3-5 about here/

²⁵ Since the contemporaneous and the refined measures of real GNP growth rate are collinear, Model 7-10 include just either the contemporaneous or the refined measures in each equation.

²⁶ Ibid., 12.

Table 3-4. The Impact of Contemporaneous and Refined Measures of Real GNP Growth Rate, and Economic Perceptions on Presidential Approval Rate 1959-2008 (Quarterly Analysis)

Dependent Variable: Quarterly Presidential Approval Rate of t

Model	1	2	3	4	5	6	7	8	9	10
Consumer Sentiment of t			0.52*** (8.09)		0.57*** (7.49)		0.57*** (8.00)	0.54*** (7.39)		
Consumer Sentiment of $t-1$				0.51*** (7.67)		0.54*** (7.00)			0.55*** (7.41)	0.49** * (6.98)
Contemporaneous Measures of real GNP Growth Rate of $t-1$	0.47 (1.91)				-0.35 (1.43)	-0.39 (1.49)	-0.37 (1.51)		-0.35 (1.36)	
Refined Measures of real GNP Growth Rate of t		0.68** (2.89)			-0.06 (0.26)	0.19 (0.81)		-0.13 (0.55)		0.13 (0.56)
Constant	52.22 (46.02)	51.40 (44.58)	7.93 (1.39)	9.03 (1.54)	4.56 (0.73)	6.69 (1.05)	5.08 (0.84)	6.70 (1.10)	5.88 (0.94)	9.82 (1.63)
N	196	197	195	195	195	194	195	195	194	195
Adjusted R^2	0.01	0.04	0.25	0.23	0.25	0.23	0.25	0.25	0.23	0.23
Standard Error of Estimates	12.17	12.04	10.65	10.76	10.64	10.77	10.61	10.67	10.76	10.78
Durbin-Watson	0.31	0.33	0.38	0.41	0.40	0.43	0.41	0.38	0.43	0.40

SOURCE: Presidential Approval Rate is collected from the Public Opinion Archives at the Roper Center,

http://webapps.ropercenter.uconn.edu/CFIDE/roper/presidential/webroot/presidential_rating_search.cfm. In the third quarter of 1964, 1972, and 1976, there is no data available. The data showed by the exit polls based on likely voters or voters are dropped.

The Index of Consumer Sentiment of the University of Michigan 1959-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis,

<http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of*

Consumer Sentiment of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the second quarter of 1959. The contemporaneous measures of real GNP growth rate of each half year became available in the first half year of 1959. Due to different data availability in 1959, the case number may change across models.

Note: Quarterly Presidential Approval Rate is calculated by averaging rates showed by all exit polls on presidential approval during a given quarter. If an exit poll happened across quarters, it is classified into the first quarter. During a given period when a new president took over the power, the approval rates of the new president are adopted, whereas those of the old president are dropped.

The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

p<0.01, * p<0.001, one-tailed.

Table 3-5. The Impact of Contemporaneous and Refined Measures of Real GNP Growth Rate, and Economic Perceptions on Presidential Popularity 1959-2008 (Semi-Annual Analysis)

Dependent Variable: Semi-Annual Presidential Approval Rate of t

<i>Model</i>	1	2	3	4	5	6	7	8	9	10
Consumer Sentiment of t			0.54** * (5.97)		0.66** * (5.62)		0.62** * (6.06)	0.58** * (5.37)		
Consumer Sentiment of $t-1$				0.51** * (5.35)		0.57** * (5.01)			0.60** * (5.45)	0.48** * (4.71)
Contemporaneous Measures of real GNP Growth Rate of $t-1$	0.47 (1.14)				-0.66 (1.65)	-0.72 (1.72)	-0.67 (1.69)		-0.68 (1.62)	
Refined Measures of real GNP Growth Rate of t		0.95* (2.36)			-0.31 (0.71)	0.34 (0.84)		-0.30 (0.71)		0.28 (0.70)
Constant	52.27 (30.40)	50.61 (28.65)	6.66 (0.84)	9.04 (1.07)	-0.93 (0.10)	4.55 (0.49)	1.66 (0.20)	3.96 (0.45)	3.24 (0.36)	10.45 (1.20)
N	99	100	100	100	99	99	99	100	99	100
Adjusted R^2	0.00	0.04	0.26	0.22	0.27	0.23	0.27	0.26	0.23	0.21
Standard Error of Estimates	11.99	11.70	10.30	10.58	10.28	10.55	10.25	10.33	10.54	10.61
Durbin-Watson	0.51	0.58	0.65	0.70	0.70	0.79	0.71	0.66	0.77	0.70

SOURCE: Presidential Approval Rate is collected from the Public Opinion Archives at the Roper Center,

http://webapps.ropercenter.uconn.edu/CFIDE/roper/presidential/webroot/presidential_rating_search.cfm. In the third quarter of 1964, 1972, and 1976, there is no data available. The data showed by the exit polls based on likely voters or voters are dropped.

The Index of Consumer Sentiment of the University of Michigan 1959-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis,

<http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of*

Consumer Sentiment of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each half year became available in the first half year of 1959. Due to different data availability in 1959, the case number may change across models.

Note: Quarterly Presidential Approval Rate is calculated by averaging rates showed by all exit polls on presidential approval during a given quarter. If an exit poll happened across quarters, it is classified into the first quarter. During a given period when a new president took over the power, the approval rates of the new president are adopted, whereas those of the old president are dropped.

The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, one-tailed

With regard to the effects of the contemporaneous and the refined measures of real GNP growth rate and economic perceptions on the vote share of in-party's candidate in presidential elections, analyses in Table 3-6 and Table 3-7 indicate similar results to their effects on presidential approval rates, even with a limited number of elections to be examined (thirteen cases). Table 3-6 reports quarterly analyses of the effects of the contemporaneous and the refined measures of real GNP growth rate and the consumer sentiment on the vote share of in-party's candidate in presidential elections. The consumer sentiments of the second and third quarter of the election year directly affect the vote share of the in-party's candidate in presidential elections. And as other research (Fair 1978) show and as many presidential election forecasting models (Abramowitz 2004, Campbell 2004, Holbrook 2004, Lockerbie 2004, and Lewis-Beck and Tien 2004) imply, the contemporaneous measures of real GNP growth rate in the second quarter of the election year also have direct effects on the vote share. However, *Equation 4* indicates that the refined measures of real GNP growth rate of the third quarter of the election year do not influence the vote share significantly. Furthermore, when the contemporaneous measures of real GNP growth rate of the second quarter in election years are examined with the consumer sentiment of the third quarter in election years in *Equation 5*, and with the consumer sentiment of the second quarter in *Equation 6*, none of the contemporaneous measures of real GNP growth rate and the consumer sentiment is statistically significant. In other words, when economic perceptions and either measures of real GNP growth rate are examined together, none of them directly affects the vote share of the in-party's candidate in presidential elections.

/Table 3-6 about here/

Table 3-6. The Impact of Contemporaneous and Refined Measures of Real GNP Growth Rate, and Economic Perceptions on the Vote Share of In-Party Presidential Candidate 1959-2008 (Quarterly Analysis)

Dependent Variable: the Vote Share of In-Party Presidential Candidate of t

<i>Model</i>	1	2	3	4	5	6
Consumer Sentiment of $t-1$	0.36* (2.67)				0.23 (1.34)	
Consumer Sentiment of $t-2$		0.25* (2.04)				0.10 (0.60)
Contemporaneous Measures of Real GNP Growth Rate of $t-2$			1.00* (2.52)		0.56 (1.12)	0.77 (1.36)
Refined Measures of Real GNP Growth Rate of $t-1$				1.45 (1.81)		
Constant	17.47 (1.43)	27.79 (2.54)	46.58 (22.17)	46.67 (18.56)	27.03 (1.83)	38.73 (2.93)
N	13	13	13	13	13	13
Adjusted R^2	0.34	0.21	0.31	0.16	0.35	0.27
Standard Error of Estimates	5.95	6.51	6.09	6.71	5.88	6.27
Durbin-Watson	2.62	2.67	2.70	2.55	2.69	2.72

SOURCE: The vote share of the in-party's candidate in presidential election is drawn from Dave Leip's Atlas of U.S. Presidential Elections, <http://uselectionatlas.org/>.

The Index of Consumer Sentiment of the University of Michigan 1959-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the second quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958. The contemporaneous measures of real GNP growth rate of each half year became available in the first half year of 1959. Due to different data availability in 1959, the case number may change across models.

Note: Quarterly Presidential Approval Rate is calculated by averaging rates showed by all exit polls on presidential approval during a given quarter. If an exit poll happened across quarters, it is classified into the first quarter. During a given period when a new president took over the power, the approval rates of the new president are adopted, whereas those of the old president are dropped.

The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*p<0.05, **p<0.01, *** p<0.001, one-tailed

Table 3-7 reports semi-annual analyses of the effects of the contemporaneous and the refined measures of real GNP growth rate and the consumer sentiment on the vote share of in-party's candidate in presidential elections. The analyses show almost the same results as quarterly analyses. Both the consumer sentiment of the first or second half year of the election year, and the contemporaneous measures of real GNP growth rate of the first half year have direct positive effect on the vote share individually. But the refined measures of real GNP growth rate of the second half year do not directly affect the vote share significantly. However, when economic perceptions and either measures of real GNP growth rate are examined together, none of them holds statistical significance in affecting the vote share of the in-party's candidate in presidential elections.

/Table 3-7 about here/

To sum up from Table 3-4 to Table 3-7, (1) the electorate's economic perceptions directly affect the presidential approval rate and the vote share of in-party's candidate in presidential elections; and (2) once economic perceptions are considered, neither measures of the "real economy" directly affect the presidential approval rates and the vote share of in-party's candidate in presidential elections. As Figure 1-1 describes, the measures of the "real economy" that influence the electorate's economic perceptions indirectly affect presidential approval rates and the vote share of in-party's candidate in presidential elections. As a result, the dependent variable can focus only on the electorate's economic perceptions in further analyses.

Table 3-7. The Impact of Contemporaneous and Refined Measures of Real GNP Growth Rate, and Economic Perceptions on the Vote Share of In-Party Presidential Candidate 1959-2008 (Semi-Annual Analysis)

Dependent Variable: the Vote Share of In-Party Presidential Candidate of t

Model	1	2	3	4	5	6	7	8
Consumer Sentiment of t	0.33* (2.28)				0.19 (0.99)	0.35 (1.94)		
Consumer Sentiment of $t-1$		0.29* (2.27)					0.15 (0.81)	0.28 (1.99)
Contemporaneous Measures of real GNP Growth Rate of $t-1$			1.27* (2.39)		0.81 (1.15)		0.80 (1.00)	
Refined Measures of real GNP Growth Rate of t				0.63 (0.89)		-0.12 (0.15)		0.27 (0.41)
Constant	19.77 (1.49)	23.85* (2.07)	44.45*** (15.85)	48.38** * (18.97)	29.33 (1.89)	18.73 (1.21)	32.84* (2.25)	24.68 (2.03)
N	13	13	13	13	13	13	13	13
Adjusted R ²	0.26	0.26	0.28	0.00	0.280	0.19	0.26	0.20
Standard Error of Estimates	6.30	6.30	6.20	7.38	6.21	6.60	6.30	6.55
Durbin-Watson	2.55	2.75	3.27	2.58	2.98	2.58	3.13	2.65

SOURCE: The vote share of the in-party's candidate in presidential election is drawn from Dave Leip's Atlas of U.S. Presidential Elections, <http://uselectionatlas.org/>.

The Index of Consumer Sentiment of the University of Michigan 1959-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each half year became available in the first half year of 1959. Due to different data availability in 1959, the case number may change across models.

Note: Quarterly Presidential Approval Rate is calculated by averaging rates showed by all exit polls on presidential approval during a given quarter. If an exit poll happened across quarters, it

is classified into the first quarter. During a given period when a new president took over the power, the approval rates of the new president are adopted, whereas those of the old president are dropped.

The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, one-tailed

The preliminary analyses in this chapter show us that (1) consumer sentiment is a substantially different variable from the contemporaneous and the refined measures of real GNP growth rate; (2) referring to the release schedule of the *Survey of Current Business* and Popkin's (1991) *The Reasoning Voter*, in reference *Quarter t* the electorate may draw the economic information of only quarters before *Quarter t* directly or indirectly from the contemporaneous economic reports by the BEA, and may also draw the economic information of *Quarter t* and quarters before *Quarter t* directly or indirectly from the real economy; (3) the contemporaneous and refined measures of the "real economy" have positive direct effects on the electorate's economic perceptions, and then affect the electorate's political attitudes and political behavior indirectly via economic perceptions. The above analyses can lead to the conclusion that the focus dependent variable for further research is economic perceptions.

In next chapter, I try to answer the questions: which "economy" has a greater impact on important economic perceptions? Is it the economy as measured by the contemporaneous economic measures or as measured by the refined economic measures? If both economic measures affect Americans' perceptions of the economy, which one is more significant? Or do they affect economic perceptions equally?

Chapter 4

Contemporaneous and Refined Economic Measures and Perceptions of the Economy

The purpose of this chapter is to examine the possible effects of the contemporaneous and the refined measures of the economy on public perceptions of the economy. Does the public learn about the economy from the contemporaneous reports about it available at the time or from the real economy through their day-to-day experience with economic activities?

There are two main parts in this chapter. The first part shows time series regression results of the impact of both economic measures on economic perceptions. In the second part, two groups of specific cases help illustrate the findings. In the first group, there are six pairs of economic quarters. In each pair, both cases have the same level of economic growth according to the contemporaneous measures, but different levels of growth according to the refined measures. In the other group, four pairs of cases illustrate the difference in perceptions in quarters, when there was same economic growth according to the refined measures of real GNP growth rate, but different growth rates according to the contemporaneous measures.

1. Impact of Contemporaneous and Refined Measures on Economic Perceptions

Since there is high level of autocorrelation in the series of cases, time series analysis regression techniques are employed to examine the impact of the contemporaneous and the refined measures of real GNP growth rate on consumer sentiment by processing partial difference transform and full difference transform on the original data. The basic time unit for analysis is one quarter of one year.

In Chapter 2, we assume that a difference of two percentage points or more between the two economic readings is a notable difference, one large enough that it might lead to different perceptions of the economy. As a result, two groups of cases are examined separately: (1) all consecutive cases from the fourth quarter of 1959 to the fourth quarter of 2008, and (2) cases from 1960 to 2008 in which the difference between the contemporaneous and the refined measures of real GNP growth rate is greater than two percentage points.

As the discussion on appropriate time lagged economic information shown in Figure 3-3, in this research there are two major economic information sources available for the electorate to form their economic perceptions in *Quarter t*. One is the real economy of *Quarter t*, the other is the contemporaneous economic reports of *Quarter t-1*, which, however, is released in *Quarter t*. In *Quarter t* the electorate are experiencing and observing the real economy of *Quarter t*, while the contemporaneous economic reports of *Quarter t-1* become available to the electorate. Both the real economy of *Quarter t* and the contemporaneous economic reports of *Quarter t-1* may serve as the economic references at the same time in *Quarter t*, which the electorate may use to form their economic perceptions in *Quarter t*. In turn in *Quarter t-1*, both the real economy of *Quarter t-1* and the contemporaneous economic reports of *Quarter t-2* may serve as the economic references at the same time, which the electorate may use to form their economic perceptions in *Quarter t-1*. And the economic references the electorate uses in *Quarter t-1*—the

real economy of *Quarter t-1* and the contemporaneous economic reports of *Quarter t-2*—may also have influences upon the electorate’s economic perceptions of *Quarter t*.

In Appendix II, I examine all possible effects of all possible economic references in *Quarter t*: the contemporaneous measures of real GNP growth rate of *Quarter t-1* and *t-2*, and the real economy of *Quarter t* and *t-1* as estimated by the refined measures of *Quarter t* and *t-1* on the electorate’s economic perceptions of *Quarter t*. The analyses show that the contemporaneous measures of *Quarter t-1* and the refined measures of *Quarter t* are the most important economic references that affect the consumer sentiment of *Quarter t*. Consequently, my next analysis focuses on the effect the contemporaneous measures of real GNP growth rate of *Quarter t-1* and the refined measures of *Quarter t* on the consumer sentiment of *Quarter t*.

A. Test on All Consecutive Cases

The analysis of the possible effects of the contemporaneous and the refined economic measures on economic perceptions in all quarters is presented first. At the first step, ordinary least square regression is applied to test the impact of the contemporaneous and the refined measures of economic growth on economic perceptions in Table 4-1. Both the contemporaneous measures of *Quarter t-1* and the refined measures of *Quarter t* significantly affect consumer sentiment of *Quarter t* in both the bivariate and multivariate equations ($p < 0.001$, one tailed). In *Equation 3*, the refined measures have a little bit higher coefficient (1.21 vs. 1.02), and standardized coefficient (0.37 vs. 0.30) than the contemporaneous measures, but the two effects are nearly equal. Unfortunately, the Durbin-Watson Statistic for each equation is about 0.4 to 0.5, well below the ideal value of 2.00. The low Durbin-Watson indicates that there is a high level of autocorrelation in the data series.

/Table 4-1 about here/

In order to correct for the effects of unacceptable high autocorrelation, the variables in the data set have been reanalyzed after taking both their partial differences from adjacent cases and also their full differences or amount of change from one case to the next. Table 4-2 presents the OLS regression results on the data after partial difference transformation (*Cochrane-Orcutt* transformation)²⁷. The weight used in the partial difference transformation is the according first order autocorrelation in Table 4-1. The weights used in *Equation 1*, *2*, and *3* to produce the partial difference transform are 0.75, 0.77, and 0.78. Due to the partial difference transformation, the number of observations decreases by one in each equation, when the first observation in the fourth quarter of 1959 is missing. The OLS regression results after partial difference transformation present that the Durbin-Watson Statistic in each equation has reached to above 1.64, located in acceptable area of no autocorrelation. In *Equation 3*, the Durbin-Watson reaches 1.83, close to 2.00. The autocorrelation in the data has dropped dramatically.

Though in *Equation 1* in Table 4-2, the contemporaneous measures of real GNP growth rate of *Quarter t-1* do not have statistically significant effects on the consumer sentiment of *Quarter t*, the refined measures of real GNP growth rate of *Quarter t* have a positive relationship

²⁷ The Cochrane-Orcutt transformation as described by Kmenta (1986: 314-316) and Ostrom (1990) has two steps as follows:

1. Run OLS estimates of
$$Y_t = a + bX_t + e_t$$

to obtain first order autocorrelation p
2. Construct Y_t^* and X_t^* in the following way
$$Y_t^* = Y_t - pY_{t-1} \quad t = 2, 3, \dots, T$$

$$X_t^* = X_t - pX_{t-1} \quad t = 2, 3, \dots, T$$
3. Obtain OLS estimates of
$$Y_t^* = a^* + b^*X_t^* + e_t^*$$

Table 4-1. The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with all Cases, Q4, 1959—Q4, 2008

Dependent Variable: Quarterly Consumer Sentiment of t

<i>Model</i>	<i>1</i>	<i>2</i>	<i>3</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	1.45*** (6.50)		1.02*** (4.63)
Refined Measures of real GNP Growth Rate of t		1.54*** (7.44)	1.21*** (5.78)
Constant	83.43*** (83.24)	82.60*** (82.05)	80.74*** (77.71)
N	197	197	197
Adjusted R^2	0.17	0.22	0.29
Standard Error of Estimates	10.77	10.49	9.98
Durbin-Watson	0.46	0.45	0.41
First Order Autocorrelation	0.75	0.77	0.78

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

The original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporary measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth

quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

In *Equation 3*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ and Refined Measures of real GNP Growth Rate of t is 0.30 and 0.37 respectively.

with the consumer sentiment of *Quarter t* significantly ($p < 0.001$, one tailed) in *Equation 2*. And in *Equation 3*, when the contemporaneous and the refined measures are tested together, both hold statistical significance in positively influencing the consumer sentiment of *Quarter t*. The refined measures of real GNP growth rate of *Quarter t* seem to have higher statistical significance ($p < 0.001$, one tailed) than the contemporaneous measures of real GNP growth rate of *Quarter t-1* ($p < 0.01$, one tailed). And the refined measures of real GNP growth rate of *Quarter t* also have larger coefficient (0.49 vs. 0.28), and larger standardized coefficient (0.35 vs. 0.18) than the contemporaneous measures of real GNP growth rate of *Quarter t-1*. All these are telling us that the refined measures of real GNP growth rate of *Quarter t* affect the consumer sentiment of *Quarter t* greater than the contemporaneous measures of real GNP growth rate of *Quarter t-1*.

/Table 4-2 about here/

The variables in the data set are also reanalyzed after taking their full difference from adjacent cases. Table 4-3 indicates the OLS regression results on the data after full difference transformation²⁸. Due to the full difference transformation, the number of cases also decreases by one in each equation, when the first case of the fourth quarter of 1959 is also missing. The OLS regression results on the data after full difference transformation also show that the Durbin-Watson Statistic of each equation jumps to around 2.30, close to 2.00, also located in acceptable area of no autocorrelation.

²⁸ The full difference transformation as described by Ostrom (1990) has two steps as follows:

1. Construct Y_t^* and X_t^* in the following way

$$Y_t^* = Y_t - Y_{t-1} \quad t = 2, 3, \dots, T$$

$$X_t^* = X_t - X_{t-1} \quad t = 2, 3, \dots, T$$

2. Obtain OLS estimates of

$$Y_t^* = a^* + b^* X_t^* + e_t^*$$

Table 4-2. The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with all Cases Based on Data after Partial Difference Transformation (the *Cochrane-Orcutt* Transformation), 1960—2008

Dependent Variable: Quarterly Consumer Sentiment of t

<i>Model</i>	<i>1</i>	<i>2</i>	<i>3</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	0.20 (1.78)		0.28** (2.64)
Refined Measures of real GNP Growth Rate of t		0.45*** (4.74)	0.49*** (5.20)
Constant	21.61*** (54.52)	19.67*** (53.24)	18.61*** (50.24)
<i>N</i>	196	196	196
Adjusted R ²	0.01	0.10	0.13
Standard Error of Estimates	5.41	5.09	4.98
Durbin-Watson	1.64	1.72	1.83

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis,

<http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporary measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth

quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

In *Equation 3*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ and Refined Measures of real GNP Growth Rate of t is 0.18 and 0.35 respectively.

The weight of partial difference transformation is 0.75, 0.77, and 0.78 respectively in *Equation 1, 2, and 3*.

Due to the partial difference transformation, the number of observations decreases by one. The start point of analysis changed from the fourth quarter of 1959 to the first quarter of 1960.

Full difference transform on the original data effectively lowers the autocorrelation in the data variables effectively. As a whole, the OLS regression results after full difference transformation in Table 4-3 are similar to those on the data after partial difference transformation in Table 4-2. When the contemporaneous measures of real GNP growth rate of *Quarter t-1* are examined individually, they do not hold any statistical significance in affecting the consumer sentiment of *Quarter t* in *Equation 1*. The refined measures of *Quarter t*, however, positively affect the consumer sentiment of *Quarter t* in *Equation 2* ($p < 0.001$, one tailed). It also means that when the change of the refined measures of *Quarter t* increases one percentage point, the change of the consumer sentiment of *Quarter t* also increases 0.37. In *Equation 3*, when the contemporaneous and the refined measures are tested together, both have statistical significance in influencing the consumer sentiment of *Quarter t* positively. Compared with the contemporaneous measures of *Quarter t-1* ($p < 0.05$, one tailed), however, the refined measures of *Quarter t* have higher statistical significance ($p < 0.001$, one tailed). The refined measures of *Quarter t* also have bigger coefficient (0.41 vs. 0.19), and bigger standardized coefficient (0.34 vs. 0.14) than the contemporaneous measures. It also means that the refined measures of real GNP growth rate of *Quarter t* affect the consumer sentiment of *Quarter t* more than the contemporaneous measures of real GNP growth rate of *Quarter t-1*.

