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ABSTRACT

Unemployment is low and inflation is falling, but consumer sentiment remains depressed. This has confounded economists, who historically rely on these two variables to gauge how consumers feel about the economy. We propose that borrowing costs, which have grown at rates they had not reached in decades, do much to explain this gap. The cost of money is not currently included in traditional price indexes, indicating a disconnect between the measures favored by economists and the effective costs borne by consumers. We show that the lows in US consumer sentiment that cannot be explained by unemployment and official inflation are strongly correlated with borrowing costs and consumer credit supply. Concerns over borrowing costs, which have historically tracked the cost of money, are at their highest levels since the Volcker-era. We then develop alternative measures of inflation that include borrowing costs and can account for almost three quarters of the gap in US consumer sentiment in 2023. Global evidence shows that consumer sentiment gaps across countries are also strongly correlated with changes in interest rates. Proposed U.S.-specific factors do not find much supportive evidence abroad.

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I. Introduction

The economy is booming, and everyone knows it - except for the American people. The "misery index" developed by Arthur Okun in the 1970s uses the Consumer Price Index (CPI) inflation and the unemployment rate as the measurement of consumers' economic well-being. With unemployment below 4 percent and inflation trending back towards the target rate (Figure 1A), the index has declined from 9.7 percent in January 2023 to 7.0 percent in December.[1] This level is well below its 40-year average, and lower than it has been any time during the 1980s.

Consumer sentiment paints a different picture, however. This measure remained depressed in 2023 and still has not risen above its pre-pandemic levels. The University of Michigan's consumer sentiment index sat one standard deviation below its historical average in December (Figure 1B). The misery index, in short, is not capturing consumers' misery.

This presents a puzzle for economists familiar with the long literature documenting the strong contemporaneous comovement of inflation, unemployment, and consumer sentiment. [2] Explanations for this recent pattern have ranged from arguments about the lagged effects of inflation to suspicions that partisanship and "vibes" lie behind this startling gap. Many of these have been absorbed into the "referred pain" hypothesis, which suggests that non-economic concerns now drive economic sentiment.[3]

In this paper, we present a more concrete explanation for this divergence: the cost of money. Consumers, unlike modern economists, consider the cost of money part of their cost of living. [4] Interest rates have reached 20-year highs in the wake of the pandemic. With higher rates, mortgage payments, car payments, and other credit payments required to finance everyday purchases have risen as well. Amid higher credit costs, banks' willingness to supply consumer credit has fallen to depths similar to the Covid and Great Financial Crises (Figure 2B). Home prices are up almost 50 percent since the start of the pandemic, while the 30-year mortgage rate has tripled since the historic lows of 2021 (Figure 2A). Given that home prices remain at historic highs despite higher interest rates, the interest payment on a new 30-year mortgage for the average house has increased more than threefold since 2021 (Figure 3A). The interest payment on a new car loan has increased more than 80 percent (Figure 3B) since the start of the pandemic. It is not surprising that this would affect how consumers feel about the economy.

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[1] See Okun (1970) and for a discussion of the development of the index, see Nessen (2008). Traditionally, this has been the year-over-year change in headline inflation. There has been some debate recently about whether measuring inflation at different intervals is informative (Council of Economic Advisers, 2023).

[2] Examples that validate and expand upon the misery index include Welsch (2007), Cohen et al. (2014), and Hufbauer et al. (2008). Past papers tended to suggest that unemployment should have a larger influence on consumer sentiment than inflation, in contrast to what seems to be transpiring (Di Tella et al., 2003).

[3] A full discussion of the political gap in consumer sentiment is beyond the scope of this brief paper, see Cummings and Mahoney (2023a) for a recent discussion and Cummings and Mahoney (2023b) discussing the lagged effects of inflation. The term "vibecession" was invented by Scanlon (2022). Ip (2023) laid out the case for "referred pain."

[4] This was not always the case, see: Keyserling (1970).