/Table 4-3 about here/

Based on either the original data or the transformed data, when the contemporaneous measures of real GNP growth rate of *Quarter t-1* and the refined measures of real GNP growth rate of *Quarter t* are merged together in one equation, the results are consistent. Both measures

Table 4-3. The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with all Cases Based on Data after Full Difference Transformation, 1960—2008

Dependent Variable: Quarterly Consumer Sentiment of t

<i>Model</i>	<i>1</i>	<i>2</i>	<i>3</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	0.10 (1.04)		0.19* (2.08)
Refined Measures of real GNP Growth Rate of t		0.37*** (4.53)	0.41*** (4.90)
Constant	-0.19 (0.51)	-0.17 (0.47)	-0.17 (0.50)
<i>N</i>	196	196	196
Adjusted R ²	0.00	0.09	0.11
Standard Error of Estimates	5.16	4.92	4.88
Durbin-Watson	2.26	2.28	2.32

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth

quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

In *Equation 3*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ and Refined Measures of real GNP Growth Rate of t is 0.14 and 0.34 respectively.

Due to the full difference transformation, the number of observations decreases by one. The start point of analysis changed from the fourth quarter of 1959 to the first quarter of 1960.

are significant in affecting the consumer sentiment of *Quarter t* positively, and the refined measures of *Quarter t* have more influence than the contemporaneous measures of *Quarter t-1* on the consumer sentiment of *Quarter t*. The OLS regression results based on the original data and the transformed data are summarized in Table 4-4. The first order autocorrelation in the OLS regression result on the original data indicates the weight of partial transformation is 0.78. I also examine whether the coefficients of two independent variables are significantly different. The *p-value* of the test on the original data, the data after partial difference transformation, and the data after full difference transformation is 0.58, 0.11, and 0.06. Since the test *p-value* on the data after partial difference transformation 0.11 is close to 0.10, and that on the data after full difference transformation 0.06 is close to 0.05, we have some, although not much, confidence to assert that the coefficient of the contemporaneous measures of real GNP growth rate of *Quarter t-1* is different from that of the refined measures of *Quarter t*. The above examination on all cases from the fourth quarter of 1959 to the fourth quarter of 2008 finds that in *Quarter t*, both the contemporaneous measures of economic growth of *Quarter t-1* and the real economy of *Quarter t* affect the electorate's economic perceptions of *Quarter t*, however, the real economy of *Quarter t* has stronger influence over the economic perceptions.

/Table 4-4 about here/

B. Test on Cases in which the Difference between the Contemporaneous and the Refined Measures of Real GNP Growth Rate over Two Percentage Points

In Chapter 2, I assume that a difference of two percentage points or more between the contemporaneous and the refined measures of real GNP growth rates is a notable difference, one

Table 4-4. The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with All Cases, Q4, 1959—Q4, 2008

Dependent Variable: Quarterly Consumer Sentiment of t

<i>Model</i>	<i>Original Data</i>	<i>Partial Difference Transformation</i>	<i>Full Difference Transformation</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	1.02*** (4.63)	0.28** (2.64)	0.19* (2.08)
Refined Measures of real GNP Growth Rate of t	1.21*** (5.78)	0.49*** (5.20)	0.41*** (4.90)
Constant	80.74*** (77.71)	18.61*** (50.24)	-0.17 (0.50)
N	197	196	196
Adjusted R^2	0.29	0.13	0.11
Standard Error of Estimates	9.98	4.98	4.88
Durbin-Watson	0.41	1.83	2.32
First Order Autocorrelation	0.78		
$P > t $ of $(b1-b2)$	0.58	0.11	0.06

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporary measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

The standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ and Refined Measures of real GNP Growth Rate of t is 0.30 and 0.37 respectively in *OLS* regression results of the original data. In *Partial Difference Transformation Equation*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ and Refined Measures of real GNP Growth Rate of t is 0.18 and 0.35 respectively. And in *Full Difference Transform Equation*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ is also less than that of Refined Measures of real GNP Growth Rate of t : 0.14 vs. 0.34.

large enough that it might lead to different perceptions of the economy. Here, I select cases out, in which the difference between the contemporaneous and refined measures of real GNP growth rates is beyond two percentage points, and process OLS regression on them and the data after partial difference transformation and full difference transformation.

First, ordinary least squares regression is applied on the original data set in Table 4-5. In *Equation 1*, the reference quarter of the difference between the contemporaneous and the refined measures of real GNP growth rates is *Quarter t-1*, in *Equation 2*, the reference quarter is *Quarter t*, and in *Equation 3*, the reference quarter is based on both *Quarter t-1* and *Quarter t*. As a consequence, different equations have different case numbers due to the different reference quarter. As for independent variables: the contemporaneous measures of real GNP growth rate of *Quarter t-1* and the refined measures of real GNP growth rate of *Quarter t*, either of them and both of them are statistically significant in affecting the consumer sentiment of *Quarter t* throughout all equations ($p < 0.001$, one tailed). In *Equation 3*, the contemporaneous measures of *Quarter t-1* have slightly higher coefficient (1.19 vs. 1.03), and standardized coefficient (0.37 vs. 0.34) than the refined measures of *Quarter t*. None of equations, however, does have a Durbin-Watson Statistic close to 2.00. The Durbin-Watson Statistic of *Equation 1, 2, and 3* is 0.64, 0.53, and 0.58, respectively, all located in area of autocorrelation. There is also a high level of autocorrelation in the series in the data set of high difference cases. In order to lower this high level of autocorrelation, transformations on the original data becomes necessary.

/Table 4-5 about here/

Table 4-5. Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with Cases Holding over Two-Percentage Difference between Contemporaneous and Refined Measures of Real GNP Growth Rate, 1960-2008

Dependent Variable: Quarterly Consumer Sentiment of t

<i>Model</i>	<i>1</i>	<i>2</i>	<i>3</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	1.38*** (4.09)		1.19*** (4.51)
Refined Measures of real GNP Growth Rate of t		1.41*** (4.73)	1.03*** (4.05)
Constant	83.26*** (49.06)	81.52*** (47.11)	80.04*** (59.98)
<i>N</i>	72	73	113
Adjusted R ²	0.18	0.23	0.33
Standard Error of Estimates	11.90	11.62	10.41
Durbin-Watson	0.64	0.53	0.58
First Order Autocorrelation	0.65	0.73	0.70

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current*

Business show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

Across models, the reference quarter in which the difference between the contemporaneous and refined measures of real GNP growth rate is beyond two percentage points is different. In *Model 1*, the reference quarter is *Quarter t-1*, in *Model 2*, the reference quarter is *Quarter t*, and in *Model 3*, the reference quarter refers to both *Quarter t-1* and *Quarter t*. As a consequence, different equation has a different case number.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

In *Equation 3*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of *t-1* and Refined Measures of real GNP Growth Rate of *t* is 0.37 and 0.34 respectively.

Table 4-6 presents the OLS regression results on the data after partial difference transformation. The weight used in the partial difference transformation is the first order autocorrelation in Table 4-5 accordingly. The weights used in *Equation 1, 2, and 3* produce the partial difference transformation is 0.65, 0.73, and 0.70. Partial difference transformation improves Durbin-Watson Statistic of *Equation 1, 2, and 3* to 1.24, 1.37, and 1.49, all located in acceptable area of no autocorrelation. The autocorrelation in the series has dropped in the data after partial difference transformation. The contemporaneous measures of real GNP growth rate of *Quarter t-1* do not have statistically significant impact on the consumer sentiment of *Quarter t* in *Equation 1*. The refined measures of *Quarter t*, however, hold statistical significance in positively affecting the consumer sentiment of *Quarter t* in *Equation 2* ($p < 0.01$, one tailed). When both measures are examined together in *Equation 3*, both are statistically significant in having a positive relationship with the consumer sentiment of *Quarter t*. The refined measures of real GNP growth rate of *Quarter t* have higher statistical significance ($p < 0.001$, one tailed) than the contemporaneous measure ($p < 0.01$, one tailed). Meanwhile the refined measures of real GNP growth rate of *Quarter t* also have higher coefficient (0.51 vs. 0.37), and standardized coefficient (0.36 vs. 0.23). The refined measures of *Quarter t* still have stronger influence on the consumer sentiment of *Quarter t*, although both measures positively affect consumer sentiment.

/Table 4-6 about here/

The variables in the data set are also reanalyzed after taking their full difference from adjacent cases. OLS regression is also applied on the data after full difference transformation.

Table 4-6. The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with Cases Holding over Two-Percentage Difference between Contemporaneous and Refined Measures of Real GNP Growth Rates, Based on Data after Partial Difference Transformation (the *Cochrane-Orcutt* Transformation), 1960—2008

Dependent Variable: Quarterly Consumer Sentiment of t

<i>Model</i>	<i>1</i>	<i>2</i>	<i>3</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	0.29 (1.54)		0.37** (2.67)
Refined Measures of real GNP Growth Rate of t		0.43** (2.99)	0.51*** (4.14)
Constant	30.26*** (37.76)	22.65*** (31.93)	25.19*** (44.28)
N	72	73	113
Adjusted R^2	0.02	0.10	0.15
Standard Error of Estimates	6.50	5.72	5.68
Durbin-Watson	1.24	1.37	1.49

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current*

Business show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

Across equations, the reference quarter on which the difference between the contemporaneous and refined measures of real GNP growth rate is beyond two percentage points is different. In *Equation 1*, the reference quarter is *Quarter t-1*, in *Equation 2*, the reference quarter is *Quarter t*, and in *Equation 3*, the reference quarter refers to both *Quarter t-1* and *Quarter t*. As a consequence, different equation has a different case number.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

In *Equation 3*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of *t-1* and Refined Measures of real GNP Growth Rate of *t* is 0.23 and 0.36 respectively.

The weight of partial transformation is 0.65, 0.73, and 0.70 respectively in *Equation 1*, *2*, and *3*.

The results are listed in Table 4-7. The Durbin-Watson Statistic of each equation becomes close to 2.00 (2.01 in *Equation 1*, 2.09 in *Equation 2*, and 2.26 in *Equation 3*). The autocorrelation in the series has decreased greatly in the data after full difference transform. In *Equation 1*, when the contemporaneous measures of real GNP growth rate of *Quarter t-1* are examined individually, they do not hold statistical significance in impacting the consumer sentiment of *Quarter t*. The refined measures of real GNP growth rate of *Quarter t*, however, are statistically significant in positively affecting the consumer sentiment of *Quarter t* ($p < 0.001$, one tailed) in *Equation 2*. If the change of the refined measures of economic growth of *Quarter t* increases one percentage point, the change of the consumer sentiment of *Quarter t* grows 0.41. In *Equation 3*, both measures of economic growth are examined together, and both measures own the statistical significance in influencing the consumer sentiment of *Quarter t* positively. The refined measures of real GNP growth rate of *Quarter t*, however, enjoy higher statistical significance ($p < 0.001$, one tailed) than the contemporaneous measures of real GNP growth rate of *Quarter t-1* ($p < 0.05$, one tailed). And the refined measures of real GNP growth rate of *Quarter t* have almost doubled coefficient (0.45 vs. 0.24), and over doubled standardized coefficient (0.41 vs. 0.19) of the contemporaneous measures of real GNP growth rate of *Quarter t-1*. As the OLS regression results on the data after partial difference transformation, here the regression results on the data after full difference transformation also present that the real economy of *Quarter t* has a stronger influences over economic perceptions than the contemporaneous measures of economic growth of *Quarter t-1*.

/Table 4-7 about here/

Table 4-7. The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with Cases Holding over Two-Percentage Difference between Contemporaneous and Refined Measures of Real GNP Growth Rates, Based on Data after Full Difference Transformation, 1960—2008

Dependent Variable: Quarterly Consumer Sentiment of t

<i>Model</i>	<i>1</i>	<i>2</i>	<i>3</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	0.20 (1.50)		0.24* (2.12)
Refined Measures of real GNP Growth Rate of t		0.41*** (3.44)	0.45*** (4.62)
Constant	0.10 (0.15)	-0.42 (0.66)	0.01 (0.02)
N	72	73	113
Adjusted R^2	0.02	0.13	0.16
Standard Error of Estimates	5.52	5.28	5.20
Durbin-Watson	2.01	2.09	2.26

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current*

Business show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

Across equations, the reference quarter on which the difference between the contemporaneous and refined measures of real GNP growth rate is beyond two percentage points is different. In *Equation 1*, the reference quarter is *Quarter t-1*, in *Equation 2*, the reference quarter is *Quarter t*, and in *Equation 3*, the reference quarter refers to both *Quarter t-1* and *Quarter t*. As a consequence, each different equation has a different case number.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

In *Equation 3*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of *t-1* and Refined Measures of real GNP Growth Rate of *t* is 0.19 and 0.41 respectively.

The summary of equations examining the effects of the contemporaneous and the refined measures of economic growth together based on big difference cases is shown in Table 4-8. From left to right, the first equation runs OLS regression on the original data, the second equation runs OLS regression on the data after partial difference transformation, and the third equation runs the same regression on the data after full difference transformation. Throughout all three data sets, both measures hold statistical significance in affecting the consumer sentiment of *Quarter t*. Although in the OLS regression results on the original data the contemporaneous measures of real GNP growth of *Quarter t-1* have a slightly stronger influence on the consumer sentiment of *Quarter t* than the refined measures of *Quarter t*, the high autocorrelation in the series in the original data lowers the convincing power of regression results. After the original data is processed by partial difference (the weight of transformation is 0.70) and full difference transformation, the high autocorrelation has decreased, especially in the data after full difference transformation. The regression results on the data after transformation should enjoy more convincing power, when Durbin-Watson Statistic reaches to acceptable area of no autocorrelation. Both regression results on the data after partial difference transformation and full difference transformation present that the refined measures of real GNP growth rate of *Quarter t* have even stronger influence on the consumer sentiment of *Quarter t* than the contemporaneous measures of real GNP growth rate of *Quarter t-1*. It is consistent with the analyses results based on all cases. I also examine the difference of the two measures' coefficients. The test *p-value* of the difference is 0.71 based on the original data, 0.43 on the data after partial difference transformation, and 0.12 on the data after full difference transformation. In this case, there may be a difference, although the evidence is also not conclusive.

/Table 4-8 about here/

To sum up time series regression on cases in which the difference between the contemporaneous and the refined measures of real GNP growth rate is beyond two percentage points, both the contemporaneous measures of economic growth of *Quarter t-1* and the real economy of *Quarter t* have positive effects on economic perceptions of *Quarter t*. The real economy of *Quarter t* has stronger impact on the economic perceptions of *Quarter t* than the contemporaneous measures of economic growth of *Quarter t-1*.

Comparing the analysis results on all cases and on big difference cases, the findings are consistent and conclusive in Figure 4-1. Both analyses report that in certain *Quarter t*, the electorate draw the economic information of quarters before *Quarter t* directly or indirectly from the contemporaneous economic reports by the BEA, and also draw the economic information of *Quarter t* and quarters before *Quarter t* directly or indirectly from the real economy. Both the contemporaneous economic reports and the real economy positively affect the electorate's economic perceptions of *Quarter t*. Regarding their influential weight, the real economy of *Quarter t* has an even stronger effects than the contemporaneous measures of economic growth of *Quarter t-1*. There may be a difference in the coefficients of the contemporaneous measures of economic growth of *Quarter t-1* and the real economy of *Quarter t* without strong evidence. In Appendix III, I change the basic analysis time unit from quarter to half year. Time series regression results on the semi-annual data report similar results to the above part.

Table 4-8. The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with Cases Holding over Two-Percentage Difference between Contemporaneous and Refined Measures of Real GNP Growth Rates, 1960—2008

Dependent Variable: Quarterly Consumer Sentiment of t

<i>Model</i>	<i>Original Data</i>	<i>Partial Difference Transformation</i>	<i>Full Difference Transformation</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	1.19*** (4.51)	0.37** (2.67)	0.24* (2.12)
Refined Measures of real GNP Growth Rate of t	1.03*** (4.05)	0.51*** (4.14)	0.45*** (4.62)
Constant	80.04*** (59.98)	25.19*** (44.28)	0.01 (0.02)
N	113	113	113
Adjusted R^2	0.33	0.15	0.16
Standard Error of Estimates	10.41	5.68	5.20
Durbin-Watson	0.58	1.49	2.26
First Order Autocorrelation	0.70		
$P > t $ of $(b1-b2)$	0.71	0.43	0.12

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

Across equations, the reference quarter on which the difference between the contemporaneous and refined measures of real GNP growth rate is beyond two percentage points is different. In *Equation 1*, the reference quarter is *Quarter t-1*, in *Equation 2*, the reference quarter is *Quarter t*, and in *Equation 3*, the reference quarter refers to both *Quarter t-1* and *Quarter t*. As a consequence, each different equation has a different case number.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

The standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ and Refined Measures of real GNP Growth Rate of t is 0.37 and 0.34 respectively in *OLS* regression model. In *Partial Difference Transformation Model*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ and Refined Measures of real GNP Growth Rate of t is 0.23 and 0.36 respectively. And in *Full Difference Transformation Model*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ is also less than that of Refined Measures of real GNP Growth Rate of t : 0.19 vs. 0.41.

/Figure 4-1 about here/

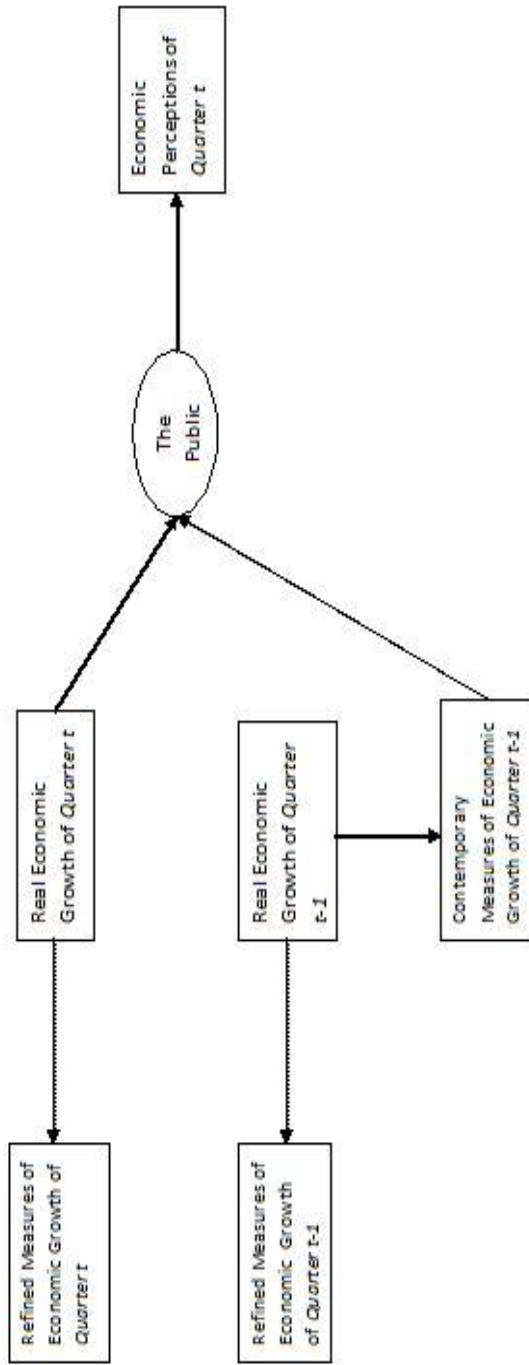
2. *Specific Cases*

In order to illustrate the above findings that both the contemporaneous measures of real GNP growth rate of *Quarter t-1* and the refined measures of real GNP growth rate of *Quarter t* have positive effects on the consumer sentiment of *Quarter t*, I selected two groups of specific cases. In the first group, there are six pairs of quarters. In each pair, both cases have the same levels of economic growth according to the contemporaneous measures, although different levels of growth according to the refined measures. In the other group, four pairs of cases show the examples with the same economic growth according to the refined measures of real GNP growth rate, although different growth rates according to the contemporaneous measures.

A. Specific Cases of Same Economic Growth According to the Contemporaneous Measures

Table 4-9 lists the first group of specific cases, in which each pair of quarters have the same economic growth according to the contemporaneous measures. Regarding the first pair of specific cases, in the second quarter of 1970 and the third quarter of 1981, the contemporaneous measures of real GNP growth rate is 0.50% referring to current quarterly estimates by the BEA. In the third quarter of 1970 when the *Survey of Current Business* of the second quarter of 1970 were released, the real economy grew at the rate of 3.54% in real GNP, and in the fourth quarter of 1981 when the *Survey of Current Business* of the third quarter of 1981 were released, the real economy dropped at the rate of 4.34% in real GNP referring to the refined measures of the comprehensive revisions by the BEA in 2008. We can see higher consumer sentiment in the third quarter of 1970 (77.6) when the real economy increased rather than that in the fourth quarter of

Figure 4-1. Contemporaneous and Refined Measures of Economic Growth Effects on Economic Perceptions in Quarter t



1981 (65.7) when the real economy decreased. In the second pair of specific cases, the BEA's current quarterly estimates show that the contemporaneous measures of real GNP growth rate is 1.50% in the fourth quarter of 1973 and the third quarter of 1996. In the BEA's comprehensive revisions, however, the real economy decreased 2.74% in real GNP in the first quarter of 1974, and the real economy increased 4.69% in real GNP in the fourth quarter of 1996. Consumer sentiment of respective quarters also ranked as expected. In the first case, the consumer sentiment was 61.8 in the first quarter of 1974 when the real economy dropped, less than that of 97.5 in the second case in the fourth quarter of 1996 when the real economy boomed. In above two pairs of specific cases, although the contemporaneous measures of real GNP growth rate of *Quarter t-1* are the same in two quarters, the real economy of *Quarter t* moved towards different directions. Consumer sentiment is higher in the quarters when real economy better off than in the quarters when real economy worse off.

/Table 4-9 about here/

With regard to the third pair of specific cases, in the second quarter of 1997 and the second quarter of 2005, the contemporaneous measures of real GNP growth rate also indicate the same increase, 3.10%. In the third quarter of 1997, however, the real economy increased more than that in the third quarter of 2005, 4.71% vs. 3.35% referring to the refined measures of real GNP growth rate. Accordingly, consumer sentiment ranked differently depending on the real economic conditions. In the third quarter of 1997, when the real economy increased more, consumer sentiment was relatively high, 105.8; whereas in the third quarter of 2005 when the real economy increased less, consumer sentiment was relatively low, 87.5. The better real

Table 4-9. Specific Cases of Same Economic Growth According to Contemporaneous Measures

Pair	Case	Contemporaneous Real GNP Growth Rate of t-1	Contemporaneous Real GNP Growth Rate of t-2	Refined Real GNP Growth Rate of t	Refined Real GNP Growth Rate of t-1	Consumer Sentiment of t	Consumer Sentiment of t-1	Change of Consumer Sentiment of t
I	1	0.50% (Q2, 1970)	-2.51%	3.54% (Q3, 1970)	0.81%	77.6	75.4	2.2
	2	0.50% (Q3, 1981)	-1.95%	-4.34% (Q4, 1981)	5.15%	65.7	74.8	-9.1
II	1	1.50% (Q4, 1973)	3.45%	-2.74% (Q1, 1974)	3.86%	61.8	76.5	-14.7
	2	1.50% (Q3, 1996)	4.33%	4.69% (Q4, 1996)	3.34%	97.5	94.9	2.6
III	1	3.10% (Q2, 1997)	5.17%	4.71% (Q3, 1997)	6.45%	105.8	103.0	2.8
	2	3.10% (Q2, 2005)	3.75%	3.35% (Q3, 2005)	1.33%	87.5	90.2	-2.7
IV	1	4.38% (Q3, 1967)	2.42%	2.98% (Q4, 1967)	3.49%	92.9	97.0	-4.1
	2	4.38% (Q3, 2005)	3.10%	1.13% (Q4, 2005)	3.35%	82.4	87.5	-5.1
V	1	4.46% (Q2, 1964)	3.80%	5.60% (Q3, 1964)	4.51%	100.6	98.5	2.1
	2	4.46% (Q4, 1987)	4.09%	2.51% (Q1, 1988)	7.15%	92.3	86.4	5.9
VI	1	4.78% (Q4, 1983)	7.74%	7.55% (Q1, 1984)	8.61%	99.5	91.5	8.0
	2	4.78% (Q1, 1989)	2.15%	2.94% (Q2, 1989)	3.76%	90.9	95.9	-5.0

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1959-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross

National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measure of real GNP growth rate of each quarter became available in the second quarter of 1959. The BEA, however, did not estimate real GNP for the fourth quarter of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

economy can cause the consumer sentiment in that quarter to rank higher. In the fourth pair of specific cases, the contemporaneous measures of real GNP growth rate of *Quarter t-1* (the third quarter of 1967 and the third quarter of 2005) in both cases are 4.38%. The real economy of *Quarter t* had higher growth rate in the first case than in the second case (2.98% in the fourth quarter of 1967 higher than 1.13% in the fourth quarter of 2005). Accordingly, the consumer sentiment of *Quarter t* also ranked higher in the first case than in the second case (92.9 in the fourth quarter of 1967 higher than 82.4 in the fourth quarter of 2005). In the fifth pair of cases, the contemporaneous measures of real GNP growth rate are the same of 4.46% in the second quarter of 1964 and the fourth quarter of 1987, although in the third quarter of 1964 the real economy increased at 5.60% in real GNP better than that of 2.51% in the first quarter of 1988. Consumer sentiment of different quarters also responded to the real economy of the reference quarters. The consumer sentiment of 100.6 in the third quarter of 1964 is obviously higher than the consumer sentiment of 92.3 in the first quarter of 1988. Finally, in the sixth pair of cases the same results are found. The contemporaneous measures of real GNP are the same, 4.78% in the fourth quarter of 1983 and the first quarter of 1989. In the first quarter of 1984, however, a better real economy presented by the refined measures of real GNP growth rate of 7.55% led to higher consumer sentiment 99.5 of that quarter; in the second quarter of 1989, a relatively poor real economy, shown by the refined measures of 2.94% caused a relatively low consumer sentiment of 90.9 in that quarter.

All of the above six pairs of specific cases show that when the contemporaneous measures of *Quarter t-1* show the same economic growth, the real economy of *Quarter t* does have a positive influence over the consumer sentiment of *Quarter t*.

B. Specific Cases of Same Economic Growth According to Refined Measures

Now, I turn to the second group of specific cases in which both cases hold the same economic growth according to the refined measures, in order to illustrate the positive relationship between the contemporaneous measures of real GNP growth rate of *Quarter t-1* and the consumer sentiment of *Quarter t*.

As far as the first pair of specific cases, in the second quarter of 1991 and the second quarter of 2004, the economic growth is the same of 1.95% in real GNP according to the refined measures. The BEA's current quarterly estimates, which were released in reference quarter, however, show that real GNP dropped down at the rate of 2.72% in the first quarter of 1991, and real GNP grew at the rate of 3.47% in the first quarter of 2004. As expected, the consumer sentiment in the second quarter of 1991 is 80.7, which is lower than 93.3 in the second quarter of 2004. In the second pair of specific cases, the common refined measures of real GNP growth rate are 3.49% in the third quarter of 1967 and the second quarter of 2007. The contemporaneous measures, however, show that real GNP increased 2.42% in the second quarter of 1967 higher than 0.58% in the first quarter of 2007. The consumer sentiment of according quarters responded to contemporaneous measures which were estimated in the reference quarter positively. Consumer sentiment was 97.0 in the third quarter of 1967 higher than that of 86.9 in the second quarter of 2007. As far as the third pair of specific cases, the BEA's refined measures present that the real economy increased at 3.86% in real GNP growth in the fourth quarter of 1973 and the third quarter of 1984. Referring to the contemporaneous measures, however, real GNP grew 3.45% in the third quarter of 1973, and 7.41% in the second quarter of 1984. In the second case experts told the public a better economy of the recent past quarter than in the first case. It resulted in a higher consumer sentiment of 98.9 in the second case than that of 76.5 in the first case. In the last pair of specific cases, the positive relationship between the contemporaneous

measures and consumer sentiment is found again. In the second quarter of 1965 and the fourth quarter of 1988 real economy increased at 5.60% of real GNP growth rate according to refined measures. At that time, however, the BEA's current quarterly estimates reported that the contemporaneous measures of real GNP growth rate were 7.66% in the first quarter of 1965 in the first case, and 2.43% in the third quarter of 1988 in the second case. Responding to the higher contemporaneous measures of real GNP growth rate in the first case, consumer sentiment also ranked higher at 105.4 in the first case than 93.0 in the second case.

/Table 4-10 about here/

The above four pairs of specific cases show that the real economy increased at the same real GNP growth rate in different quarters in each pair according to the BEA's comprehensive revisions in 2008. In each pair in *Quarter t*, however, the BEA's current quarterly estimates reported different contemporaneous measures of real GNP growth rate of *Quarter t-1*. Comparison in four pairs of specific cases show that when the real economy performs at the same level in different quarters, economic perceptions respond positively to the economic growth depicted by the BEA's contemporaneous measures.

All specific cases here are helpful in illustrating the findings that both the contemporaneous and refined measures of economic growth positively influence economic perceptions. Regarding two key independent variables in this research: the contemporaneous and the refined measures of economic growth, when one independent variable is the same, consumer sentiment as dependent variable has a positive relationship with the other independent variable in each pair of cases. In certain quarter, either high contemporaneous measures of economic growth

Table 4-10 Specific Cases Holding Same Refined Real GNP Growth Rate of *Quarter t*

<i>Pair</i>	<i>Case</i>	<i>Contemporaneous Real GNP Growth Rate of t-1</i>	<i>Contemporaneous Real GNP Growth Rate of t-2</i>	<i>Refined Real GNP Growth Rate of t</i>	<i>Refined Real GNP Growth Rate of t-1</i>	<i>Consumer Sentiment of t</i>	<i>Consumer Sentiment of t-1</i>	<i>Change of Consumer Sentiment of t</i>
<i>I</i>	<i>1</i>	-2.72% (Q1, 1991)	-1.89%	1.95% (Q2, 1991)	-2.73%	80.7	75.0	5.7
	<i>2</i>	3.47% (Q1, 2004)	5.55%	1.95% (Q2, 2004)	3.45%	93.3	98.0	-4.7
<i>II</i>	<i>1</i>	2.42% (Q2, 1967)	-0.20%	3.49% (Q3, 1967)	0.01%	97.0	95.9	1.1
	<i>2</i>	0.58% (Q1, 2007)	3.49%	3.49% (Q2, 2007)	0.80%	86.9	92.2	-5.3
<i>III</i>	<i>1</i>	3.45% (Q3, 1973)	2.48%	3.86% (Q4, 1973)	-1.53%	76.5	72.0	4.5
	<i>2</i>	7.41% (Q2, 1984)	8.94%	3.86% (Q3, 1984)	7.03%	98.9	96.6	2.3
<i>IV</i>	<i>1</i>	7.66% (Q1, 1965)	2.10%	5.60% (Q2, 1965)	10.55%	105.4	102.0	3.4
	<i>2</i>	2.43% (Q3, 1988)	3.11%	5.60% (Q4, 1988)	1.87%	93.0	96.0	-3.0

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available on the third quarter of 1958. The BEA, however, did not estimate real GNP for the

fourth quarter of 1958. The contemporary measure of real GNP growth rate of each half year became available in the second half year of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Semi-annual consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given half year.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

estimated by the BEA in that quarter or high refined measures of economic growth of that quarter revised by the BEA comprehensively can lead to high consumer sentiment of that quarter; whereas either low contemporaneous measures of economic growth estimated by the BEA in that quarter or low refined measures of economic growth of that quarter reviewed by the BEA comprehensively can cause low economic evaluations of that quarter among the electorate.

Analyses in this chapter clarify the effects of the contemporaneous and the refined measures of economic growth on consumer sentiment. In certain quarter, both the contemporaneous measures of economic growth estimated by experts in that quarter and the refined measures of economic growth of that quarter reviewed by experts have positive effects on consumer sentiment of that quarter. The refined measures of economic growth hold a stronger influence over the consumer sentiment than the contemporaneous measures.

Chapter 5

Conclusion and Implication:

Evaluation Consistency with Contemporaneous or Refined Economic Growth Measures

The link of the real economy to perceptions of the economy and then to the electorate's political attitudes and behavior has been the core of an extensive established literature on retrospective economic voting. The measurements of economic conditions have been taken for granted in studies of economic voting. Nevertheless, in reality at any particular time, the electorate draws economic information about the recent past directly or more commonly indirectly from the contemporaneous economic reports by the BEA, and also draws information about the economy directly and indirectly from observation of real economic activities. Different readings of economic conditions from different sources may cause different economic perceptions, and hence, different evaluations of political leaders.

This study has worked on the distinction between the contemporaneous measures of economic growth and the real economy as estimated by the refined measures of economic growth, and the effects of both measures on the electorate's economic perceptions, and further on their political attitudes and behavior. In this final chapter, I draw some conclusions based on the

analyses in previous chapters, and discuss the implications of evaluation consistency with the contemporaneous or the refined economic growth measures. I also discuss further research suggested by the findings of this study.

1. Conclusion

Though the real economy is the intended object of the electorate's economic perceptions, the electorate's economic perceptions are not a simply and perfect reflection of the real economy. Many factors affect how the real economic conditions are perceived. One of them is the uncertainty about the actual condition of the economy. The BEA's continual revisions on economic measures change the picture of the economic conditions quite a bit from the economy as contemporarily measured with possibly flawed but contemporaneous information to an improved estimate of the real economy measured much later with more complete and accurate information. While the contemporaneous and the refined measures are typically highly correlated, there are many times in which there are big differences between them. At any particular time, the BEA release their probably inaccurate contemporaneous measures of the recent past economy, while the electorate experience and observe real economic activities as later revealed by the refined economic measures by the BEA. Both the contemporaneous measures of the recent past economy and the real economy may become the direct and indirect economic information sources of the electorate, and hence affect the electorate's economic perceptions. This study examines and compares the effects of both the contemporaneous economic reports by the BEA and the real economy on the electorate's economic perceptions, and political attitudes and behavior.

The analyses reported in this research indicate that the electorate's economic perceptions directly affect their political attitudes and behavior. Both the contemporaneous economic reports by the BEA and the real economy may indirectly influence the electorate's political attitudes and behavior via their economic perceptions. The questions asked here were whether they have an effect, what are their relative effects on the electorate's economic perceptions. With the help of time series regression techniques, analyses of the effects of the contemporaneous and the refined measures of real GNP growth rate on consumer sentiment from 1960 to 2008 indicate that both the contemporaneous economic reports by the BEA and the real economy as later revealed by refined BEA measures positively affect the electorate's economic perceptions. The better are either the contemporaneous economic reports by the BEA or the real economy as estimated by the refined measures of economic growth, the better are economic perceptions among the electorate. Between the two, the real economy as described by the refined measures of economic growth appears to have a slightly stronger influence over perceptions than the contemporaneous economic reports by the BEA. The electorate refers to both the latest contemporaneous economic reports by the BEA released at that time and the real economy of that time in their process of forming their economic perceptions, but they depend more on their own experiences and observations of the real economy in their day-to-day lives. The evidence of the state of the economy acquired during their daily lives provides citizens with the most direct and cheapest economic information and are, ultimately, more important in shaping their economic perceptions.

The electorate responds not only to the economy as the contemporaneous experts at that time describe it to be, but also to the real economic conditions as later experts were able to determine it more accurately to have been. Both versions of "economy" affect Americans' perceptions of the economy, and the version of the real economy as later experts were able to

determine it more accurately to have been is more significant when the electorate forms their economic perceptions.

2. The Implications of Evaluation Consistency with Contemporaneous or Refined Economic Growth Measures

The above conclusion is important, because it is helpful in answering questions concerning the economic information process in retrospective economic voting and implication, even answering the question of how democracies can function effectively with the electorates who are not fully informed in democratic theory.

Depending on the assumption that the electorate could fully realize and understand what is happening in the economy, and the assumption that the contemporaneous government statistics reflects the economy accurately, a huge literature attempts to link the contemporaneous government economic statistics to electoral outcomes and presidential approval (Blendon et al. 1997, and Lewis-Beck 1988). In fact, when the contemporaneous government economic statistics is employed to measure the economy, the real economy may have been misrepresented, it does so with some significant error. That is, the contemporaneous measures are imperfect, errors happen between the contemporaneous government economic statistics and the real economy due to the limited available source data (Doms and Morin 2004, and Blendon et al. 1997). For example, most of “advance” estimates of the BEA refer to “previous trends and judgment” (Bureau of Economic Analysis 2009: 1-7). The economic performance in a certain quarter shows a clue of what to expect the following quarter. As a result, the economic experts may expect a picture of the economic conditions different from the real economy, such as in the third quarter

of 2008, when the real economy was much poorer than what the economic experts expected (Campbell 2011). As a result, the electorate's economic perceptions may have been simplified, for the reason that the contemporaneous government economic statistics is not the only one of the information sources of the electorate's economic perceptions (Doms and Morin 2004, and Blendon et al. 1997).

There are gaps between how the electorate and the government statistics view the economy, as well as the real economy. After Blendon et al. (1997) find "a substantial gap between how the public and economists view the economy," they explain possible conditions, which may cause the gap. One of them is that the electorate's experiences of the real economy in their day-to-day lives and observations of how others whom they know tell them a different story from the contemporaneous government economic statistics. This condition happens more when there are big gaps between the real economy and the contemporaneous government economic statistics. But both the contemporaneous government economic statistics and the electorate's economic perceptions mirror the real economy. Given the significance of the electorate's economic perceptions, it is important to understand how the electorate's economic perceptions correspond with the real economy, and with the contemporaneous measures of that economy.

This study finds that the electorate draws economic information to form their economic perceptions from both the contemporaneous economic reports by the BEA and the real economy as estimated by the refined economic reports by the BEA. Between the two, the actual economy as measured by the BEA's refined measures has the stronger influence. These findings may shed light on various analyses of the impact of the economy on politics. For example, many forecasting models of presidential elections must rely upon the contemporaneous measures of the economy. Since the real economy as measured much later by the BEA has the greater impact on

voters' economic perceptions and evaluations, but is unavailable at the time to forecasters, predictions of the elections will contain greater error than they would have had with a measure of actual economic conditions.

Politicians and campaign strategists may also make mistakes when they design their campaign strategies based on the contemporaneous measures of economic growth. When economic reality is better than the contemporaneous measures of the time indicate, in-party candidates may be too guarded or defensive in their strategies and out-party candidates may be too ambitious or aggressive in theirs. When economic reality, on the other hand, is weaker than the contemporaneous measures suggest, the opposite mis-estimations may occur. In-party candidates may be too aggressive, and out-party candidates may be too cautious. The incomplete and inaccurate contemporaneous measures of the economy may cause their decisions to deviate from the correct choice. These discrepancies may go so far as to cause strategic candidates to make mistakes about decisions to seek higher offices or whether or not to retire from office (Jacobson and Kernell 1982).

And our understanding may also move forward in three aspects. First, the electorate is capable of evaluating the economy (Mackuen and Coombs, 1981). The electorate experiences the real economy in their day-to-day lives and observations of how others whom they know are affected by the economy (Campbell 2008). As “the reasoning voter” (Popkin 1994), the uninformed electorate “successfully uses cues and information shortcuts” to form their economic perceptions “as if they were fully informed” (Bartels 1996: 194). Second, the electorate depends more on their experiences and observations of the real economy in their day-to-day lives rather than on the contemporaneous governmental economic measures, when they form their economic perceptions. Third, overall the electorate may not trust much in the contemporaneous

governmental economic measure and their accuracy (Blendon et al. 1997), comparing to the fact that their experiences and observations of the real economy provide costless information shortcuts (Popkin 1994), which help the electorate gain immediate and tangible information on the economy (Kiewiet 1983).

Even though the electorate has only a modest level of economic information, they still depend more on sensing the pulse of the real economy in their day-to-day lives and observations of how others whom they know are affected by the economy than drawing economic information from the contemporaneous governmental economic statistical index in forming their economic perceptions, further practicing retrospective economic voting. As a result, democracy can function in a healthy way on retrospective voting, even when the electorate has only modest levels of information and sophistication, referring to democratic theorists (Key 1966, and Lippmann 1925).

3. Further Research

This study just opens an exploit on the difference of the contemporaneous measures of economic performance and the real economy in real GNP growth rate, and their effects on perceptions of the economy, several jobs need to be paid more attention to in future research.

First, it is better to update measurements of economic performance and economic perceptions of the electorate, when more data becomes available in real GDP and consumer confidence index. Because real GNP is available from the third quarter of 1958 to the present, whereas real GDP has been estimated since the third quarter of 1991, real GNP growth rate has a much longer time span than real GDP. As a result, real GNP annual growth rate is employed to

measure economic growth in this research. However, GDP is better in describing the real economy in the United States than GNP, for the reason that GDP “covers the goods and services produced by labor and property located in the United States and is thus consistent with key economic indicators of employment, productivity, and industry output”²⁹, whereas GNP covers the goods and services produced by the labor and property of Americans. Meanwhile, the two most popular measures of economic perceptions are University of Michigan’s *The Index of Consumer Sentiment* and the Conference Board’s *Consumer Confidence Index*. Besides *The Index of Consumer Sentiment*, *Consumer Confidence Index* provides another effective way to measure economic perceptions of the electorate, although it became available in 1971 later than *The Index of Consumer Sentiment*.

Second, further research may answer such questions as whether there is any distance from other contemporaneous governmental economic estimates to the real economy, like unemployment, although Runkle (1998) finds the big difference in real economic output and inflation between their contemporaneous measures and their revisions. What is the difference between other contemporaneous governmental economic estimates and the real economy? How do they influence the electorate’s economic perceptions with the real economy?

Third, since the contemporaneous measures of real GNP growth rate is not very highly reliable, although they also have influences on the electorate’s economic perceptions, are there any other contemporaneous measures of the economy holding higher reliability than the contemporaneous measures of real GNP growth rate? Are there any substitutes of the

²⁹ Bureau of Economic Analysis. “A Guide to the National Income and Product Accounts of the United States”
<http://www.bea.gov/national/pdf/nipaguid.pdf>

contemporaneous measures of real GNP growth rate for election forecasting models and campaign strategists? What is the best substitute?

The most important finding in this study is that at certain time, the electorate draws economic information not only from the real economy, but also from the contemporaneous economic reports by the BEA, to form their economic perceptions. Between the two, the real economy as later revealed by the refined measures of real GNP growth rate by the BEA holds a stronger influence than the contemporaneous economic reports by the BEA. In implication, the relatively weak effects of the contemporaneous measures of economic growth over economic perceptions prove they are relatively poorly reliable to measure the economy and the electorate's economic perceptions. It should be emphasized that the limited reliability of the contemporaneous measures of economic growth may cause mistakes in presidential election forecasts and politician and campaign strategy designs, when election forecasters, politicians, and campaign strategists rely so much on the contemporaneous economic reports by the BEA.

Appendix I

Release Record of GNP and GDP in Monthly Survey of Current Business by the BEA

The purpose of this appendix is to record the historic details of the release of the contemporaneous measures of GNP and GDP by the Bureau of Economic Analysis (BEA). In this study, all original contemporaneous measures of GNP and GDP are collected from the original version of the *Survey of Current Business* released by the Bureau of Economic Analysis (BEA) each month. Original *Survey of Current Business* before 1994 is available in Data & Statistics, FRASER ECONOMIC LIBRARY AND ARCHIVES in St. Louis FED. And original *Survey of Current Business* after 1994 is collected from Survey of Current Business Online at BEA. In Table I-1, I made summary of the release date, reference quarter, and measurement on reference quarter's economy of each issue of the *Survey of Current Business* from August 1947 to December 2010.