These increases in the cost of living do not make it into economists' measures of inflation, however. The CPI excludes interest payments and is up a relatively muted 20 percent since the end of 2019.[5] This was not always the case. When Okun created his index, the measurement procedure for the CPI included measures of interest costs. This changed with the CPI redesign of 1983 (Bolhuis et al. 2022a, b). Before January of that year, homeownership variables, including housing prices and mortgage rates, entered directly into the CPI. The inclusion of these components made inflation increase mechanically at the beginning of a tightening cycle and decline once policy normalization began. It also led to a volatile series with disproportionate weight for a component—housing—that is both a consumption and an investment good. After years of research, the Bureau of Labor Statistics (BLS) moved to a system of owners' equivalent rent, which has a stronger theoretical justification (Gillingham, 1983). Housing prices and financing costs were removed from the index. But it did not disappear from the effective costs borne by would-be home buyers or others reliant on financing due to liquidity constraints, including those borrowing to finance cars and other forms of consumption. This paper argues that this disconnect in inflation measurement, on the one hand, and actual increases in the cost of living due to higher financing costs faced by consumers, on the other, underpins the recent divergence between official inflation data and consumer sentiment.

Economists need to better consider the cost of money to understand how consumers are currently experiencing inflation. We support this thesis in three stages. First, we show that the variation in the current University of Michigan Index of Consumer Sentiment, which cannot be explained by inflation and unemployment, has historically shown a strong correlation with proxies for the growth of consumer borrowing costs, such as the growth of interest rates for mortgages or car loans and the willingness of banks to extend consumer installment loans. We show that the other questions in the survey that measure consumer sentiment provide direct evidence that concerns of consumers about borrowing costs are at historic highs, surpassed only by the Volcker-era.

Second, we develop alternative CPI measures that explicitly incorporate the cost of money. We explain the methodology the Bureau of Labor Statistics (BLS) used historically to calculate the CPI measures for housing, which included a measure of the cost of homeownership which reflected mortgage payments. The current methodology relies solely on the rental market to impute the change in the price of owners' equivalent rent. We also discuss the market for auto loans and personal interest payments in consumption to propose proxies that better reflect the actual costs borne by consumers. The cost of financing car purchases is absent from the official price indices. To the extent that vehicle lease prices represent the flow utility that an owner-driver receives from their car, there is an argument to be made that for consistency lease prices should be measured instead of headline car prices. The growth of lease prices has remained strong as list price growth has begun to slow. Having made these points, we then present alternative CPI measures that reflect mortgage interest payments, personal interest payments for car loans and other non-housing consumption, and lease prices for vehicles. As such, we reconstruct the CPI series that formed consumers' unfavorable impressions of the Carter

[5] Stoller (2023) discusses the prior understanding of the cost of money and the current situation.

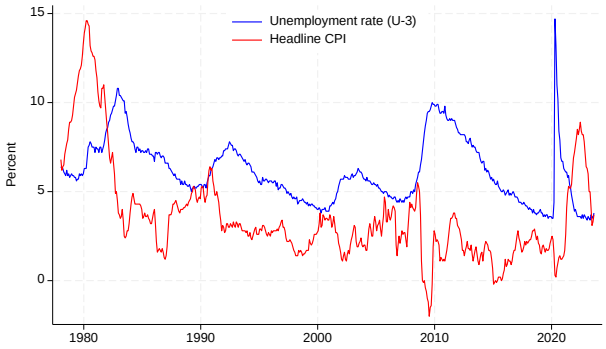
administration in the late 1970s and expand it using interest payments. These alternative measures show both a much higher peak and a continued high level of inflation. Using these measures in a simple model estimated on pre-Covid data only, closes more than 70 percent of the average gap in economic sentiment in 2023.

Finally, we present global evidence on cross-country variation in consumer sentiment gaps. In contrast to the hypothesis put forward in a highly publicized Financial Times article, we find that a sentiment gap is not a unique feature of the United States.[6] Estimating the same model for consumer sentiment on pre-Covid data for each of 10 advanced OECD economies, we find that in all but one country—the United Kingdom--consumer sentiment is currently more depressed than expected given official inflation and unemployment. Furthermore, we show that the magnitude of these gaps is strongly correlated with the relative growth of interest rates across countries, providing further support for our hypothesis. Although we do not fully dismiss other possible concerns, we present suggestive evidence that interest rate increases may fit better with gaps internationally than does "referred pain." The United Kingdom would not be among the first chosen for general optimism, nor would the country with the largest measured gap—Sweden—seem to be highest on measures of social distrust or inequality.