/Table I-1 about here/

Table I-1. Release Record of GNP and GDP in Survey of Current Business: National Income and Product Accounts

Source: FRASER³⁰ and BEA

<i>Release Date</i>	<i>Reference Quarter</i>	<i>Measurement on Reference Quarter's Economy</i>
01-Aug-1947	Second Quarter 1947	GNP in current dollars
01-Oct-1947	Second Quarter 1947 Revised Q1.1947	GNP in current dollars
01-Nov-1947	Third Quarter 1947 Revised Q2.1947 and Q1.1947	GNP in current dollars
01-Dec-1947	Third Quarter 1947	GNP in current dollars
01-Jan-1948	Third Quarter 1947 Revised Q2.1947	GNP in current dollars
01-Feb-1948	Fourth Quarter 1947 Revised Q1.1947 to Q3.1947	GNP in current dollars
01-Mar-1948	Revised Fourth Quarter 1947 Revised Q3.1947	GNP in current dollars
01-Apr-1948	Fourth Quarter 1947	GNP in current dollars
01-May-1948	First Quarter 1948 Revised Q4.1947	GNP in current dollars
01-Jun-1948	First Quarter 1948	GNP in current dollars
01-Jul-1948	Revised First Quarter 1948 and Historical Data Revised Q2.1947 to Q1.1948	GNP in current dollars
01-Aug-1948	Second Quarter 1948 Revised Q1.1948	GNP in current dollars
01-Sep-1948	Second Quarter 1948	GNP in current dollars
01-Oct-1948	Second Quarter 1948	GNP in current dollars
01-Nov-1948	Third Quarter 1948 Revised Q1.1948 and Q2.1948	GNP in current dollars
01-Dec-1948	Third Quarter 1948	GNP in current dollars
01-Jan-1949	Third Quarter 1948	GNP in current dollars
01-Feb-1949	Fourth Quarter 1948 Revised Q1.1949 to Q3.1949	GNP in current dollars
01-Mar-1949	Fourth Quarter 1948	GNP in current dollars
01-Apr-1949	Fourth Quarter 1948	GNP in current dollars
01-May-1949	First Quarter 1949 Revised Q4.1948	GNP in current dollars
01-Jun-1949	First Quarter 1949	GNP in current dollars
01-Jul-1949	First Quarter 1949 and Historical Tables Revised Q2.1948 to Q1.1949	GNP in current dollars
01-Aug-1949	Second Quarter 1949 Revised Q1.1949	GNP in current dollars
01-Sep-1949	Second Quarter 1949	GNP in current dollars

³⁰ <http://fraser.stlouisfed.org/statreleases/nipa/>

01-Oct-1949	Second Quarter 1949 Revised Q1.1949	GNP in current dollars
01-Nov-1949	Third Quarter 1949 Revised Q1.1949 and Q2.1949	GNP in current dollars
01-Dec-1949	Third Quarter 1949	GNP in current dollars
01-Jan-1950	Third Quarter 1949	GNP in current dollars
01-Feb-1950	Fourth Quarter 1949 Revised Q1. 1949 to Q3. 1949	GNP in current dollars
01-Mar-1950	Annual Total 1949	GNP in current dollars
01-Apr-1950	Fourth Quarter 1949	GNP in current dollars
01-May-1950	First Quarter 1950 Revised Q4.1949	GNP in current dollars
01-Jun-1950	First Quarter 1950 Revised Q4.1949	GNP in current dollars
01-Jul-1950	First Quarter 1950 and Historical Data Revised Q2.1949 to Q1.1950	GNP in current dollars
01-Aug-1950	Second Quarter 1950 Revised Q4. 1949 and Q1. 1950	GNP in current dollars
01-Sep-1950	Second Quarter 1950	GNP in current dollars
01-Oct-1950	Second Quarter 1950 Revised Q1.1950	GNP in current dollars
01-Nov-1950	Third Quarter 1950 Revised Q1.1950 and Q2.1950	GNP in current dollars
01-Dec-1950	Third Quarter 1950	GNP in current dollars
01-Jan-1951	Third Quarter 1950 Revised Q1.1950 and Q2.1950	GNP in current dollars
01-Feb-1951	Fourth Quarter 1950 Revised Q1.1950 to Q3.1950	GNP in current dollars
01-Mar-1951	Fourth Quarter 1950	GNP in current dollars
01-Apr-1951	Fourth Quarter 1950	GNP in current dollars
01-May-1951	First Quarter 1951 Revised Q3.1950 and Q4.1950	GNP in current dollars
01-Jun-1951	First Quarter 1951	GNP in current dollars
01-Jul-1951	First Quarter 1951 Revised Q2.1950 through Q1.1951	GNP in current dollars
01-Aug-1951	Second Quarter 1951 Revised Q1.1950 through Q1.1951	GNP in current dollars
01-Sep-1951	Second Quarter 1951	GNP in current dollars
01-Oct-1951	Second Quarter 1951 Revised Q1.1951	GNP in current dollars
01-Nov-1951	Third Quarter 1951 Revised Q1.1951 and Q2.1951	GNP in current dollars
01-Dec-1951	Third Quarter 1951 Revised Q3.1951	GNP in current dollars
01-Jan-1952	Third Quarter 1951 Revised Q3.1951	GNP in current dollars
01-Feb-1952	Fourth Quarter 1951	GNP in current dollars

	Revised Q1.1951 to Q3.1951	
01-Mar-1952	Fourth Quarter 1951 and Annual 1951	GNP in current dollars
01-Apr-1952	Fourth Quarter 1951	GNP in current dollars
01-May-1952	First Quarter 1952 Revised Q1.1951 to Q4.1951	GNP in current dollars
01-Jun-1952	First Quarter 1952	GNP in current dollars
01-Jul-1952	First Quarter 1952 and Historical Data Revised Q2.1951 to Q1.1952	GNP in current dollars
01-Aug-1952	Second Quarter 1952 Revised Q1.1952	GNP in current dollars
01-Sep-1952	Second Quarter 1952	GNP in current dollars
01-Oct-1952	Second Quarter 1952	GNP in current dollars
01-Nov-1952	Third Quarter 1952 Revised Q1.1952 and Q2.1952	GNP in current dollars
01-Dec-1952	Third Quarter 1952	GNP in current dollars
01-Jan-1953	Third Quarter 1952	GNP in current dollars
01-Feb-1953	Fourth Quarter 1952 Revised Q1.1952 through Q3.1952	GNP in current dollars
01-Mar-1953	Fourth Quarter 1952 Preliminary Q4.1952	GNP in current dollars
01-Apr-1953	Fourth Quarter 1952 Preliminary Q4.1952	GNP in current dollars
01-May-1953	First Quarter 1953 Revised Q1.1952 to Q4.1952	GNP in current dollars
01-Jun-1953	First Quarter 1953	GNP in current dollars
01-Jul-1953	First Quarter 1953 and Historical Data Revised Q2.1952 to Q1.1953	GNP in current dollars
01-Aug-1953	Second Quarter 1953 Revised Q1.1953	GNP in current dollars
01-Sep-1953	Second Quarter 1953	GNP in current dollars
01-Oct-1953	Second Quarter 1953 Revised Q1.1953	GNP in current dollars
01-Nov-1953	Third Quarter 1953 Revised Q2.1953	GNP in current dollars
01-Dec-1953	Third Quarter 1953 Revised Q2.1953	GNP in current dollars
01-Jan-1954	Third Quarter 1953	GNP in current dollars
01-Feb-1954	Fourth Quarter 1953 Revised Q1.1953 to Q3.1953	GNP in current dollars
01-Mar-1954	Fourth Quarter 1953	GNP in current dollars
01-Apr-1954	Fourth Quarter 1953	GNP in current dollars
01-May-1954	First Quarter 1954 Revised Q1.1953 to Q4.1953	GNP in current dollars
01-Jun-1954	First Quarter 1954	GNP in current dollars
01-Jul-1954	Historical Tables Revised Q1.1950 to Q4.1953	GNP in current dollars
01-Aug-1954	Second Quarter 1954	GNP in current dollars

	Revised Q1.1953 to Q1.1954	
01-Sep-1954	Second Quarter 1954	GNP in current dollars
01-Oct-1954	Second Quarter 1954	GNP in current dollars
01-Nov-1954	Third Quarter 1954 Revised Q1.1954 and Q2.1954	GNP in current dollars
01-Dec-1954	Third Quarter 1954	GNP in current dollars
01-Jan-1955	Third Quarter 1954	GNP in current dollars
01-Feb-1955	Fourth Quarter 1954 Revised Q1. 1954 through Q3.1954	GNP in current dollars
01-Mar-1955	Fourth Quarter 1954	GNP in current dollars
01-Apr-1955	Fourth Quarter 1954	GNP in current dollars
01-May-1955	First Quarter 1955 Revised Q1.1954 through Q4.1954	GNP in current dollars
01-Jun-1955	First Quarter 1955	GNP in current dollars
01-Jul-1955	First Quarter 1955 and Historical Data Revised Q2.1954 to Q1.1955	GNP in current dollars
01-Aug-1955	Second Quarter 1955 Revised Q1.1953 through Q4.1954	GNP in current dollars
01-Sep-1955	Second Quarter 1955	GNP in current dollars
01-Oct-1955	Second Quarter 1955	GNP in current dollars
01-Nov-1955	Third Quarter 1955 Revised Q2.1955	GNP in current dollars
01-Dec-1955	Third Quarter 1955	GNP in current dollars
01-Jan-1956	Revised Third Quarter 1955	GNP in current dollars
01-Feb-1956	Fourth Quarter 1955 Revised Q1.1955 through Q3.1955	GNP in current dollars
01-Mar-1956	Fourth Quarter 1955	GNP in current dollars
01-Apr-1956	Revised Fourth Quarter 1955	GNP in current dollars
01-May-1956	First Quarter 1956 Revised Q1.1955 through Q4.1955	GNP in current dollars
01-Jun-1956	First Quarter 1956	GNP in current dollars
01-Jul-1956	Revised First Quarter 1956 and Historical Data Revised Q2.1955 to Q1.1956	GNP in current dollars
01-Aug-1956	Second Quarter 1956 Revised Q1.1954 through Q1.1956	GNP in current dollars
01-Sep-1956	Second Quarter 1956	GNP in current dollars
01-Oct-1956	Second Quarter 1956	GNP in current dollars
01-Nov-1956	Third Quarter 1956 Revised Q2.1956	GNP in current dollars
01-Dec-1956	Third Quarter 1956	GNP in current dollars
01-Jan-1957	Third Quarter 1956	GNP in current dollars
01-Feb-1957	Fourth Quarter 1956 Revised Q1.1956 through Q3.1956	GNP in current dollars
01-Mar-1957	Fourth Quarter 1956	GNP in current dollars
01-Apr-1957	Fourth Quarter 1956	GNP in current dollars
01-May-1957	First Quarter 1957	GNP in current dollars

	Revised Q1.1956 through Q3.1956	
01-Jun-1957	First Quarter 1957	GNP in current dollars
01-Jul-1957	Revised First Quarter 1957 and Historical Data Revised Q2.1956 to Q1.1957	GNP in current dollars
01-Aug-1957	Second Quarter 1957 Revised Q1.1955 through Q1.1957	GNP in current dollars
01-Sep-1957	Second Quarter 1957	GNP in current dollars
01-Oct-1957	Second Quarter 1957 Revised	GNP in current dollars
01-Nov-1957	Third Quarter 1957 Revised Q1.1955 through Q2.1957	GNP in current dollars
01-Dec-1957	Third Quarter 1957	GNP in current dollars
01-Jan-1958	Third Quarter 1957	GNP in current dollars
01-Feb-1958	Fourth Quarter 1957 Revised Q1.1957 to Q3.1957	GNP in current dollars
01-Mar-1958	Fourth Quarter 1957	GNP in current dollars
01-Apr-1958	Fourth Quarter 1957	GNP in current dollars
01-May-1958	First Quarter 1958 and Annual 1957	GNP in current dollars
01-Jun-1958	First Quarter 1958	GNP in current dollars
01-Jul-1958	Revised First Quarter 1958 and Historical Data Revised Q2.1957 to Q1.1958	GNP in current dollars
01-Aug-1958	Second Quarter 1958	GNP in current dollars
01-Sep-1958	Second Quarter 1958	GNP in current dollars
01-Oct-1958	Second Quarter 1958	GNP in current dollars
01-Nov-1958	Third Quarter 1958	GNP in current dollars
01-Dec-1958	Third Quarter 1958	GNP in 1957 dollars
01-Jan-1959	Third Quarter 1958	GNP in current dollars
01-Feb-1959	Fourth Quarter 1958 Preliminary	GNP in current dollars
01-Mar-1959	Fourth Quarter 1958	GNP in current dollars
01-Apr-1959	Fourth Quarter 1958	GNP in current dollars
01-May-1959	First Quarter 1959 Revised Q3.1957 through Q4.1958	GNP in 1954 dollars
01-Jun-1959	First Quarter 1959	GNP in current dollars
01-Jul-1959	Revised First Quarter 1959 and Historical Data Revised Q2.1958 to Q1.1959	GNP in current dollars
01-Aug-1959	Second Quarter 1959 Revised Q1.1958 through Q1.1959	GNP in 1954 dollars
01-Sep-1959	Second Quarter 1959	GNP in current dollars
01-Oct-1959	Second Quarter 1959	GNP in 1954 dollars
01-Nov-1959	Third Quarter 1959 Revised Q1.1958 through Q2.1959	GNP in 1954 dollars
01-Dec-1959	Third Quarter 1959	GNP in 1954 dollars
01-Jan-1960	Third Quarter 1959	GNP in 1954 dollars
01-Feb-1960	Fourth Quarter 1959 Revised Q1.1959 to Q3.1959	GNP in 1954 dollars
01-Mar-1960	Corrected Fourth Quarter 1959	GNP in 1954 dollars
01-Apr-1960	Fourth Quarter 1959	GNP in 1954 dollars

01-May-1960	First Quarter 1960 Revised Q1.1959 through Q4.1959	GNP in 1954 dollars
01-Jun-1960	First Quarter 1960	GNP in 1954 dollars
01-Jul-1960	Revised First Quarter 1960 and Historical Data Revised Q2.1959 to Q1.1960	GNP in 1954 dollars
01-Aug-1960	Second Quarter 1960 Revised Q2.1959 through Q1.1960	GNP in 1954 dollars
01-Sep-1960	Second Quarter 1960	GNP in 1954 dollars
01-Oct-1960	Second Quarter 1960	GNP in 1954 dollars
01-Nov-1960	Third Quarter 1960 Revised Q3.1959 through Q2.1960	GNP in 1954 dollars
01-Dec-1960	Third Quarter 1960	GNP in 1954 dollars
01-Jan-1961	Third Quarter 1960	GNP in 1954 dollars
01-Feb-1961	Fourth Quarter 1960	GNP in 1954 dollars
01-Mar-1961	Fourth Quarter 1960	GNP in 1954 dollars
01-Apr-1961	Fourth Quarter 1960	GNP in 1954 dollars
01-May-1961	First Quarter 1961 Revised Q1.1960 through Q4.1960	GNP in 1954 dollars
01-Jun-1961	First Quarter 1961	GNP in 1954 dollars
01-Jul-1961	Revised First Quarter 1961 and Historical Data Revised Q2.1960 to Q1.1961	GNP in 1954 dollars
01-Aug-1961	Second Quarter 1961	GNP in 1954 dollars
01-Sep-1961	Second Quarter 1961	GNP in 1954 dollars
01-Oct-1961	Second Quarter 1961	GNP in 1954 dollars
01-Nov-1961	Third Quarter 1961	GNP in 1954 dollars
01-Dec-1961	Third Quarter 1961	GNP in 1954 dollars
01-Jan-1962	Third Quarter 1961	GNP in 1954 dollars
01-Feb-1962	Fourth Quarter 1961 Revised Q4.1960 through Q4.1961	GNP in 1954 dollars
01-Mar-1962	Fourth Quarter 1961	GNP in 1954 dollars
01-Apr-1962	Fourth Quarter 1961	GNP in 1954 dollars
01-May-1962	First Quarter 1962	GNP in 1954 dollars
01-Jun-1962	First Quarter 1962	GNP in 1954 dollars
01-Jul-1962	Revised First Quarter 1962 and Historical Data Revised Q1.1959 to Q1.1962 and Annual 1961 summary	GNP in 1954 dollars
01-Aug-1962	Second Quarter 1962	GNP in 1954 dollars
01-Sep-1962	Second Quarter 1962	GNP in 1954 dollars
01-Oct-1962	Second Quarter 1962	GNP in 1954 dollars
01-Nov-1962	Third Quarter 1962	GNP in 1954 dollars
01-Dec-1962	Third Quarter 1962	GNP in 1954 dollars
01-Jan-1963	Third Quarter 1962	GNP in 1954 dollars
01-Feb-1963	Fourth Quarter 1962 and Historical Data	GNP in 1954 dollars
01-Mar-1963	Fourth Quarter 1962 Preliminary and Revised Fourth Quarter 1963 Revised Entire year of 1962 and Preliminary Q2.1963	GNP in 1954 dollars

01-Apr-1963	Fourth Quarter 1962	GNP in 1954 dollars
01-May-1963	First Quarter 1963 and Historical Data	GNP in 1954 dollars
01-Jun-1963	Revised First Quarter 1963 Revised from 1959 to Q1.1963	GNP in 1954 dollars
01-Jul-1963	Revised First Quarter 1963 and Historical Data Revised Q1.1960 to Q1.1963	GNP in 1954 dollars
01-Aug-1963	Second Quarter 1963	GNP in 1954 dollars
01-Sep-1963	Revised Second Quarter 1963 Revised from 1959 to Q2.1963	GNP in 1954 dollars
01-Oct-1963	Second Quarter 1963	GNP in 1954 dollars
01-Nov-1963	Preliminary Third Quarter 1963 and Historical Data	GNP in 1954 dollars
01-Dec-1963	Revised Third Quarter 1963	GNP in 1954 dollars
01-Jan-1964	Third Quarter 1963 and Historical Data	GNP in 1954 dollars
01-Feb-1964	Fourth Quarter 1963	GNP in 1954 dollars
01-Mar-1964	Revised Fourth Quarter 1963	GNP in 1954 dollars
01-Apr-1964	Revised Fourth Quarter 1963	GNP in 1954 dollars
01-May-1964	Preliminary First Quarter 1964 and Historical Data	GNP in 1954 dollars
01-Jun-1964	Revised First Quarter 1964	GNP in 1954 dollars
01-Jul-1964	Preliminary Second Quarter 1964 and Historical Data	GNP in 1954 dollars
01-Aug-1964	Revised Second Quarter 1964 and Historical Data	GNP in 1954 dollars
01-Sep-1964	Revised Second Quarter 1964	GNP in 1954 dollars
01-Oct-1964	Preliminary Third Quarter 1964 and Historical Data	GNP in 1954 dollars
01-Nov-1964	Revised Third Quarter 1964	GNP in 1954 dollars
01-Dec-1964	Third Quarter 1964	GNP in 1954 dollars
01-Jan-1965	Preliminary Fourth Quarter 1964 and Historical Data	GNP in 1954 dollars
01-Feb-1965	Revised Fourth Quarter 1964 and Historical Data	GNP in 1954 dollars
01-Mar-1965	Revised Fourth Quarter 1964 and Historical Revisions Back to 1961	GNP in 1954 dollars
01-Apr-1965	Preliminary First Quarter 1965 and Historical Data Revised Q4.1964, Historical Revisions to 1961	GNP in 1954 dollars
01-May-1965	Revised First Quarter 1965 and Historical Revisions back to 1961	GNP in 1954 dollars
01-Jun-1965	Revised First Quarter 1965 and Historical Data	GNP in 1954 dollars
01-Jul-1965	Preliminary Second Quarter 1965 and Historical Revisions back to 1961	GNP in 1954 dollars
01-Aug-1965	Revised Second Quarter 1965, Revised Q2.1962 to Q2.1965, and Historical Revisions back to 1961	GNP in 1958 dollars
01-Sep-1965	Second Quarter 1965 Historical Revisions back to 1929	GNP in 1958 dollars
01-Oct-1965	Preliminary Third Quarter 1965 and Historical Revisions Back to 1929	GNP in 1958 dollars
01-Nov-1965	Revised Third Quarter 1965 and Historical Revisions back to 1929	GNP in 1958 dollars
01-Dec-1965	Third Quarter 1965 Historical Revisions back to 1929	GNP in 1958 dollars
01-Jan-1966	Fourth Quarter 1965 Preliminary and Historical Data	GNP in 1958 dollars

	Revised Q1.1965 to Q3.1965	
01-Feb-1966	Revised Fourth Quarter 1965	GNP in 1958 dollars
01-Mar-1966	Fourth Quarter 1965 and Historical Data	GNP in 1958 dollars
01-Apr-1966	Preliminary First Quarter 1966 and Historical Data	GNP in 1958 dollars
01-May-1966	Revised First Quarter 1966 and Historical Data	GNP in 1958 dollars
01-Jun-1966	First Quarter 1966	GNP in 1958 dollars
01-Jul-1966	Preliminary Second Quarter 1966 and Historical Data Revisions from Q2.1963 to Q1.1966 and Historical Revisions	GNP in 1958 dollars
01-Aug-1966	Revised Second Quarter 1966 Historical Revisions	GNP in 1958 dollars
01-Sep-1966	Second Quarter 1966 Historical Revisions	GNP in 1958 dollars
01-Oct-1966	Preliminary Third Quarter 1966 and Historical Data Revisions from Q2.1963 to Q2.1966 and Historical Revisions	GNP in 1958 dollars
01-Nov-1966	Revised Third Quarter 1966 Historical Revisions	GNP in 1958 dollars
01-Dec-1966	Third Quarter 1966 Historical Revisions	GNP in 1958 dollars
01-Jan-1967	Preliminary Fourth Quarter 1966 and Revised Q3.1966 and Historical Revisions	GNP in 1958 dollars
01-Feb-1967	Revised Fourth Quarter 1966 Historical Revisions	GNP in 1958 dollars
01-Mar-1967	Fourth Quarter 1966 Historical Revisions	GNP in 1958 dollars
01-Apr-1967	Preliminary First Quarter 1967 and Historical Revisions	GNP in 1958 dollars
01-May-1967	Revised First Quarter 1967 and Historical Revisions	GNP in 1958 dollars
01-Jun-1967	First Quarter 1967 Historical Revisions	GNP in 1958 dollars
01-Jul-1967	Preliminary Second Quarter 1967 and Historical Data Revised Q2.1964 to Q1.1967 and Historical Revisions	GNP in 1958 dollars
01-Aug-1967	Revised Second Quarter 1967 Historical Revisions	GNP in 1958 dollars
01-Sep-1967	Second Quarter 1967 Historical Revisions	GNP in 1958 dollars
01-Oct-1967	Preliminary Third Quarter 1967 Historical Revisions	GNP in 1958 dollars
01-Nov-1967	Revised Third Quarter 1967 Historical Revisions	GNP in 1958 dollars
01-Dec-1967	Third Quarter 1967 Historical Revisions	GNP in 1958 dollars
01-Jan-1968	Preliminary Fourth Quarter 1967 Historical Revisions	GNP in 1958 dollars
01-Feb-1968	Revised Fourth Quarter 1967 Historical Revisions	GNP in 1958 dollars

01-Mar-1968	Fourth Quarter 1967 Historical Revisions	GNP in 1958 dollars
01-Apr-1968	Preliminary First Quarter 1967 Historical Revisions	GNP in 1958 dollars
01-May-1968	Revised First Quarter 1967	GNP in 1958 dollars
01-Jun-1968	First Quarter 1968	GNP in 1958 dollars
01-Jul-1968	Preliminary Second Quarter 1968 Revised Q2.1965 to Q1.1968 and Historical Revisions	GNP in 1958 dollars
01-Aug-1968	Revised Second Quarter 1968 Historical Revisions	GNP in 1958 dollars
01-Sep-1968	Revised Second Quarter 1968	GNP in 1958 dollars
01-Oct-1968	Preliminary Third Quarter 1968 Historical Revisions	GNP in 1958 dollars
01-Nov-1968	Revised Third Quarter 1968 Historical Revisions	GNP in 1958 dollars
01-Dec-1968	Third Quarter 1968 Historical Revisions	GNP in 1958 dollars
01-Jan-1969	Preliminary Fourth Quarter 1968 Historical Revisions	GNP in 1958 dollars
01-Feb-1969	Revised Fourth Quarter 1968 Historical Revisions	GNP in 1958 dollars
01-Mar-1969	Fourth Quarter 1968 Historical Revisions	GNP in 1958 dollars
01-Apr-1969	Preliminary First Quarter 1969 Historical Revisions	GNP in 1958 dollars
01-May-1969	Revised First Quarter 1969 Historical Revisions	GNP in 1958 dollars
01-Jun-1969	First Quarter 1969 Historical Revisions	GNP in 1958 dollars
01-Jul-1969	Preliminary Second Quarter 1969 Revised Q2.1966 to Q1.1969 and Historical Revisions	GNP in 1958 dollars
01-Aug-1969	Revised Second Quarter 1969 Historical Revisions	GNP in 1958 dollars
01-Sep-1969	Second Quarter 1969 Historical Revisions	GNP in 1958 dollars
01-Oct-1969	Preliminary Third Quarter 1969 Historical Revisions	GNP in 1958 dollars
01-Nov-1969	Revised Third Quarter 1969 Historical Revisions	GNP in 1958 dollars
01-Dec-1969	Third Quarter 1969 Historical Revisions	GNP in 1958 dollars
01-Jan-1970	Preliminary Fourth Quarter 1969 Historical Revisions back to 1965	GNP in 1958 dollars
01-Feb-1970	Revised Fourth Quarter 1969 Historical Revisions back to 1965	GNP in 1958 dollars
01-Mar-1970	Fourth Quarter 1969	GNP in 1958 dollars
01-Apr-1970	Preliminary First Quarter 1970	GNP in 1958 dollars

01-May-1970	Revised First Quarter 1970	GNP in 1958 dollars
01-Jun-1970	First Quarter 1970	GNP in 1958 dollars
01-Jul-1970	Preliminary Second Quarter 1970 Historical Revisions back to 1967	GNP in 1958 dollars
01-Aug-1970	Revised Second Quarter 1970 Historical Revisions back to 1967	GNP in 1958 dollars
01-Sep-1970	Second Quarter 1970 Historical Revisions back to 1967	GNP in 1958 dollars
01-Oct-1970	Preliminary Third Quarter 1970 Historical Revisions back to 1967	GNP in 1958 dollars
01-Nov-1970	Revised Third Quarter 1970 Historical Revisions back to 1970	GNP in 1958 dollars
01-Dec-1970	Third Quarter 1970 Historical Revisions back to 1967	GNP in 1958 dollars
01-Jan-1971	Preliminary Fourth Quarter 1970 Historical Revisions back to 1967	GNP in 1958 dollars
01-Feb-1971	Revised Fourth Quarter 1970	GNP in 1958 dollars
01-Mar-1971	Fourth Quarter 1970	GNP in 1958 dollars
01-Apr-1971	Preliminary First Quarter 1971	GNP in 1958 dollars
01-May-1971	Revised First Quarter 1971	GNP in 1958 dollars
01-Jun-1971	First Quarter 1971	GNP in 1958 dollars
01-Jul-1971	Preliminary Second Quarter 1971 Historical Revisions Back to 1967	GNP in 1958 dollars
01-Aug-1971	Revised Second Quarter 1971	GNP in 1958 dollars
01-Sep-1971	Revised Second Quarter 1971	GNP in 1958 dollars
01-Oct-1971	Preliminary Third Quarter 1971	GNP in 1958 dollars
01-Nov-1971	Revised Third Quarter 1971	GNP in 1958 dollars
01-Dec-1971	Third Quarter 1971	GNP in 1958 dollars
01-Jan-1972	Preliminary Fourth Quarter 1971 Revised Q1.1971 to Q3.1971	GNP in 1958 dollars
01-Feb-1972	Revised Fourth Quarter 1971	GNP in 1958 dollars
01-Mar-1972	Fourth Quarter 1971	GNP in 1958 dollars
01-Apr-1972	Preliminary First Quarter 1972	GNP in 1958 dollars
01-May-1972	Revised First Quarter 1972	GNP in 1958 dollars
01-Jun-1972	First Quarter 1972	GNP in 1958 dollars
01-Jul-1972	Preliminary Second Quarter 1972 Historical Revisions back to 1969	GNP in 1958 dollars
01-Aug-1972	Revised Second Quarter 1972 Historical Revisions back to 1969	GNP in 1958 dollars
01-Sep-1972	Second Quarter 1972 Historical Revisions	GNP in 1958 dollars
01-Oct-1972	Preliminary Third Quarter 1972 Historical Revisions back to 1969	GNP in 1958 dollars
01-Nov-1972	Revised Third Quarter 1972 Historical Revisions back to 1969	GNP in 1958 dollars
01-Dec-1972	Third Quarter 1972 Historical Revisions back to 1972	GNP in 1958 dollars

01-Jan-1973	Preliminary Fourth Quarter 1972 Historical Revisions back to 1969	GNP in 1958 dollars
01-Feb-1973	Revised Fourth Quarter 1972	GNP in 1958 dollars
01-Mar-1973	Fourth Quarter 1973	GNP in 1958 dollars
01-Apr-1973	Preliminary First Quarter 1973	GNP in 1958 dollars
01-May-1973	Revised First Quarter 1973	GNP in 1958 dollars
01-Jun-1973	First Quarter 1973 (revised series)	GNP in 1958 dollars
01-Jul-1973	Preliminary Second Quarter 1973 and Historical Data Revised from Q1.1973 to Q2.1970	GNP in 1958 dollars
01-Aug-1973	Revised Second Quarter 1973	GNP in 1958 dollars
01-Sep-1973	Second Quarter 1973 (revised series)	GNP in 1958 dollars
01-Oct-1973	Preliminary Third Quarter 1973	GNP in 1958 dollars
01-Nov-1973	Revised Third Quarter 1973	GNP in 1958 dollars
01-Dec-1973	Third Quarter 1973 (revised series)	GNP in 1958 dollars
01-Jan-1974	Preliminary Fourth Quarter 1973	GNP in 1958 dollars
01-Feb-1974	Revised Fourth Quarter 1973	GNP in 1958 dollars
01-Mar-1974	Fourth Quarter 1973	GNP in 1958 dollars
01-Apr-1974	Preliminary First Quarter 1974	GNP in 1958 dollars
01-May-1974	Revised First Quarter 1974	GNP in 1958 dollars
01-Jun-1974	First Quarter 1974	GNP in 1958 dollars
01-Jul-1974	Preliminary Second Quarter 1974 and Historical Data Revised Q1.1974 to Q2.1971 and Historical Revisions back to 1971	GNP in 1958 dollars
01-Aug-1974	Revised Second Quarter 1974	GNP in 1958 dollars
01-Sep-1974	Revised Second Quarter 1974	GNP in 1958 dollars
01-Oct-1974	Preliminary Third Quarter 1974	GNP in 1958 dollars
01-Nov-1974	Revised Third Quarter 1974	GNP in 1958 dollars
01-Dec-1974	Revised Third Quarter 1974	GNP in 1958 dollars
01-Jan-1975	Preliminary Fourth Quarter 1974	GNP in 1958 dollars
01-Feb-1975	Revised Fourth Quarter 1974	GNP in 1958 dollars
01-Mar-1975	Revised Fourth Quarter 1974	GNP in 1958 dollars
01-Apr-1975	Preliminary First Quarter 1975	GNP in 1958 dollars
01-May-1975	Revised First Quarter 1975	GNP in 1958 dollars
01-Jun-1975	Revised First Quarter 1975	GNP in 1958 dollars
01-Jul-1975	Preliminary Second Quarter 1975	GNP in 1958 dollars
01-Aug-1975	Revised Second Quarter 1975	GNP in 1958 dollars
01-Sep-1975	Revised Second Quarter 1975	GNP in 1958 dollars
01-Oct-1975	Preliminary Third Quarter 1975	GNP in 1958 dollars
01-Nov-1975	Revised Third Quarter 1975	GNP in 1958 dollars
01-Dec-1975	Revised Third Quarter 1975	GNP in 1958 dollars
01-Jan-1976	Preliminary Fourth Quarter 1975 and Historical Data Revised Q3.1975 to Q4.1972 and Historical Revisions back to 1946	GNP in 1972 dollars
01-Feb-1976	Revised Fourth Quarter 1975	GNP in 1972 dollars
01-Mar-1976	Revised Fourth Quarter 1975	GNP in 1972 dollars
01-Apr-1976	Preliminary First Quarter 1976	GNP in 1972 dollars

01-May-1976	Revised First Quarter 1976	GNP in 1972 dollars
01-Jun-1976	Revised First Quarter 1976	GNP in 1972 dollars
01-Jul-1976	Preliminary Second Quarter 1976 and Historical Data Revised Q1.1976 to Q2.1973 and Historical Revisions back to 1973	GNP in 1972 dollars
01-Aug-1976	Revised Second Quarter 1976	GNP in 1972 dollars
01-Sep-1976	Revised Second Quarter 1976	GNP in 1972 dollars
01-Oct-1976	Preliminary Third Quarter 1976	GNP in 1972 dollars
01-Nov-1976	Revised Third Quarter 1976	GNP in 1972 dollars
01-Dec-1976	Revised Third Quarter 1976	GNP in 1972 dollars
01-Jan-1977	Preliminary Fourth Quarter 1976	GNP in 1972 dollars
01-Feb-1977	Revised Fourth Quarter 1976	GNP in 1972 dollars
01-Mar-1977	Revised Fourth Quarter 1976	GNP in 1972 dollars
01-Apr-1977	Preliminary First Quarter 1977	GNP in 1972 dollars
01-May-1977	Revised First Quarter 1977	GNP in 1972 dollars
01-Jun-1977	Revised First Quarter 1977	GNP in 1972 dollars
01-Jul-1977	Preliminary Second Quarter 1977 and Historical Data Revised from Q1.1974 to Q1.1977	GNP in 1972 dollars
01-Aug-1977	Revised Second Quarter 1977	GNP in 1972 dollars
01-Sep-1977	Revised Second Quarter 1977	GNP in 1972 dollars
01-Oct-1977	Third Quarter 1977 (revised series)	GNP in 1972 dollars
01-Nov-1977	Revised Third Quarter 1977	GNP in 1972 dollars
01-Dec-1977	Revised Third Quarter 1977	GNP in 1972 dollars
01-Jan-1978	Preliminary Fourth Quarter 1977	GNP in 1972 dollars
01-Feb-1978	Revised Fourth Quarter 1977	GNP in 1972 dollars
01-Mar-1978	Revised Fourth Quarter 1977	GNP in 1972 dollars
01-Apr-1978	Preliminary First Quarter 1978 Revised Data for Q4.1977 and Q1.1975	GNP in 1972 dollars
01-May-1978	Revised First Quarter 1978	GNP in 1972 dollars
01-Jun-1978	Revised First Quarter 1978	GNP in 1972 dollars
01-Jul-1978	Preliminary Second Quarter 1978 and Historical Data	GNP in 1972 dollars
01-Aug-1978	Revised Second Quarter 1978	GNP in 1972 dollars
01-Sep-1978	Revised Second Quarter 1978	GNP in 1972 dollars
01-Oct-1978	Preliminary Third Quarter 1978	GNP in 1972 dollars
01-Nov-1978	Revised Third Quarter 1978	GNP in 1972 dollars
01-Dec-1978	Revised Third Quarter 1978	GNP in 1972 dollars
01-Jan-1979	Preliminary Fourth Quarter 1978	GNP in 1972 dollars
01-Feb-1979	Revised Fourth Quarter 1978	GNP in 1972 dollars
01-Mar-1979	Revised Fourth Quarter 1978	GNP in 1972 dollars
01-Apr-1979	Preliminary First Quarter 1979	GNP in 1972 dollars
01-May-1979	Revised First Quarter 1979	GNP in 1972 dollars
01-Jun-1979	Revised First Quarter 1979	GNP in 1972 dollars
01-Jul-1979	Preliminary Second Quarter 1979	GNP in 1972 dollars
01-Aug-1979	Revised Second Quarter 1979	GNP in 1972 dollars
01-Sep-1979	Revised Second Quarter 1979	GNP in 1972 dollars
01-Oct-1979	Preliminary Third Quarter 1979	GNP in 1972 dollars

01-Nov-1979	Revised Third Quarter 1979	GNP in 1972 dollars
01-Dec-1979	Revised Third Quarter 1979	GNP in 1972 dollars
01-Jan-1980	Preliminary Fourth Quarter 1979	GNP in 1972 dollars
01-Feb-1980	Revised Fourth Quarter 1979	GNP in 1972 dollars
01-Mar-1980	Revised Fourth Quarter 1979	GNP in 1972 dollars
01-Apr-1980	Preliminary First Quarter 1980	GNP in 1972 dollars
01-May-1980	Revised First Quarter 1980	GNP in 1972 dollars
01-Jun-1980	Revised First Quarter 1980	GNP in 1972 dollars
01-Jul-1980	Preliminary Second Quarter 1980	GNP in 1972 dollars
01-Aug-1980	Revised Second Quarter 1980	GNP in 1972 dollars
01-Sep-1980	Revised Second Quarter 1980	GNP in 1972 dollars
01-Oct-1980	Preliminary Third Quarter 1980	GNP in 1972 dollars
01-Nov-1980	Revised Third Quarter 1980	GNP in 1972 dollars
01-Dec-1980	Third Quarter 1980	GNP in 1972 dollars
01-Jan-1981	Preliminary Fourth Quarter 1980	GNP in 1972 dollars
01-Feb-1981	Revised Fourth Quarter 1980	GNP in 1972 dollars
01-Mar-1981	Revised Fourth Quarter 1980	GNP in 1972 dollars
01-Apr-1981	Preliminary First Quarter 1981	GNP in 1972 dollars
01-May-1981	Revised First Quarter 1981	GNP in 1972 dollars
01-Jun-1981	Revised First Quarter 1981	GNP in 1972 dollars
01-Jul-1981	Preliminary Second Quarter 1981	GNP in 1972 dollars
01-Aug-1981	Revised Second Quarter 1981	GNP in 1972 dollars
01-Sep-1981	Revised Second Quarter 1981	GNP in 1972 dollars
01-Oct-1981	Preliminary Third Quarter 1981	GNP in 1972 dollars
01-Nov-1981	Revised Third Quarter 1981	GNP in 1972 dollars
01-Dec-1981	Revised Third Quarter 1981	GNP in 1972 dollars
01-Jan-1982	Preliminary Fourth Quarter 1981	GNP in 1972 dollars
01-Feb-1982	Revised Fourth Quarter 1981	GNP in 1972 dollars
01-Mar-1982	Revised Fourth Quarter 1981	GNP in 1972 dollars
01-Apr-1982	Preliminary First Quarter 1982	GNP in 1972 dollars
01-May-1982	Revised First Quarter 1982	NI in current dollars
01-Jun-1982	Revised First Quarter 1982	GNP in 1972 dollars
01-Jul-1982	Second Quarter 1982 and Historical Data	GNP in 1972 dollars
01-Aug-1982	Revised Second Quarter 1982	GNP in 1972 dollars
01-Sep-1982	Revised Second Quarter 1982	GNP in 1972 dollars
01-Oct-1982	Preliminary Third Quarter 1982	GNP in 1972 dollars
01-Nov-1982	Revised Third Quarter 1982	GNP in 1972 dollars
01-Dec-1982	Revised Third Quarter 1982	GNP in 1972 dollars
01-Jan-1983	Preliminary Fourth Quarter 1982	GNP in 1972 dollars
01-Feb-1983	Revised Fourth Quarter 1982	GNP in 1972 dollars
01-Mar-1983	Revised Fourth Quarter 1982	GNP in 1972 dollars
01-Apr-1983	Preliminary First Quarter 1983	GNP in 1972 dollars
01-May-1983	Revised First Quarter 1983	GNP in 1972 dollars
01-Jun-1983	Revised First Quarter 1983	GNP in 1972 dollars
01-Jul-1983	Second Quarter 1983 and Historical Data	GNP in 1972 dollars
01-Aug-1983	Revised Second Quarter 1983	GNP in 1972 dollars

01-Sep-1983	Revised Second Quarter 1983	GNP in 1972 dollars
01-Oct-1983	Preliminary Third Quarter 1983	GNP in 1972 dollars
01-Nov-1983	Revised Third Quarter 1983	GNP in 1972 dollars
01-Dec-1983	Revised Third Quarter 1983	GNP in 1972 dollars
01-Jan-1984	Preliminary Fourth Quarter 1983	GNP in 1972 dollars
01-Feb-1984	Revised Fourth Quarter 1983	GNP in 1972 dollars
01-Mar-1984	Revised Fourth Quarter 1983	GNP in 1972 dollars
01-Apr-1984	Preliminary First Quarter 1984	GNP in 1972 dollars
01-May-1984	Revised First Quarter 1984	GNP in 1972 dollars
01-Jun-1984	Revised First Quarter 1984	GNP in 1972 dollars
01-Jul-1984	Second Quarter 1984 and Historical Data	GNP in 1972 dollars
01-Aug-1984	Revised Second Quarter 1984	GNP in 1972 dollars
01-Sep-1984	Revised Second Quarter 1984	GNP in 1972 dollars
01-Oct-1984	Preliminary Third Quarter 1984	GNP in 1972 dollars
01-Nov-1984	Revised Third Quarter 1984	GNP in 1972 dollars
01-Dec-1984	Revised Third Quarter 1984	GNP in 1972 dollars
01-Jan-1985	Preliminary Fourth Quarter 1984	GNP in 1972 dollars
01-Feb-1985	Revised Fourth Quarter 1984	GNP in 1972 dollars
01-Mar-1985	Revised Fourth Quarter 1984	GNP in 1972 dollars
01-Apr-1985	Preliminary First Quarter 1985	GNP in 1972 dollars
01-May-1985	Revised First Quarter 1985	GNP in 1972 dollars
01-Jun-1985	Revised First Quarter 1985	GNP in 1972 dollars
01-Jul-1985	Preliminary Second Quarter 1985	GNP in 1972 dollars
01-Aug-1985	Revised Second Quarter 1985	GNP in 1972 dollars
01-Sep-1985	Revised Second Quarter 1985	GNP in 1972 dollars
01-Oct-1985	Preliminary Third Quarter 1985	GNP in 1972 dollars
01-Nov-1985	Revised Third Quarter 1985	GNP in 1972 dollars
01-Dec-1985	Third Quarter 1985	GNP in 1982 dollars
01-Jan-1986	Preliminary Fourth Quarter 1985	GNP in 1982 dollars
01-Feb-1986	Revised Fourth Quarter 1985	GNP in 1982 dollars
01-Mar-1986	Fourth Quarter 1985	GNP in 1982 dollars
01-Apr-1986	Preliminary First Quarter 1986	GNP in 1982 dollars
01-May-1986	Revised First Quarter 1986	GNP in 1982 dollars
01-Jun-1986	Revised First Quarter 1986	GNP in 1982 dollars
01-Jul-1986	Preliminary Second Quarter 1986	GNP in 1982 dollars
01-Aug-1986	Revised Second Quarter 1986	GNP in 1982 dollars
01-Sep-1986	Revised Second Quarter 1986	GNP in 1982 dollars
01-Oct-1986	Preliminary Third Quarter 1986	GNP in 1982 dollars
01-Nov-1986	Revised Third Quarter 1986	GNP in 1982 dollars
01-Dec-1986	Revised Third Quarter 1986	GNP in 1982 dollars
01-Jan-1987	Preliminary Fourth Quarter 1986	GNP in 1982 dollars
01-Feb-1987	Revised Fourth Quarter 1986	GNP in 1982 dollars
01-Mar-1987	Revised Fourth Quarter 1986	GNP in 1982 dollars
01-Apr-1987	Preliminary First Quarter 1987	GNP in 1982 dollars
01-May-1987	Revised First Quarter 1987	GNP in 1982 dollars
01-Jun-1987	Revised First Quarter 1987	GNP in 1982 dollars

01-Jul-1987	Preliminary Second Quarter 1987	GNP in 1982 dollars
01-Aug-1987	Revised Second Quarter 1987	GNP in 1982 dollars
01-Sep-1987	Revised Second Quarter 1987	GNP in 1982 dollars
01-Oct-1987	Preliminary Third Quarter 1987	GNP in 1982 dollars
01-Nov-1987	Revised Third Quarter 1987	GNP in 1982 dollars
01-Dec-1987	Revised Third Quarter 1987	GNP in 1982 dollars
01-Jan-1988	Preliminary Fourth Quarter 1987	GNP in 1982 dollars
01-Feb-1988	Revised Fourth Quarter 1987	GNP in 1982 dollars
01-Mar-1988	Revised Fourth Quarter 1987	GNP in 1982 dollars
01-Apr-1988	Preliminary First Quarter 1988	GNP in 1982 dollars
01-May-1988	Revised First Quarter 1988	GNP in 1982 dollars
01-Jun-1988	Revised First Quarter 1988	GNP in 1982 dollars
01-Jul-1988	Second Quarter 1988	GNP in 1982 dollars
01-Aug-1988	Revised Second Quarter 1988	GNP in 1982 dollars
01-Sep-1988	Revised Second Quarter 1988	GNP in 1982 dollars
01-Oct-1988	Third Quarter 1988	GNP in 1982 dollars
01-Nov-1988	Revised Third Quarter 1988	GNP in 1982 dollars
01-Dec-1988	Revised Third Quarter 1988	GNP in 1982 dollars
01-Jan-1989	Fourth Quarter 1988	GNP in 1982 dollars
01-Feb-1989	Revised Fourth Quarter 1988	GNP in 1982 dollars
01-Mar-1989	Revised Fourth Quarter 1988	GNP in 1982 dollars
01-Apr-1989	First Quarter 1989	GNP in 1982 dollars
01-May-1989	Revised First Quarter 1989	GNP in 1982 dollars
01-Jun-1989	Revised First Quarter 1989	GNP in 1982 dollars
01-Jul-1989	Second Quarter 1989	GNP in 1982 dollars
01-Aug-1989	Revised Second Quarter 1989	GNP in 1982 dollars
01-Sep-1989	Revised Second Quarter 1989	GNP in 1982 dollars
01-Oct-1989	Third Quarter 1989	GNP in 1982 dollars
01-Nov-1989	Revised Third Quarter 1989	GNP in 1982 dollars
01-Dec-1989	Revised Third Quarter 1989	GNP in 1982 dollars
01-Jan-1990	Fourth Quarter 1989	GNP in 1982 dollars
01-Feb-1990	Revised Fourth Quarter 1989	GNP in 1982 dollars
01-Mar-1990	Revised Fourth Quarter 1989	GNP in 1982 dollars
01-Apr-1990	First Quarter 1990	GNP in 1982 dollars
01-May-1990	Revised First Quarter 1990	GNP in 1982 dollars
01-Jun-1990	Revised First Quarter 1990	GNP in 1982 dollars
01-Jul-1990	Second Quarter 1990	GNP in 1982 dollars
01-Aug-1990	Revised Second Quarter 1990	GNP in 1982 dollars
01-Sep-1990	Second Quarter 1990, Final	GNP in 1982 dollars
01-Oct-1990	Third Quarter 1990, Advance	GNP in 1982 dollars
01-Nov-1990	Third Quarter 1990, Preliminary	GNP in 1982 dollars
01-Dec-1990	Third Quarter 1990, Revised	GNP in 1982 dollars
01-Jan-1991	Fourth Quarter 1990, Advanced	GNP in 1982 dollars
01-Feb-1991	Fourth Quarter 1990, Preliminary	GNP in 1982 dollars
01-Mar-1991	Fourth Quarter 1990, Revised	GNP in 1982 dollars
01-Apr-1991	First Quarter 1991, Advanced	GNP in 1982 dollars

01-May-1991	First Quarter 1991, Revised	GNP in 1982 dollars
01-Jun-1991	First Quarter 1991, Revised	GNP in 1982 dollars
01-Jul-1991	Second Quarter 1991, Advanced	GNP in 1982 dollars
01-Aug-1991	Second Quarter 1991, Revised	GNP in 1982 dollars
01-Sep-1991	Second Quarter 1991, Final	GNP in 1982 dollars
01-Oct-1991	Third Quarter 1991, Advance	GNP in 1982 dollars
01-Nov-1991	Third Quarter 1991, Preliminary Historical Data	GNP in 1987 dollars GDP in 1987 dollars
01-Dec-1991	Third Quarter 1991, Revised	GNP in 1987 dollars GDP in 1987 dollars
01-Jan-1992	Fourth Quarter 1991, Advance Historical Data	GDP in 1987 dollars
	Third Quarter 1991, Revised	GNP in 1987 dollars
01-Feb-1992	Fourth Quarter 1991, Preliminary Historical Data	GDP in 1987 dollars
	Third Quarter 1991, Revised	GNP in 1987 dollars
01-Mar-1992	Fourth Quarter 1991, Final	GDP in 1987 dollars
	Fourth Quarter 1991	GNP in 1987 dollars
01-Apr-1992	First Quarter 1992, Advance Historical Data	GDP in 1987 dollars
	Fourth Quarter 1991	GNP in 1987 dollars
01-May-1992	First Quarter 1992, Preliminary	GDP in 1987 dollars
	First Quarter 1992, Advance	GNP in 1987 dollars
01-Jun-1992	First Quarter 1992, Revised	GDP in 1987 dollars
	First Quarter 1992, Preliminary	GNP in 1987 dollars
01-Jul-1992	Second Quarter 1992, Advance	GDP in 1987 dollars
	First Quarter 1992, Revised	GNP in 1987 dollars
01-Aug-1992	Second Quarter 1992, Preliminary	GDP in 1987 dollars
	Second Quarter 1992, Advance	GNP in 1987 dollars
01-Sep-1992	Second Quarter 1992, Final Historical Data	GDP in 1987 dollars
	Second Quarter 1992, Preliminary	GNP in 1987 dollars
01-Oct-1992	Third Quarter 1992, Advance	GDP in 1987 dollars
	Second Quarter 1992, Final	GNP in 1987 dollars
01-Nov-1992	Third Quarter 1992, Preliminary	GDP in 1987 dollars
	Third Quarter 1992, Preliminary	GNP in 1987 dollars
01-Dec-1992	Third Quarter 1992, Final Historical Data	GDP in 1987 dollars
	Third Quarter 1992, Final	GNP in 1987 dollars
01-Jan-1993	Fourth Quarter 1992, Advance	GDP in 1987 dollars
	Third Quarter 1992, Final	GNP in 1987 dollars
01-Feb-1993	Fourth Quarter 1992, Preliminary	GDP in 1987 dollars
	Third Quarter 1992, Final	GNP in 1987 dollars
01-Mar-1993	Fourth Quarter 1992, Final	GDP in 1987 dollars
	Fourth Quarter 1992	GNP in 1987 dollars
01-Apr-1993	First Quarter 1993, Advance	GDP in 1987 dollars

	Fourth Quarter 1992	GNP in 1987 dollars
01-May-1993	First Quarter 1993, Preliminary	GDP in 1987 dollars
	First Quarter 1993, Preliminary	GNP in 1987 dollars
01-Jun-1993	First Quarter 1993, Final	GDP in 1987 dollars
	First Quarter 1993, Final	GNP in 1987 dollars
01-Jul-1993	Second Quarter 1993, Advance	GDP in 1987 dollars
	First Quarter 1993, Final	GNP in 1987 dollars
01-Aug-1993	Second Quarter 1993, Preliminary	GDP in 1987 dollars
	Second Quarter 1993, Preliminary	GNP in 1987 dollars
01-Sep-1993	Second Quarter 1993, Final	GDP in 1987 dollars
	Second Quarter 1993, Final	GNP in 1987 dollars
01-Oct-1993	Third Quarter 1993, Advance	GDP in 1987 dollars
	Second Quarter 1993, Final	GNP in 1987 dollars
01-Nov-1993	Third Quarter 1993, Preliminary	GDP in 1987 dollars
	Third Quarter 1993, Preliminary	GNP in 1987 dollars
01-Dec-1993	Third Quarter 1993, Final	GDP in 1987 dollars
	Third Quarter 1993, Final	GNP in 1987 dollars
01-Jan-1994	Fourth Quarter 1993, Advance	GDP in 1987 dollars
	Third Quarter 1993, Final	GNP in 1987 dollars
01-Feb-1994	Fourth Quarter 1993, Preliminary	GDP in 1987 dollars
	Third Quarter 1993, Final	GNP in 1987 dollars
01-Mar-1994	Fourth Quarter 1993, Final	GDP in 1987 dollars GNP in 1987 dollars
01-Apr-1994	First Quarter 1994, Advance	GDP in 1987 dollars
	Fourth Quarter 1993, Final	GNP in 1987 dollars
01-May-1994	First Quarter 1994, Preliminary	GDP in 1987 dollars GNP in 1987 dollars
01-Jun-1994	First Quarter 1994, Final	GDP in 1987 dollars GNP in 1987 dollars
01-Jul-1994	Second Quarter 1994	GDP in 1987 dollars
	First Quarter 1994, Revised	GNP in 1987 dollars
01-Aug-1994	Second Quarter 1994, Preliminary	GDP in 1987 dollars GNP in 1987 dollars
01-Sep-1994	Second Quarter 1994, Final	GDP in 1987 dollars GNP in 1987 dollars
01-Oct-1994	Third Quarter 1994, Advance	GDP in 1987 dollars
	Second Quarter 1994, Final	GNP in 1987 dollars
01-Nov-1994	Third Quarter 1994, Preliminary	GDP in 1987 dollars GNP in 1987 dollars
01-Dec-1994	Third Quarter 1994, Final	GDP in 1987 dollars GNP in 1987 dollars
01-Jan-1995	Fourth Quarter 1994, Advance	GDP in 1987 dollars
	Third Quarter 1994, Final	GNP in 1987 dollars
01-Feb-1995	Fourth Quarter 1994, Preliminary	GDP in 1987 dollars
	Third Quarter 1994, Final	GNP in 1987 dollars
01-Mar-1995	Fourth Quarter 1994, Final	GDP in 1987 dollars

		GNP in 1987 dollars
01-Apr-1995	First Quarter 1995, Advance	GDP in 1987 dollars
	Fourth Quarter 1994, Final	GNP in 1987 dollars
01-May-1995	First Quarter 1995, Preliminary	GDP in 1987 dollars GNP in 1987 dollars
01-Jun-1995	First Quarter 1995, Final	GDP in 1987 dollars GNP in 1987 dollars
01-Jul-1995	Second Quarter 1995, Advance	GDP in 1987 dollars
	First Quarter 1995, Final	GNP in 1987 dollars
01-Aug-1995	Second Quarter 1995, Preliminary	GDP in 1987 dollars GNP in 1987 dollars
01-Sep-1995	Second Quarter 1995, Final	GDP in 1987 dollars GNP in 1987 dollars
01-Oct-1995	Third Quarter 1995, Advance	GDP in 1987 dollars
	Second Quarter 1995, Final	GNP in 1987 dollars
01-Nov,Dec-1995	Third Quarter 1995, Preliminary Historical Data 1959-1995	GDP in 1992 dollars GNP in 1992 dollars
01-Jan-1996	Third Quarter 1995 and Historical Data	GDP in 1992 dollars GNP in 1992 dollars
01-Mar-1996	Third Quarter 1995, Final Fourth Quarter 1995, Advance	GDP in 1992 dollars
	Third Quarter 1995, Final	GNP in 1992 dollars
01-Apr-1996	Fourth Quarter 1995, Final	GDP in 1992 dollars GNP in 1992 dollars
01-May-1996	First Quarter 1996, Advance	GDP in 1992 dollars
	Fourth Quarter 1995, Final	GNP in 1992 dollars
01-Jun-1996	First Quarter 1996, Preliminary	GDP in 1992 dollars GNP in 1992 dollars
01-Jul-1996	First Quarter 1996, Final	GDP in 1992 dollars GNP in 1992 dollars
01-Aug-1996	Second Quarter 1996, Advance	GDP in 1992 dollars
	First Quarter 1996, Revised	GNP in 1992 dollars
01-Sep-1996	Second Quarter 1996, Preliminary	GDP in 1992 dollars GNP in 1992 dollars
01-Oct-1996	Second Quarter 1996, Final	GDP in 1992 dollars GNP in 1992 dollars
01-Nov-1996	Third Quarter 1996, Advance	GDP in 1992 dollars
	Second Quarter 1996, Final	GNP in 1992 dollars
01-Dec-1996	Third Quarter 1996, Preliminary Historical Data	GDP in 1992 dollars GNP in 1992 dollars
01-Jan-1997	Third Quarter 1996, Final	GDP in 1992 dollars GNP in 1992 dollars
01-Feb-1997	Fourth Quarter 1996, Advance	GDP in 1992 dollars
	Third Quarter 1996, Final	GNP in 1992 dollars
01-Mar-1997	Fourth Quarter 1996, Preliminary	GDP in 1992 dollars
	Third Quarter 1996, Final	GNP in 1992 dollars

01-Apr-1997	Fourth Quarter 1996, Final	GDP in 1992 dollars GNP in 1992 dollars
01-May-1997	First Quarter 1997, Advance	GDP in 1992 dollars
	Fourth Quarter 1996, Revised	GNP in 1992 dollars
01-Jun-1997	First Quarter 1997, Preliminary	GDP in 1992 dollars GNP in 1992 dollars
01-Jul-1997	First Quarter 1997, Final	GDP in 1992 dollars GNP in 1992 dollars
01-Aug-1997	Second Quarter 1997 Historical Data	GDP in 1992 dollars
	First Quarter 1997, Revised	GNP in 1992 dollars
01-Sep-1997	Second Quarter 1997, Preliminary	GDP in 1992 dollars GNP in 1992 dollars
01-Oct-1997	Second Quarter 1997, Final	GDP in 1992 dollars GNP in 1992 dollars
01-Nov-1997	Third Quarter 1997, Advance	GDP in 1992 dollars
	Second Quarter 1997, Final	GNP in 1992 dollars
01-Dec-1997	Third Quarter 1997, Preliminary	GDP in 1992 dollars GNP in 1992 dollars
01-Jan-1998	Third Quarter 1997, Final	GDP in 1992 dollars GNP in 1992 dollars
01-Feb-1998	Fourth Quarter 1997, Advance	GDP in 1992 dollars
	Third Quarter 1997, Final	GNP in 1992 dollars
01-Mar-1998	Fourth Quarter 1997, Preliminary	GDP in 1992 dollars
	Third Quarter 1997, Final	GNP in 1992 dollars
01-Apr-1998	Fourth Quarter 1997, Final	GDP in 1992 dollars GNP in 1992 dollars
01-May-1998	First Quarter 1998, Advance	GDP in 1992 dollars
	Fourth Quarter 1997, Final	GNP in 1992 dollars
01-Jun-1998	First Quarter 1998, Preliminary	GDP in 1992 dollars GNP in 1992 dollars
01-Jul-1998	First Quarter 1998, Final	GDP in 1992 dollars GNP in 1992 dollars
01-Aug-1998	Second Quarter 1998	GDP in 1992 dollars
	First Quarter 1998, Revised	GNP in 1992 dollars
01-Sep-1998	Second Quarter 1998, Preliminary	GDP in 1992 dollars GNP in 1992 dollars
01-Oct-1998	Second Quarter 1998, Final	GDP in 1992 dollars GNP in 1992 dollars
01-Nov-1998	Third Quarter 1998, Advance	GDP in 1992 dollars
	Second Quarter 1998, Final	GNP in 1992 dollars
01-Dec-1998	Third Quarter 1998, Preliminary	GDP in 1992 dollars GNP in 1992 dollars
Jan-1999	Third Quarter 1998, Final	GDP in 1992 dollars GNP in 1992 dollars
Feb-1999	Fourth Quarter 1998, Advance	GDP in 1992 dollars
	Third Quarter 1998, Final	GNP in 1992 dollars

Mar-1999	Fourth Quarter 1998, Preliminary	GDP in 1992 dollars
	Third Quarter 1998, Final	GNP in 1992 dollars
Apr-1999	Fourth Quarter 1998, Final	GDP in 1992 dollars GNP in 1992 dollars
	Fourth Quarter 1998, Final	GDP in 1992 dollars GNP in 1992 dollars
May-1999	First Quarter 1999, Advanced	GDP in 1992 dollars
	Fourth Quarter 1998, Final	GNP in 1992 dollars
Jun-1999	First Quarter 1999, Preliminary	GDP in 1992 dollars GNP in 1992 dollars
	First Quarter 1999, Final	GDP in 1992 dollars GNP in 1992 dollars
Aug-1999	Second Quarter 1999, Advance	GDP in 1992 dollars
	First Quarter 1999, Final	GNP in 1992 dollars
Sep-1999	Second Quarter 1999, Preliminary	GDP in 1992 dollars GNP in 1992 dollars
	Second Quarter 1999, Final	GDP in 1992 dollars GNP in 1992 dollars
Nov-1999	Third Quarter 1999, Advance	GDP in 1996 dollars
Dec-1999	Third Quarter 1999, Preliminary	GDP in 1996 dollars GNP in 1996 dollars
	Third Quarter 1999, Final	GDP in 1996 dollars GNP in 1996 dollars
Feb-2000	Fourth Quarter 1999, Advance	GDP in 1996 dollars
	Third Quarter 1999, Final	GNP in 1996 dollars
Mar-2000	Fourth Quarter 1999, Preliminary	GDP in 1996 dollars
	Third Quarter 1999, Final	GNP in 1996 dollars
Apr-2000	Fourth Quarter 1999, Final	GDP in 1996 dollars GNP in 1996 dollars
	Fourth Quarter 1999, Final	GDP in 1996 dollars GNP in 1996 dollars
May-2000	First Quarter 2000, Advance	GDP in 1996 dollars
	Fourth Quarter 1999, Final	GNP in 1996 dollars
Jun-2000	First Quarter 2000, Preliminary	GDP in 1996 dollars GNP in 1996 dollars
	First Quarter 2000, Final	GDP in 1996 dollars GNP in 1996 dollars
Aug-2000	Second Quarter 2000, Advance	GDP in 1996 dollars
	First Quarter 2000, Revised	GNP in 1996 dollars
Sep-2000	Second Quarter 2000, Preliminary	GDP in 1996 dollars GNP in 1996 dollars
	Second Quarter 2000, Final	GDP in 1996 dollars GNP in 1996 dollars
Nov-2000	Third Quarter 2000, Advance	GDP in 1996 dollars
	Second Quarter 2000, Final	GNP in 1996 dollars
Dec-2000	Third Quarter 2000, Preliminary	GDP in 1996 dollars GNP in 1996 dollars
	Third Quarter 2000, Final	GDP in 1996 dollars GNP in 1996 dollars
Jan-2001	Third Quarter 2000, Final	GDP in 1996 dollars GNP in 1996 dollars
Feb-2001	Fourth Quarter 2000, Advance	GDP in 1996 dollars

	Third Quarter 2000, Final	GNP in 1996 dollars
Mar-2001	Fourth Quarter 2000, Preliminary	GDP in 1996 dollars
	Third Quarter 2000, Final	GNP in 1996 dollars
Apr-2001	Fourth Quarter 2000, Final	GDP in 1996 dollars GNP in 1996 dollars
May-2001	First Quarter 2001, Advance	GDP in 1996 dollars
	Fourth Quarter 2000, Final	GNP in 1996 dollars
Jun-2001	First Quarter 2001, Preliminary	GDP in 1996 dollars GNP in 1996 dollars
Jul-2001	First Quarter 2001, Final	GDP in 1996 dollars GNP in 1996 dollars
Aug-2001	Second Quarter 2001, Advance	GDP in 1996 dollars
	First Quarter 2001, Revised	GNP in 1996 dollars
Sep-2001	Second Quarter 2001, Preliminary	GDP in 1996 dollars GNP in 1996 dollars
Oct-2001	Second Quarter 2001, Final	GDP in 1996 dollars GNP in 1996 dollars
Nov-2001	Third Quarter 2001, Advance	GDP in 1996 dollars
	Second Quarter 2001, Final	GNP in 1996 dollars
Dec-2001	Third Quarter 2001, Preliminary	GDP in 1996 dollars GNP in 1996 dollars
Jan-2002	Third Quarter 2001, Final	GDP in 1996 dollars GNP in 1996 dollars
Feb-2002	Fourth Quarter 2001, Advance	GDP in 1996 dollars
	Third Quarter 2001, Final	GNP in 1996 dollars
Mar-2002	Fourth Quarter 2001, Preliminary	GDP in 1996 dollars
	Third Quarter 2001, Final	GNP in 1996 dollars
Apr-2002	Fourth Quarter 2001, Final	GDP in 1996 dollars GNP in 1996 dollars
May-2002	First Quarter 2002, Advance	GDP in 1996 dollars
	Fourth Quarter 2001, Final	GNP in 1996 dollars
Jun-2002	First Quarter 2002, Preliminary	GDP in 1996 dollars GNP in 1996 dollars
Jul-2002	First Quarter 2002, Final	GDP in 1996 dollars GNP in 1996 dollars
Aug-2002	Second Quarter 2002, Advance	GDP in 1996 dollars
	First Quarter 2002, Revised	GNP in 1996 dollars
Sep-2002	Second Quarter 2002, Preliminary	GDP in 1996 dollars GNP in 1996 dollars
Oct-2002	Second Quarter 2002, Final	GDP in 1996 dollars GNP in 1996 dollars
Nov-2002	Third Quarter 2002, Advance	GDP in 1996 dollars
	Second Quarter 2002, Final	GNP in 1996 dollars
Dec-2002	Third Quarter 2002, Preliminary	GDP in 1996 dollars GNP in 1996 dollars
Jan-2003	Third Quarter 2002, Final	GDP in 1996 dollars

		GNP in 1996 dollars
Feb-2003	Fourth Quarter 2002, Advance	GDP in 1996 dollars
	Third Quarter 2002, Final	GNP in 1996 dollars
Mar-2003	Fourth Quarter 2002, Preliminary	GDP in 1996 dollars
	Third Quarter 2002, Final	GNP in 1996 dollars
Apr-2003	Fourth Quarter 2002, Final	GDP in 1996 dollars GNP in 1996 dollars
May-2003	First Quarter 2003, Advance	GDP in 1996 dollars
	Fourth Quarter 2002, Final	GNP in 1996 dollars
Jun-2003	First Quarter 2003, Preliminary	GDP in 1996 dollars GNP in 1996 dollars
Jul-2003	First Quarter 2003, Final	GDP in 1996 dollars GNP in 1996 dollars
Aug-2003	Second Quarter 2003, Advance	GDP in 1996 dollars
	First Quarter 2003, Final	GNP in 1996 dollars
Sep-2003	Second Quarter 2003, Preliminary	GDP in 1996 dollars GNP in 1996 dollars
Oct-2003	Second Quarter 2003, Final	GDP in 1996 dollars GNP in 1996 dollars
Nov-2003	Third Quarter 2003, Advance	GDP in 1996 dollars
	Second Quarter 2003, Final	GNP in 1996 dollars
Dec-2003	Historical data until Second Quarter 2003, Revised	GDP in 2000 dollars GNP in 2000 dollars
Jan-2004	Third Quarter 2003, Final	GDP in 2000 dollars
Feb-2004	Fourth Quarter 2003, Advance	GDP in 2000 dollars
	Third Quarter 2003, Final	GNP in 2000 dollars
Mar-2004	Fourth Quarter 2003, Preliminary	GDP in 2000 dollars
	Third Quarter 2003, Final	GNP in 2000 dollars
Apr-2004	Fourth Quarter 2003, Final	GDP in 2000 dollars GNP in 2000 dollars
May-2004	First Quarter 2004, Advance	GDP in 2000 dollars
	Fourth Quarter 2003, Final	GNP in 2000 dollars
Jun-2004	First Quarter 2004, Preliminary	GDP in 2000 dollars GNP in 2000 dollars
Jul-2004	First Quarter 2004, Final	GDP in 2000 dollars GNP in 2000 dollars
Aug-2004	Second Quarter 2004, Advance Revised Historical Data	GDP in 2000 dollars
	First Quarter 2004, Revised	GNP in 2000 dollars
Sep-2004	Second Quarter 2004, Preliminary	GDP in 2000 dollars GNP in 2000 dollars
Oct-2004	Second Quarter 2004, Final	GDP in 2000 dollars GNP in 2000 dollars
Nov-2004	Third Quarter 2004, Advance	GDP in 2000 dollars
	Second Quarter 2004, Final	GNP in 2000 dollars
Dec-2004	Third Quarter 2004, Preliminary	GDP in 2000 dollars

		GNP in 2000 dollars
Jan-2005	Third Quarter 2004, Final	GDP in 2000 dollars GNP in 2000 dollars
Feb-2005	Fourth Quarter 2004, Advance	GDP in 2000 dollars
	Third Quarter 2004, Final	GNP in 2000 dollars
Mar-2005	Fourth Quarter 2004, Preliminary	GDP in 2000 dollars
	Third Quarter 2004, Final	GNP in 2000 dollars
Apr-2005	Fourth Quarter 2004, Final	GDP in 2000 dollars GNP in 2000 dollars
May-2005	First Quarter 2005, Advance	GDP in 2000 dollars
	Fourth Quarter 2004, Final	GNP in 2000 dollars
Jun-2005	First Quarter 2005, Preliminary	GDP in 2000 dollars GNP in 2000 dollars
Jul-2005	First Quarter 2005, Final	GDP in 2000 dollars GNP in 2000 dollars
Aug-2005	Second Quarter 2005, Advance	GDP in 2000 dollars
	First Quarter 2005, Revised	GNP in 2000 dollars
Sep-2005	Second Quarter 2005, Preliminary	GDP in 2000 dollars GNP in 2000 dollars
Oct-2005	Second Quarter 2005, Final	GDP in 2000 dollars GNP in 2000 dollars
Nov-2005	Third Quarter 2005, Advance	GDP in 2000 dollars
	Second Quarter 2005, Final	GNP in 2000 dollars
Dec-2005	Third Quarter 2005, Preliminary	GDP in 2000 dollars GNP in 2000 dollars
Jan-2006	Third Quarter 2005, Final	GDP in 2000 dollars GNP in 2000 dollars
Feb-2006	Fourth Quarter 2005, Advance	GDP in 2000 dollars
	Third Quarter 2005, Final	GNP in 2000 dollars
Mar-2006	Fourth Quarter 2005, Preliminary	GDP in 2000 dollars
	Third Quarter 2005, Final	GNP in 2000 dollars
Apr-2006	Fourth Quarter 2005, Final	GDP in 2000 dollars GNP in 2000 dollars
May-2006	First Quarter 2006, Advance	GDP in 2000 dollars
	Fourth Quarter 2005, Final	GNP in 2000 dollars
Jun-2006	First Quarter 2006, Preliminary	GDP in 2000 dollars GNP in 2000 dollars
Jul-2006	First Quarter 2006, Final	GDP in 2000 dollars GNP in 2000 dollars
Aug-2006	Second Quarter 2006, Advance	GDP in 2000 dollars
	First Quarter 2006, Revised	GNP in 2000 dollars
Sep-2006	Second Quarter 2006, Preliminary	GDP in 2000 dollars GNP in 2000 dollars
Oct-2006	Second Quarter 2006, Final	GDP in 2000 dollars GNP in 2000 dollars
Nov-2006	Third Quarter 2006, Advance	GDP in 2000 dollars

	Second Quarter 2006, Final	GNP in 2000 dollars
Dec-2006	Third Quarter 2006, Preliminary	GDP in 2000 dollars GNP in 2000 dollars
Jan-2007	Third Quarter 2006, Final	GDP in 2000 dollars GNP in 2000 dollars
Feb-2007	Fourth Quarter 2006, Advance	GDP in 2000 dollars
	Third Quarter 2006, Final	GNP in 2000 dollars
Mar-2007	Fourth Quarter 2006, Preliminary	GDP in 2000 dollars
	Third Quarter 2006, Final	GNP in 2000 dollars
Apr-2007	Fourth Quarter 2006, Final	GDP in 2000 dollars GNP in 2000 dollars
May-2007	First Quarter 2007, Advance	GDP in 2000 dollars
	Fourth Quarter 2006, Final	GNP in 2000 dollars
Jun-2007	First Quarter 2007, Preliminary	GDP in 2000 dollars GNP in 2000 dollars
Jul-2007	First Quarter 2007, Final	GDP in 2000 dollars GNP in 2000 dollars
Aug-2007	Second Quarter 2007, Advance	GDP in 2000 dollars
	First Quarter 2007, Revised	GNP in 2000 dollars
Sep-2007	Second Quarter 2007, Preliminary	GDP in 2000 dollars GNP in 2000 dollars
Oct-2007	Second Quarter 2007, Final	GDP in 2000 dollars GNP in 2000 dollars
Nov-2007	Third Quarter 2007, Advance	GDP in 2000 dollars
	Second Quarter 2007, Final	GNP in 2000 dollars
Dec-2007	Third Quarter 2007, Preliminary	GDP in 2000 dollars GNP in 2000 dollars
Jan-2008	Third Quarter 2007, Final	GDP in 2000 dollars GNP in 2000 dollars
Feb-2008	Fourth Quarter 2007, Advance	GDP in 2000 dollars
	Third Quarter 2007, Final	GNP in 2000 dollars
Mar-2008	Fourth Quarter 2007, Preliminary	GDP in 2000 dollars
	Third Quarter 2007, Final	GNP in 2000 dollars
Apr-2008	Fourth Quarter 2007, Final	GDP in 2000 dollars GNP in 2000 dollars
May-2008	First Quarter 2008, Advance	GDP in 2000 dollars
	Fourth Quarter 2007, Final	GNP in 2000 dollars
Jun-2008	First Quarter 2008, Preliminary	GDP in 2000 dollars GNP in 2000 dollars
Jul-2008	First Quarter 2008, Final	GDP in 2000 dollars GNP in 2000 dollars
Aug-2008	Second Quarter 2008, Advance	GDP in 2000 dollars
	First Quarter 2008, Revised	GNP in 2000 dollars
Sep-2008	Second Quarter 2008, Preliminary	GDP in 2000 dollars GNP in 2000 dollars
Oct-2008	Second Quarter 2008, Final	GDP in 2000 dollars

		GNP in 2000 dollars
Nov-2008	Third Quarter 2008, Advance	GDP in 2000 dollars
	Second Quarter 2008, Revised	GNP in 2000 dollars
Dec-2008	Third Quarter 2008, Preliminary	GDP in 2000 dollars GNP in 2000 dollars
Jan-2009	Third Quarter 2008, Final	GDP in 2000 dollars GNP in 2000 dollars
Feb-2009	Fourth Quarter 2008, Advance	GDP in 2000 dollars
	Third Quarter 2008, Final	GNP in 2000 dollars
Mar-2009	Fourth Quarter 2008, Preliminary	GDP in 2000 dollars
	Third Quarter 2008, Final	GNP in 2000 dollars
Apr-2009	Fourth Quarter 2008, Final	GDP in 2000 dollars GNP in 2000 dollars
May-2009	First Quarter 2009, Advance	GDP in 2000 dollars
	Fourth Quarter 2008, Final	GNP in 2000 dollars
Jun-2009	First Quarter 2009, Preliminary	GDP in 2000 dollars GNP in 2000 dollars
Jul-2009	First Quarter 2009, Final	GDP in 2000 dollars GNP in 2000 dollars
Aug-2009	Second Quarter 2009, Advance	GDP in 2005 dollars
	First Quarter 2009, Revised	GNP in 2005 dollars
Sep-2009	Second Quarter 2009, Second Estimates	GDP in 2005 dollars GNP in 2005 dollars
Oct-2009	Second Quarter 2009, Third Estimates	GDP in 2005 dollars GNP in 2005 dollars
Nov-2009	Third Quarter 2009, Advance	GDP in 2005 dollars
	Second Quarter 2009, Third Estimates	GNP in 2005 dollars
Dec-2009	Third Quarter 2009, Second Estimates	GDP in 2005 dollars GNP in 2005 dollars
Jan-2010	Third Quarter 2009, Third Estimates	GDP in 2005 dollars GNP in 2005 dollars
Feb-2010	Fourth Quarter 2009, Advance	GDP in 2005 dollars
	Third Quarter 2009, Third Estimates	GNP in 2005 dollars
Mar-2010	Fourth Quarter 2009, Second Estimates	GDP in 2005 dollars
	Third Quarter 2009, Third Estimates	GNP in 2005 dollars
Apr-2010	Fourth Quarter 2009, Third Estimates	GDP in 2005 dollars GNP in 2005 dollars
May-2010	First Quarter 2010, Advance	GDP in 2005 dollars
	Fourth Quarter 2009, Third Estimates	GNP in 2005 dollars
Jun-2010	First Quarter 2010, Second Estimates	GDP in 2005 dollars GNP in 2005 dollars
Jul-2010	First Quarter 2010, Third Estimates	GDP in 2005 dollars GNP in 2005 dollars
Aug-2010	Second Quarter 2010, Advance	GDP in 2005 dollars
	First Quarter 2010, Revised	GNP in 2005 dollars
Sept-2010	Second Quarter 2010, Second Estimates	GDP in 2005 dollars

		GNP in 2005 dollars
Oct-2010	Second Quarter 2010, Third Estimates	GDP in 2005 dollars GNP in 2005 dollars
Nov-2010	Third Quarter 2010, Advance	GDP in 2005 dollars
	Second Quarter 2010, Third Estimates	GNP in 2005 dollars
Dec-2010	Third Quarter 2010, Second Estimates	GDP in 2005 dollars GNP in 2005 dollars

Appendix II

Exploring Different Lag Structures of the Effects of Contemporaneous and Refined Economic Measures on Economic Perceptions

The purpose of this appendix is to determine what is the most appropriate lag in the contemporaneous and the refined economic measures. As the discussion of the appropriate time lagged economic information shown in Figure 3-3, in this research there are two major economic information sources for the electorate to form their economic perceptions in *Quarter t*. One is the real economy of *Quarter t*, the other is the contemporaneous economic reports of *Quarter t-1*, which is released in *Quarter t*. In *Quarter t* the electorate may draw economic information from both information sources directly or indirect to form their economic perceptions of *Quarter t*. In turn in *Quarter t-1*, the electorate may draw economic information from both the real economy of *Quarter t-1* and the contemporaneous economic reports of *Quarter t-2*, which is released in *Quarter t-1*, to form their economic perceptions of *Quarter t-1*. And the economic information sources in *Quarter t-1*—the real economy of *Quarter t-1* and the contemporaneous economic reports of *Quarter t-2*—may also affect the electorate’s economic perceptions of *Quarter t*.

Here I examine the effects of above four possible economic references in *Quarter t* the electorate may use to form their economic perceptions of *Quarter t*: the contemporaneous measures of real GNP growth rate of *Quarter t-1* and *t-2*, and the real economy of *Quarter t* and

t-1 as later revealed by the refined measures of *Quarter t* and *t-1* on the electorate's economic perceptions of *Quarter t*. In Chapter 2, we assume that a difference in measures of two percentage points or more between the contemporaneous and the refined measures of real GNP growth rate is a notable difference, one large enough that it might lead to different perceptions of the economy. In my analyses, I normally examine two groups of cases separately: (1) all consecutive cases from the fourth quarter of 1959 to the fourth quarter of 2008, and (2) cases from 1960 to 2008 in which the difference between the contemporaneous and the refined measures of real GNP growth rate is over two percentage points.

1. Test on All Consecutive Cases

The analysis of the possible effects of the contemporaneous and the refined economic measures on economic perceptions on all quarters is presented first. As the first step, ordinary least square regression is applied to test the impact of the contemporaneous and the refined measures of economic growth on economic perceptions in Table II-1. From *Equation 1* to *4*, single economic measures are examined, and multiple economic measures are examined from *Equation 5* to *10*. Although almost all economic measures affect the economic perceptions of *Quarter t* ($p < 0.001$, one tailed), except the contemporaneous measures of real GNP growth rate of *Quarter t* when the refined measures of real economic growth of *Quarter t* and *t-1* are examined together in *Equation 9* and *10*, The Durbin-Watson Statistic in all equations in Table II-1 is below 0.55, far away from 2.00, located in the area of autocorrelation in the series. There are high autocorrelation in the series in the original data.

/Table II-1 about here/

Table II-1 The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions Based on All Cases, Q4, 1959-Q4, 2008

Dependent Variable: Quarterly Consumer Sentiment of t

Model	Single Economic Measures				Multiple Economic Measures					
	1	2	3	4	5	6	7	8	9	10
Contemporaneous Measures of real GNP Growth Rate of $t-1$	1.45*** (6.50)				1.02*** (4.63) [0.30]		1.17*** (5.11) [0.34]		0.59 (1.76) [0.17]	0.45 (1.38) [0.13]
Contemporaneous Measures of real GNP Growth Rate of $t-2$			1.22*** (5.35)			0.88*** (3.85) [0.26]	0.84*** (3.69) [0.25]			0.72*** (3.41) [0.21]
Refined Measures of real GNP Growth Rate of t		1.54*** (7.44)			1.21*** (5.78) [0.37]			1.28*** (6.22) [0.39]	1.20*** (5.76) [0.37]	1.16*** (5.67) [0.35]
Refined Measures of real GNP Growth Rate of $t-1$				1.34*** (6.04)		1.06*** (4.71) [0.32]		0.97*** (4.60) [0.29]	0.54 (1.69) [0.16]	0.44 (1.38) [0.13]
Constant	83.43*** (83.24)	82.60*** (82.05)	84.04*** (81.15)	83.21*** (78.09)	80.74*** (77.71)	81.54*** (72.96)	81.78*** (76.41)	80.26*** (73.97)	80.21** * (74.30)	79.00*** (71.19)
N	197	197	197	197	197	197	197	197	197	197
Adjusted R ²	0.17	0.22	0.12	0.15	0.29	0.21	0.22	0.29	0.30	0.34
Standard Error of Estimates	10.77	10.49	11.09	10.90	9.98	10.54	10.44	9.98	9.93	9.67
Durbin-Watson	0.46	0.45	0.43	0.52	0.41	0.51	0.42	0.37	0.38	0.39
First Order Autocorrelation	0.75	0.77	0.77	0.73	0.78	0.73	0.77	0.81	0.80	0.80

SOURCE: *The Index of Consumer Sentiment* of the University of Michigan 1959-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958. The contemporaneous measures of real GNP growth rate of each half year became available in the first half year of 1959. Due to different data availability in 1959, the case number may change across models.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

[] Standardized coefficient of the according variable.

In order to correct the effects of unacceptable high autocorrelation in the series, the variables in the data set have been reanalyzed after taking both their partial differences from adjacent cases and also their full differences or amount of change from one case to the next. Table II-2 indicates the OLS regression results on the data after partial difference transformation³¹, and Table II-3 shows the results on the data after full difference transformation³². The weight used in the partial difference transformation is the first order autocorrelation in Table II-1. The first order autocorrelation of each equation in Table II-1 gives the weight of partial difference transformation in according equation. After partial difference transformation, the Durbin-Watson Statistic in all equations in Table II-2 reach to a range of 1.50-1.95, located in the acceptable area of no autocorrelation. And after full difference transformation, the Durbin-Watson Statistic in all equations in Table II-3 increase to a range of 2.16-2.35, also located in the acceptable area of no autocorrelation. Both transformations dropped the high autocorrelation in the series greatly, although case number drops one, because the first case is missed due to the transformations. In the data sets after transformation, there is lower autocorrelation in the series. Throughout all equations in three tables—Table II-1, Table

³¹ The partial difference transformation as described by Kmenta (1986: 314-316) and Ostrom (1990) has two steps as follows:

1. Run OLS estimates of

$$Y_t = a + bX_t + e_t$$
to obtain first order autocorrelation p
2. Construct Y_t^* and X_t^* in the following way

$$Y_t^* = Y_t - pY_{t-1} \quad t = 2, 3, \dots, T$$

$$X_t^* = X_t - pX_{t-1} \quad t = 2, 3, \dots, T$$
3. Obtain OLS estimates of

$$Y_t^* = a^* + b^*X_t^* + e_t^*$$

³² The full difference transformation as described by Ostrom (1990) has two steps as follows:

1. Construct Y_t^* and X_t^* in the following way

$$Y_t^* = Y_t - Y_{t-1} \quad t = 2, 3, \dots, T$$

$$X_t^* = X_t - X_{t-1} \quad t = 2, 3, \dots, T$$
2. Obtain OLS estimates of

$$Y_t^* = a^* + b^*X_t^* + e_t^*$$

II-2, and Table II-3—only the equation examining the effects of the contemporaneous measures of real GNP growth rate of *Quarter t-1* and the refined measures of real GNP growth rate of *Quarter t* together hold statistical significance constantly.

/Table II-2 about here/

/Table II-3 about here/

2. Test on Cases in which the Difference between Contemporaneous and Refined Measures of Real GNP Growth Rate over Two Percentage Points

In Chapter 2, I assume that a difference of two percentage points or more between the contemporaneous and refined measures of real GNP growth rates is a notable difference, one large enough that it might lead to different perceptions of the economy. Here I select cases out, in which the difference between the contemporaneous and the refined measures of real GNP growth rates is beyond two percentage points, and then process OLS regression on them and the data after partial difference transformation and full difference transformation.

First, ordinary least squares regression is applied on the original data set in Table II-4. From *Equation 1* to *4*, single economic measures are examined. All single economic measures affect the economic perception of *Quarter t* significantly. From *Equation 5* to *10*, multiple economic measures are examined. Most economic measures are also significant in affecting the economic perception of *Quarter t*. Nevertheless, the Durbin-Watson Statistic of each equation is

Table II-2 The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions Based on All Cases Based on Data after Partial Difference Transformation (the *Cochrane-Orcutt* Transformation), 1960—2008

Dependent Variable: Quarterly Consumer Sentiment of t

Model	Single Economic Measures				Multiple Economic Measures					
	1	2	3	4	5	6	7	8	9	10
Contemporaneous Measures of real GNP Growth Rate of $t-1$	0.20 (1.78)				0.28** (2.64) [0.18]		0.21 (1.78) [0.13]		0.18 (1.38) [0.12]	0.21 (1.57) [0.14]
Contemporaneous Measures of real GNP Growth Rate of $t-2$			0.01 (0.04)			0.04 (0.36) [0.03]	0.07 (0.59) [0.04]			0.10 (0.95) [0.07]
Refined Measures of real GNP Growth Rate of t		0.45*** (4.74)			0.49*** (5.20) [0.35]			0.53*** (5.29) [0.40]	0.52*** (5.11) [0.39]	0.53*** (5.18) [0.39]
Refined Measures of real GNP Growth Rate of $t-1$				0.05 (0.46)		0.06 (0.51) [0.04]		0.24* (2.33) [0.18]	0.14 (1.05) [0.10]	0.14 (1.08) [0.10]
Constant	21.61** * (54.52)	19.67** * (53.24)	20.00** * (51.28)	23.47** * (57.70)	18.61** * (50.24)	23.44** * (55.77)	19.82** * (49.34)	16.04** * (43.88)	16.86** * (45.71)	16.78** * (44.31)
N	196	196	196	196	196	196	196	196	196	196
Adjusted R ²	0.01	0.10	0.00	0.00	0.13	0.00	0.01	0.12	0.12	0.12
Standard Error of Estimates	5.41	5.09	5.38	5.54	4.98	5.56	5.35	4.91	4.93	4.93
Durbin-Watson	1.64	1.72	1.64	1.51	1.83	1.52	1.73	1.96	1.92	1.95

SOURCE: *The Index of Consumer Sentiment* of the University of Michigan 1959-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of*

Consumer Sentiment of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958. The contemporaneous measures of real GNP growth rate of each half year became available in the first half year of 1959. Due to different data availability in 1959, the case number may change across models.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

[] Standardized coefficient of the according variable.

Table II-3 The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions Based on All Cases Based on Data after Full Difference Transformation, 1960—2008

Dependent Variable: Quarterly Consumer Sentiment of t

Model	Single Economic Measures				Multiple Economic Measures					
	1	2	3	4	5	6	7	8	9	10
Contemporaneous Measures of real GNP Growth Rate of $t-1$	0.10 (1.04)				0.19* (2.08) [0.14]		0.09 (0.88) [0.07]		0.16 (1.32) [0.12]	0.17 (1.36) [0.13]
Contemporaneous Measures of real GNP Growth Rate of $t-2$			-0.06 (0.60)			-0.07 (0.75) [-0.06]	-0.03 (0.25) [-0.02]			0.03 (0.35) [0.03]
Refined Measures of real GNP Growth Rate of t		0.37*** (4.53)			0.41*** (4.90) [0.34]			0.45*** (4.81) [0.37]	0.43*** (4.61) [0.36]	0.44*** (4.61) [0.36]
Refined Measures of real GNP Growth Rate of $t-1$				-0.05 (0.65)		-0.07 (0.79) [-0.06]		0.16 (1.69) [0.13]	0.07 (0.56) [0.05]	0.07 (0.57) [0.06]
Constant	-0.19 (0.51)	-0.17 (0.47)	-0.19 (0.51)	-0.19 (0.50)	-0.17 (0.49)	-0.19 (0.51)	-0.19 (0.51)	-0.16 (0.45)	-0.17 (0.48)	-0.17 (0.47)
N	196	196	196	196	196	196	196	196	196	196
Adjusted R^2	0.00	0.09	0.00	0.00	0.11	0.00	0.00	0.10	0.10	0.10
Standard Error of Estimates	5.16	4.92	5.17	5.17	4.88	5.18	5.18	4.90	4.89	4.90
Durbin-Watson	2.26	2.28	2.21	2.18	2.32	2.16	2.26	2.34	2.34	2.35

SOURCE: *The Index of Consumer Sentiment* of the University of Michigan 1959-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the

fourth quarter of 1958. The contemporaneous measures of real GNP growth rate of each half year became available in the first half year of 1959. Due to different data availability in 1959, the case number may change across models.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

[] Standardized coefficient of the according variable.

below 0.68, located in unacceptable area of autocorrelation. There is a high level of autocorrelation in the series.

/Table II-4 about here/

The variables in the data set have been reanalyzed after taking both their partial differences from adjacent cases and also their full differences or amount of change from one case to the next in Table II-5, and Table II-6, to correct the effects of unacceptable high autocorrelation. Table II-5 presents the OLS regression results on the data after partial difference transformation (*Cochrane-Orcutt* transformation). The weight of partial difference transformation of each equation is the first order autocorrelation of according equation in Table II-4 accordingly. The OLS regression results after partial difference transformation present that the Durbin-Watson Statistic in each equation has reached to around 1.50. The high level of autocorrelation in the series has dropped in the data after partial difference transformation. Table II-6 indicates the OLS regression results on the data after full difference transformation. The Durbin-Watson Statistic in each equation is from 1.97 to 2.43, located in acceptable area of no autocorrelation. Similar results are found throughout all equations from Table II-4 to Table II-6 to those from Table II-1 to Table II-3. Only the equation examining the effects of the contemporaneous measures of real GNP growth rate of *Quarter t-1* and the refined measures of real GNP growth rate of *Quarter t* together hold statistical significance constantly.

/Table II-5 about here/

Table II-4 Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with Cases over Two-Percentage Differences, 1960-2008

Dependent Variable: Quarterly Consumer Sentiment of t

Model	Single Economic Measures				Multiple Economic Measures					
	1	2	3	4	5	6	7	8	9	10
Contemporaneous Measures of real GNP Growth Rate of $t-1$	1.38*** (4.09)				1.19*** (4.51) [0.37]		1.08*** (3.67) [0.33]		0.79* (2.02) [0.25]	0.57 (1.51) [0.17]
Contemporaneous Measures of real GNP Growth Rate of $t-2$			0.91** (2.79)			0.88** (3.16) [0.29]	0.78** (2.83) [0.25]			0.59* (2.44) [0.19]
Refined Measures of real GNP Growth Rate of t		1.41*** (4.73)			1.03*** (4.05) [0.34]			1.16*** (4.63) [0.38]	1.03*** (4.08) [0.34]	1.04*** (4.50) [0.34]
Refined Measures of real GNP Growth Rate of $t-1$				1.08** (3.23)		0.85** (3.00) [0.27]		1.03*** (4.22) [0.34]	0.49 (1.37) [0.16]	0.38 (1.10) [0.12]
Constant	83.26*** (49.06)	81.52*** (47.11)	84.18*** (50.71)	83.12*** (43.18)	80.04*** (59.98)	81.28*** (55.65)	81.46*** (60.25)	79.39*** (56.34)	79.48*** (57.16)	78.69*** (61.24)
N	72	73	72	72	113	113	113	113	113	138
Adjusted R^2	0.18	0.23	0.09	0.12	0.33	0.19	0.22	0.31	0.33	0.34
Standard Error of Estimates	11.90	11.62	11.87	12.36	10.41	11.22	11.01	10.52	10.37	10.06
Durbin-Watson	0.64	0.53	0.50	0.68	0.58	0.60	0.53	0.53	0.56	0.44
First Order Autocorrelation	0.65	0.73	0.68	0.64	0.70	0.66	0.70	0.73	0.71	0.77

SOURCE: *The Index of Consumer Sentiment* of the University of Michigan 1959-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the

fourth quarter of 1958. The contemporaneous measures of real GNP growth rate of each half year became available in the first half year of 1959. Due to different data availability in 1959, the case number may change across models.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

[] Standardized coefficient of the according variable.

Table II-5 The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with Cases Holding over Two-Percentage Difference between Contemporaneous and Refined Measures of Real GNP Growth Rates, Based on Data after Partial Difference Transformation (the *Cochrane-Orcutt* Transformation), 1960—2008

Dependent Variable: Quarterly Consumer Sentiment of t

Model	Single Economic Measures				Multiple Economic Measures					
	1	2	3	4	5	6	7	8	9	10
Contemporaneous Measures of real GNP Growth Rate of $t-1$	0.29 (1.54)				0.37** (2.67) [0.23]		0.23 (1.48) [0.15]		0.25 (1.38) [0.16]	0.18 (1.15) [0.12]
Contemporaneous Measures of real GNP Growth Rate of $t-2$			-0.05 (0.31)			0.05 (0.32) [0.03]	0.06 (0.44) [0.04]			0.03 (0.26) [0.02]
Refined Measures of real GNP Growth Rate of t		0.43** (2.99)			0.51*** (4.14) [0.36]			0.60*** (4.52) [0.44]	0.57*** (4.14) [0.41]	0.52*** (4.27) [0.39]
Refined Measures of real GNP Growth Rate of $t-1$				-0.03 (0.18)		0.03 (0.24) [0.02]		0.32* (2.38) [0.23]	0.18 (1.04) [0.13]	0.16 (1.05) [0.12]
Constant	30.26*** (37.76)	22.65*** (31.93)	27.10*** (36.74)	31.56*** (36.58)	25.19*** (44.28)	29.01*** (44.75)	25.33*** (41.22)	22.52*** (39.05)	24.18*** (41.03)	19.13*** (38.11)
N	72	73	72	72	113	113	113	113	113	138
Adjusted R^2	0.02	0.10	0.00	0.00	0.15	0.00	0.00	0.14	0.15	0.11
Standard Error of Estimates	6.50	5.72	6.10	6.68	5.68	6.40	6.12	5.57	5.64	5.39
Durbin-Watson	1.24	1.37	1.57	1.19	1.49	1.36	1.57	1.61	1.55	1.94

SOURCE: *The Index of Consumer Sentiment* of the University of Michigan 1959-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958. The contemporaneous measures of real GNP growth rate of each half year became available in the first half year of 1959. Due to different data availability in 1959, the case number may change across models.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

[] Standardized coefficient of the according variable.

/Table II-6 about here/

To sum up above analyses on both groups of cases, among all possible economic references in *Quarter t* the electorate may use to form their economic perceptions: the contemporaneous measures of real GNP growth rate of *Quarter t-1* and *t-2*, and the real economy of *Quarter t* and *t-1* as later revealed by the refined measures of *Quarter t* and *t-1* on the electorate's economic perceptions of *Quarter t*, both the contemporaneous measures of real GNP growth rate of *Quarter t-1* and the refined measures of real GNP growth rate of *Quarter t* are statistically significant in impacting the consumer sentiment of *Quarter t* positively.

Table II-6 The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with Cases Holding over Two-Percentage Difference between Contemporaneous and Refined Measures of Real GNP Growth Rates, Based on Data after Full Difference Transformation, 1960—2008

Dependent Variable: Quarterly Consumer Sentiment of t

Model	Single Economic Measures				Multiple Economic Measures					
	1	2	3	4	5	6	7	8	9	10
Contemporaneous Measures of real GNP Growth Rate of $t-1$	0.20 (1.50)				0.24* (2.12) [0.19]		0.12 (0.90) [0.09]		0.18 (1.26) [0.14]	0.12 (0.86) [0.09]
Contemporaneous Measures of real GNP Growth Rate of $t-2$			-0.07 (0.54)			-0.13 (1.09) [-0.11]	-0.08 (0.65) [-0.07]			-0.05 (0.43) [-0.04]
Refined Measures of real GNP Growth Rate of t		0.41*** (3.44)			0.45*** (4.62) [0.41]			0.53*** (4.63) [0.47]	0.49*** (4.24) [0.44]	0.43*** (3.87) [0.37]
Refined Measures of real GNP Growth Rate of $t-1$				-0.11 (0.87)		-0.07 (0.64) [-0.06]		0.21 (1.80) [-0.04]	0.09 (0.62) [0.08]	0.09 (0.67) [0.08]
Constant	0.10 (0.15)	-0.42 (0.66)	-0.99 (1.45)	0.29 (0.44)	0.01 (0.02)	-0.48 (0.89)	-0.52 (0.97)	-0.04 (0.07)	-0.02 (0.03)	-0.16 (0.34)
N	72	73	72	72	113	113	113	113	113	138
Adjusted R^2	0.02	0.13	0.00	0.00	0.16	0.00	0.00	0.15	0.16	0.10
Standard Error of Estimates	5.52	5.28	5.78	5.58	5.20	5.75	5.74	5.23	5.21	5.35
Durbin-Watson	2.01	2.09	2.42	1.97	2.26	2.14	2.27	2.30	2.29	2.43

SOURCE: *The Index of Consumer Sentiment* of the University of Michigan 1959-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the

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Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Quarterly consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given quarter.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

[] Standardized coefficient of the according variable.

Appendix III

Semi-Annual Analyses on the Impact of Contemporaneous and Refined Economic Measures on Economic Perceptions

The purpose of this appendix is to examine the impact of the contemporaneous and the refined measures of real GNP growth rate on the electorate's economic perceptions on the basic analysis time unit of half year. In this appendix, I change the basic analysis time unit from quarter to half year in examining the impact of the contemporaneous and the refined measures on economic perceptions. The dependent variable is the consumer sentiment of *Half-Year t*. And two independent variables are the contemporaneous measures of real GNP growth rate of *Half-Year t-1*, and the refined measures of real GNP growth rate of *Half-Year t*. I also examine two groups of cases separately: (1) all consecutive cases from 1960 to the 2008, and (2) cases from 1960 to 2008 in which the difference between the contemporaneous and the refined measures of real GNP growth rates is beyond two percentage points.

1. Test on All Consecutive Cases

The following analyses examine the possible effects of the contemporaneous and the refined economic measures on economic perceptions of each half year from 1960 to 2008. First, I run ordinary least square regression to examine the impact of the contemporaneous measures of real

GNP growth rate of *Half-Year t-1* and the refined measures of real GNP growth rate of *Half-Year t* on economic perceptions of *Half-Year t* in Table III-1. Either individual economic measures in *Equation 1* and *2* or both of them in *Equation 3* affect the economic perceptions of *Half-Year t* significantly ($p < 0.001$, one tailed). In *Equation 3*, the refined measures have a little bit higher coefficient (1.82 vs. 1.33), and standardized coefficient (0.45 vs. 0.33) than the contemporaneous measures, but the two effects are nearly equal. Unfortunately, the Durbin-Watson Statistic of each equation is about 0.4 to 0.6, well below the ideal value of 2.00. The low Durbin-Watson indicates that there is a high level of autocorrelation in the series.

/Table III-1 about here/

In order to control the effects of unacceptable high autocorrelation, the variables in the data set have been reanalyzed after taking both their partial differences from adjacent cases and also their full differences or amount of change from one case to the next. Table III-2 presents the OLS regression results on the data after partial difference transformation (*Cochrane-Orcutt* transformation)³³. The weight used in the partial difference transformation is the first order autocorrelation. The weights used in equation 1-3 to produce the partial difference transform are

³³ The Cochrane-Orcutt transformation as described by Kmenta (1986: 314-316) and Ostrom (1990) has two steps as follows:

1. Run OLS estimates of

$$Y_t = a + bX_t + e_t$$
to obtain first order autocorrelation p
2. Construct Y_t^* and X_t^* in the following way

$$Y_t^* = Y_t - pY_{t-1} \quad t = 2, 3, \dots, T$$

$$X_t^* = X_t - pX_{t-1} \quad t = 2, 3, \dots, T$$
3. Obtain OLS estimates of

$$Y_t^* = a^* + b^*X_t^* + e_t^*$$

Table III-1. The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with all Cases, 1960—2008

Dependent Variable: Semi-Annual Consumer Sentiment of t

<i>Model</i>	<i>1</i>	<i>2</i>	<i>3</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	1.92*** (5.28)		1.33*** (3.93)
Refined Measures of real GNP Growth Rate of t		2.26*** (6.56)	1.82*** (5.38)
Constant	82.00*** (55.39)	80.28*** (54.19)	77.82*** (51.29)
N	98	98	98
Adjusted R^2	0.22	0.30	0.39
Standard Error of Estimates	10.25	9.68	9.02
Durbin-Watson	0.51	0.55	0.43
First Order Autocorrelation	0.70	0.72	0.77

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958. The contemporaneous measure of real GNP growth rate of each half year became available in the second half year of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Semi-annual consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given half year.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

In *Equation 3*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ and Refined Measures of real GNP Growth Rate of t is 0.33 and 0.45 respectively.

0.70, 0.72, and 0.77. The OLS regression results after partial difference transformation present that the Durbin-Watson Statistic in each equation has reached to above 1.20, located in acceptable area of no autocorrelation. In *Equation 3*, the Durbin-Watson reaches 1.66. The autocorrelation in the data has dropped greatly. In *Equation 1*, the contemporaneous measures of real GNP growth rate of *Half-Year t-1* positively affect the economic perceptions of *Half-Year t* significantly ($p < 0.05$, one tailed). In *Equation 2* and *Equation 3*, either individual refined measures of real GNP growth rate of *Half-Year t* or both the contemporaneous and the refined measures of economic growth affect the economic perceptions of *Half-Year t* significantly ($p < 0.001$, one tailed). But the refined measures of real GNP growth rate of *Half-Year t* also have larger coefficient (0.99 vs. 0.64), and larger standardized coefficient (0.49 vs. 0.34) than the contemporaneous measures of real GNP growth rate of *Half-Year t-1*. These are telling us that the refined measures of real GNP growth rate of *Half-Year t* affect the consumer sentiment of *Half-Year t* greater than the contemporaneous measures of real GNP growth rate of *Half-Year t-1*.

/Table III-2 about here/

The variables in the data set are also reanalyzed after taking their full difference from adjacent cases. Table III-3 indicates the OLS regression results on the data after full difference transformation³⁴. The OLS regression results on the data after full difference transformation also

³⁴ The full difference transformation as described by Ostrom (1990) has two steps as follows:

1. Construct Y_t^* and X_t^* in the following way

$$Y_t^* = Y_t - Y_{t-1} \quad t = 2, 3, \dots, T$$

$$X_t^* = X_t - X_{t-1} \quad t = 2, 3, \dots, T$$

2. Obtain OLS estimates of

Table III-2. The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with all Cases Referring to Partial Difference Transformation (the *Cochrane-Orcutt* Transformation), 1960—2008

Dependent Variable: Semi-Annual Consumer Sentiment of t

<i>Model</i>	<i>1</i>	<i>2</i>	<i>3</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	0.51* (2.59)		0.64*** (3.88)
Refined Measures of real GNP Growth Rate of t		0.90*** (4.57)	0.99*** (5.51)
Constant	25.63*** (41.62)	23.51*** (40.85)	18.82*** (35.47)
<i>N</i>	98	98	98
Adjusted R ²	0.06	0.17	0.27
Standard Error of Estimates	5.89	5.45	4.96
Durbin-Watson	1.24	1.41	1.66

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis,

<http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

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The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958. The contemporaneous measure of real GNP growth rate of each half year became available in the second half year of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Semi-annual consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given half year.

$$Y_t^* = a^* + b^* X_t^* + e_t^*$$

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

In *Equation 3*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ and Refined Measures of real GNP Growth Rate of t is 0.34 and 0.49 respectively.

The weight of partial transformation is 0.70, 0.72, and 0.77 respectively in *Equation 1, 2, and 3*.

show that the Durbin-Watson Statistic of each equation jumps to above 1.70, located in acceptable area of no autocorrelation. In *Equation 1*, the contemporaneous measures of real GNP growth rate of *Half-Year t-1* have positive influence over the economic perceptions of *Half-Year t* significantly ($p < 0.05$, one tailed). In *Equation 2*, the refined measures of real GNP growth rate of *Half-Year t* also influence the economic perceptions of *Half-Year t* significantly ($p < 0.01$, one tailed). And in *Equation 3*, both the contemporaneous and the refined economic measures affect the economic perceptions significantly at the same time ($p < 0.001$, one tailed). The refined measures of *Half-Year t* also have bigger coefficient (0.87 vs. 0.57), and bigger standardized coefficient (0.35 vs. 0.48) than the contemporaneous measures of *Half-Year t-1*. It also means that the refined measures of real GNP growth rate of *Half-Year t* affect the consumer sentiment of *Half-Year t* more than the contemporaneous measures of real GNP growth rate of *Half-Year t-1*.

/Table III-3 about here/

Table III-4 summarizes the equations testing both the contemporaneous measures of real GNP growth rate of *Half-Year t-1* and the refined measures of real GNP growth rates of *Half-Year t* together. No matter the data is transformed or not, the refined measures of real GNP growth rate *Half-Year t* have higher coefficient, and standardized coefficient than the contemporaneous measures of real GNP growth rate of *Half-Year t-1*. The refined measures of real GNP growth rate of *Half-Year t* are more influential on the economic perceptions of *Half-Year t* than the contemporaneous measures of real GNP growth rate of *Half-Year t-1*. When

Table III-3. The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with all Cases Referring to Full Difference Transformation, 1960—2008

Dependent Variable: Semi-Annual Consumer Sentiment of t

<i>Model</i>	<i>1</i>	<i>2</i>	<i>3</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	0.38* (2.34)		0.57*** (3.84)
Refined Measures of real GNP Growth Rate of t		0.72** (4.20)	0.87*** (5.28)
Constant	-0.30 (0.52)	-0.28 (0.53)	-0.22 (0.44)
N	98	98	98
Adjusted R^2	0.04	0.15	0.25
Standard Error of Estimates	5.63	5.32	4.98
Durbin-Watson	1.72	1.81	2.00

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958. The contemporaneous measure of real GNP growth rate of each half year became available in the second half year of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Semi-annual consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given half year.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth

quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

In *Equation 3*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ and Refined Measures of real GNP Growth Rate of t is 0.35 and 0.48 respectively.

examining the difference of the coefficients of two independent variables, the test *p-value* is 0.37, 0.11, and 0.12 on the original data, the data after partial transformation, and the data after full difference transformation accordingly. There may be a difference between the coefficients of two measures, but the evidence is not conclusive.

/Table III-4 about here/

2. Test on Cases in which the Difference between Contemporaneous and Refined Measures of Real GNP Growth Rate over Two Percentage Points

In Chapter 2, we have an assumption that a difference of two percentage points or more between the contemporaneous and the refined measures of real GNP growth rates is a notable difference, one large enough that it might lead to different perceptions of the economy. Here these cases are selected out, in which the difference between the contemporaneous and the refined measures of real GNP growth rates is beyond two percentage points, and then process OLS regression on them.

Table III-5 presents the results of ordinary least squares regression on the original data. In *Equation 1-3*, either the individual economic measures or both of them have positive effects on the economic perceptions of *Half-Year t*. But the Durbin-Watson Statistic of *Equation 1, 2 and 3* is 1.22, 1.07, and 0.63, much less than 2.00. There is also high level of autocorrelation in the series in the data set of high difference cases. In order to lower this high level of autocorrelation,

Table III-4 The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with all Cases, 1960—2008

Dependent Variable: Semi-Annual Consumer Sentiment of t

<i>Model</i>	<i>OLS</i>	<i>Partial Difference Transformation</i>	<i>Full Difference Transformation</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	1.33*** (3.93)	0.64*** (3.88)	0.57*** (3.84)
Refined Measures of real GNP Growth Rate of t	1.82*** (5.38)	0.99*** (5.51)	0.87*** (5.28)
Constant	77.82*** (51.29)	18.82*** (35.47)	-0.22 (0.44)
N	98	98	98
Adjusted R^2	0.39	0.27	0.25
Standard Error of Estimates	9.02	4.96	4.98
Durbin-Watson	0.43	1.66	2.00
First Order Autocorrelation	0.77		
$P > t $ of $(b1-b2)$	0.37	0.11	0.12

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

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The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958. The contemporaneous measure of real GNP growth rate of each half year became available in the second half year of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Semi-annual consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given half year.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

The standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ and Refined Measures of real GNP Growth Rate of t is 0.33 and 0.45 respectively in *OLS* regression model. In the regression results on the data after *Partial Difference Transformation*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ and Refined Measures of real GNP Growth Rate of t is 0.34 and 0.49 respectively. And in the regression result on the data after *Full Difference Transformation*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ is also less than that of Refined Measures of real GNP Growth Rate of t : 0.35 vs. 0.48.

transformations on the original data becomes necessary. Next I process partial difference and full difference transformation on the original data, and OLS regression on the data after transformation.

/Table III-5 about here/

Table III-6 presents the OLS regression results on the data after partial difference transformation. The weight used in the partial difference transformation is the according first order autocorrelation. The weights used in *Equation 1, 2, and 3* produce the partial difference transformation is 0.26, 0.41, and 0.62. Partial difference transformation improves the Durbin-Watson Statistic of *Equation 1, 2, and 3* to 1.35, 0.89, and 1.23, although not very satisfactory. The autocorrelation in the series has dropped in the data after partial difference transformation. Meanwhile, either the individual contemporaneous and refined measures of real GNP growth rate or both of them enjoy statistical significance in affecting consumer sentiment of *Half-Year t* positively. In *Equation 3* testing the effects of both the contemporaneous measures of real GNP growth rate of *Half-Year t-1* and the refined measures of real GNP growth rates of *Half-Year t* together, the refined measures hold higher statistical significance ($p < 0.01$, one tailed) than the contemporaneous measures ($p < 0.05$, one tailed). And the refined measures have higher coefficient (0.97 vs. 0.63), and standardized coefficient (0.49 vs. 0.33) than the contemporaneous ones. Both the contemporaneous measures of real GNP growth rate of *Half-Year t-1* and the refined measures of real GNP growth rate of *Half-Year t* have positive effects on the consumer

Table III-5 Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with Cases Holding over Two-Percentage Difference between Contemporaneous and Refined Measures of Real GNP Growth Rates, 1960-2008

Dependent Variable: Semi-Annual Consumer Sentiment of t

<i>Model</i>	<i>1</i>	<i>2</i>	<i>3</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	2.15** (3.60)		1.22* (2.28)
Refined Measures of real GNP Growth Rate of t		2.57*** (5.02)	1.63** (3.26)
Constant	82.06*** (30.42)	74.98*** (26.32)	75.99*** (29.86)
<i>N</i>	18	18	31
Adjusted R ²	0.41	0.59	0.45
Standard Error of Estimates	10.19	9.31	9.73
Durbin-Watson	1.22	1.07	0.63
First Order Autocorrelation	0.26	0.41	0.62

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958. The contemporaneous measure of real GNP growth rate of each half year became available in the second half year of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Semi-annual consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given half year.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

Across equations, the reference half year on which the difference between the contemporaneous and refined measures of real GNP growth rate is beyond two percentage points is different. In *Equation 1*, the reference quarter is *Half-Year t-1*, in *Equation 2*, the reference quarter is *Half-Year t*, and in *Equation 3*, the reference quarter refers to both *Half-Year t-1* and *Half-Year t*. As a consequence, each different equation has a different case number.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

In *Equation 3*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of *t-1* and Refined Measures of real GNP Growth Rate of *t* is 0.34 and 0.49 respectively.

sentiment of *Half-Year t*. The refined measures of real GNP growth rate of *Half-Year t* are more influential than the contemporaneous measures.

/Table III-6 about here/

The variables in the data set are also reanalyzed after full difference transformation. In Table III-7, the Durbin-Watson Statistic of *Equation 1, 2, and 3* has increased to 2.21, 1.77, and 2.26, located in acceptable area of no autocorrelation. There is a high level of independence of the data among adjacent cases in the data after full difference transformation. The OLS regression results on the data after full difference transformation present that only the refined measures of real GNP growth rate of *Half-Year t* is statistically significant in *Equation 3* testing the effects of both the contemporaneous measures of real GNP growth rate of *Half-Year t-1* and the refined measures of real GNP growth rate of *Half-Year t* together. Neither of the individual contemporaneous or refined measures affect the economic perceptions of *Half-Year t* in *Equation 1 and Equation 2*. But in *Equation 3*, when the contemporaneous and the refined measures are examined together, only the refined measures of real GNP growth of *Half-Year t* positively affect the consumer sentiment of *Half-Year t* significantly ($p < 0.01$, one-tailed). These findings also reflect that the more influential power of the refined economic measures over economic conceptions.

/Table III-7 about here/

Table III-6 The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with Cases Holding over Two-Percentage Difference between Contemporaneous and Refined Measures of Real GNP Growth Rates, Referring to Partial Difference Transformation (the *Cochrane-Orcutt* Transformation), 1960—2008

Dependent Variable: Semi-Annual Consumer Sentiment of t

<i>Model</i>	<i>1</i>	<i>2</i>	<i>3</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	1.54* (2.80)		0.63* (2.12)
Refined Measures of real GNP Growth Rate of t		1.73** (3.47)	0.97** (3.16)
Constant	62.36*** (29.46)	45.47*** (22.07)	30.78*** (27.47)
N	18	18	31
Adjusted R^2	0.29	0.39	0.29
Standard Error of Estimates	8.57	7.51	5.80
Durbin-Watson	1.35	0.89	1.23

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

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The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958. The contemporaneous measure of real GNP growth rate of each half year became available in the second half year of 1958.

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Across equations, the reference half year on which the difference between the contemporaneous and refined measures of real GNP growth rate is beyond two percentage points is different. In *Equation 1*, the reference quarter is *Half-Year t-1*, in *Equation 2*, the reference quarter is *Half-Year t*, and in *Equation 3*, the reference quarter refers to both *Half-Year t-1* and *Half-Year t*. As a consequence, each different equation has a different case number.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

In *Equation 3*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of *t-1* and Refined Measures of real GNP Growth Rate of *t* is 0.33 and 0.49 respectively.

The weight of partial transformation is 0.26, 0.41, and 0.62 respectively in *Equation 1*, *2*, and *3*.

Table III-7 The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with Cases Holding over Two-Percentage Difference between Contemporaneous and Refined Measures of Real GNP Growth Rates, Referring to Full Difference Transformation, 1960—2008

Dependent Variable: Semi-Annual Consumer Sentiment of t

<i>Model</i>	<i>1</i>	<i>2</i>	<i>3</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	0.08 (0.27)		0.38 (1.88)
Refined Measures of real GNP Growth Rate of t		0.17 (0.46)	0.69** (2.96)
Constant	0.68 (0.52)	-1.21 (1.00)	0.24 (0.28)
N	18	18	31
Adjusted R^2	0.00	0.00	0.22
Standard Error of Estimates	5.26	5.14	4.70
Durbin-Watson	2.21	1.77	2.26

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958. The contemporaneous measure of real GNP growth rate of each half year became available in the second half year of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Semi-annual consumer sentiment is calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given half year.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

Across equations, the reference half year on which the difference between the contemporaneous and refined measures of real GNP growth rate is beyond two percentage points is different. In *Equation 1*, the reference quarter is *Half-Year t-1*, in *Equation 2*, the reference quarter is *Half-Year t*, and in *Equation 3*, the reference quarter refers to both *Half-Year t-1* and *Half-Year t*. As a consequence, each different equation has a different case number.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

In *Equation 3*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of *t-1* and Refined Measures of real GNP Growth Rate of *t* is 0.31 and 0.49 respectively.

Table III-8 summarizes equations testing the effects of both the contemporaneous measures of real GNP growth rate of *Half-Year t-1* and the refined measures of real GNP growth rates of *Half-Year t* together over the economic perceptions of *Half-Year t*. As far as whether the coefficients of two independent variables are significantly different, the test *p-value* is 0.64, 0.41, and 0.28 on the original data, the data after partial difference transformation, and the data after full difference transformation accordingly. It is not confident to say the coefficients of two independent variables are different.

/Table III-8 about here/

In summary, the above semi-annual analyses on the impact of the contemporaneous and the refined measures on economic perception have the similar results to the quarterly analyses in Chapter 4. Both the contemporaneous measures of economic growth by the BEA and the real economy as revealed by the refined measures of economic growth have positive effects on the electorate's economic perceptions. And the real economy holds a higher influence over the electorate's economic perceptions than the contemporaneous economic measures.

Table III-8 The Effects of the Contemporaneous and Refined Economic Measures on Economic Perceptions with Cases Holding over Two-Percentage Difference between Contemporaneous and Refined Measures of Real GNP Growth Rates, 1960—2008

Dependent Variable: Semi-Annual Consumer Sentiment of t

<i>Model</i>	<i>OLS</i>	<i>Partial Difference Transformation</i>	<i>Full Difference Transformation</i>
Contemporaneous Measures of real GNP Growth Rate of $t-1$	1.22* (2.28)	0.63* (2.12)	0.38 (1.88)
Refined Measures of real GNP Growth Rate of t	1.63** (3.26)	0.97** (3.16)	0.69** (2.96)
Constant	75.99*** (29.86)	30.78*** (27.47)	0.24 (0.28)
N	31	31	31
Adjusted R^2	0.45	0.29	0.22
Standard Error of Estimates	9.73	5.80	4.70
Durbin-Watson	0.63	1.23	2.26
First Order Autocorrelation	0.62		
$P > t $ of $(b1-b2)$	0.64	0.41	0.28

SOURCE: *The Index of Consumer Sentiment* of University of Michigan 1958-2008 is collected from Economic Research in Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/series/UMCSENT/downloaddata?cid=98>

Original GNP is from the *Survey of Current Business* by the Bureau of Economic Analysis (BEA). The *Survey of Current Business* before 1994 is collected from FRASER, St. Louis Fed. The *Survey of Current Business* after 1994 is collected from Survey of Current Business Online in BEA. Refined GNP is from Table 1.7.6 Relation of Real Gross Domestic Product, Real Gross National Product, and Real Net National Product, Chained Dollars in National Economic Accounts in the BEA, which was released on Dec 22, 2010.

<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=44&Freq=Qtr&FirstYear=2008&LastYear=2010>.

In 1959, the Survey Research Center of the University of Michigan estimated *The Index of Consumer Sentiment* in May and Nov 1959. From 1960 to 1977, they estimated *The Index of Consumer Sentiment* of each quarter in the middle of each quarter. From 1978 to the present, they estimated *The Index of Consumer Sentiment* each month.

The contemporaneous measures of real GNP growth rate of each quarter became available in the third quarter of 1958. The BEA, however, did not estimate real GNP for the fourth quarter of 1958. The contemporaneous measure of real GNP growth rate of each half year became available in the second half year of 1958.

Note: The Survey Research Center of the University of Michigan assumes that *The Index of Consumer Sentiment* in the first quarter of 1966 equals 100. Semi-annual consumer sentiment is

calculated by averaging *The Index of Consumer Sentiment* estimated by the Survey Research Center of the University of Michigan during a given half year.

There are differences between the contemporaneous and refined measures of real GNP annual growth rates. For example, the contemporaneous measure in the *Survey of Current Business* show that real GNP of the first quarter of 2000 increased 5.45% compared to the fourth quarter of 1999. The refined measures of GNP released by National Economic Accounts in the BEA in Dec 2010, however, present that the actual increase rate is only 0.86%.

*** $p < 0.001$, one-tailed; ** $p < 0.01$, one tailed; and * $p < 0.05$, one tailed.

The standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ and Refined Measures of real GNP Growth Rate of t is 0.34 and 0.49 respectively in *OLS* regression results on the original data. In the regression result on the data after *Partial Difference Transformation*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ and Refined Measures of real GNP Growth Rate of t is 0.33 and 0.49 respectively. And in the regression result on the data after *Full Difference Transformation*, the standardized coefficient of Contemporaneous Measures of real GNP Growth Rate of $t-1$ is also less than that of Refined Measures of real GNP Growth Rate of t : 0.31 vs. 0.49.

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