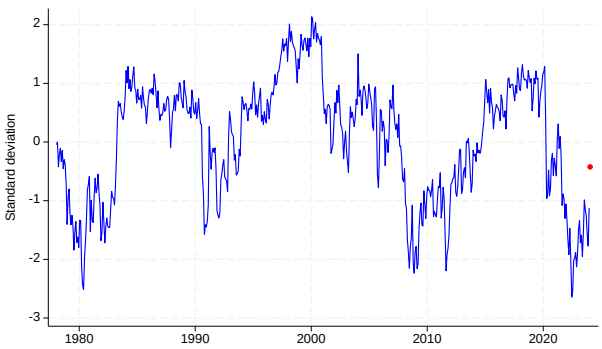
In January, after most of the research for this paper was completed, consumer sentiment jumped to its highest level since 2021. Although this is just one month of data, it appears consistent with our hypothesis. If high borrowing costs explain the consumer sentiment anomaly of 2023, then the recent moderation of the growth rate of borrowing costs in recent months could help consumers significantly in 2024, but further rises could prolong consumer dissatisfaction.

Figure 1

A: Unemployment and inflation



B: Consumer sentiment

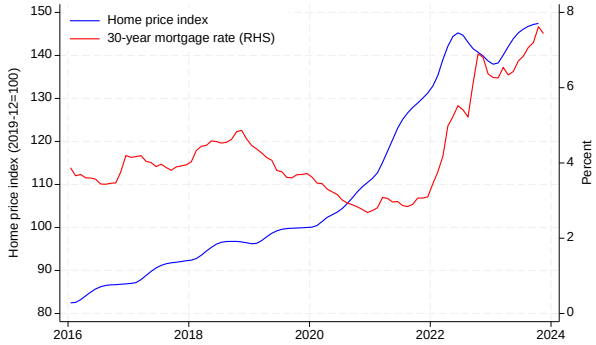


Notes: Figure 1A: blue line is U-3 unemployment rate, total unemployed as percent of the civilian labor force. Red line is the year-on-year growth in official headline CPI inflation. Figure 1B: University of Michigan's Index of Consumer Sentiment, standardized such that its mean equals zero and its standard deviation equals one. Preliminary reading for January 2024 in red.
Source: University of Michigan, FRED, and author's calculations.

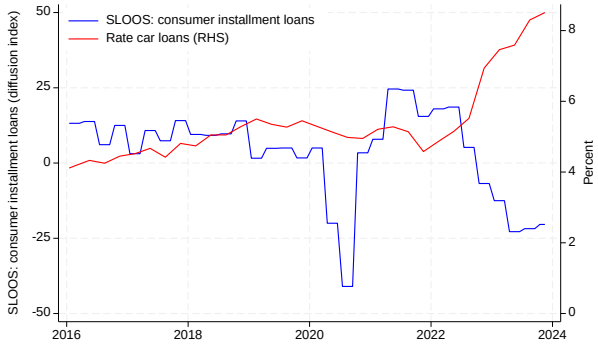
[6] See Burn-Murdoch (2023).

Figure 2

A: Consumer credit conditions (SLOOS) and interest rate on car loans



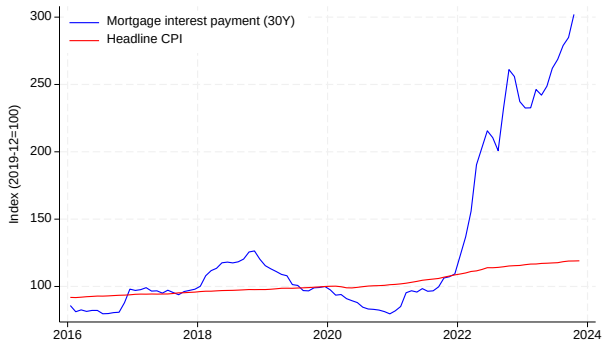
B: Home price growth and mortgage rates



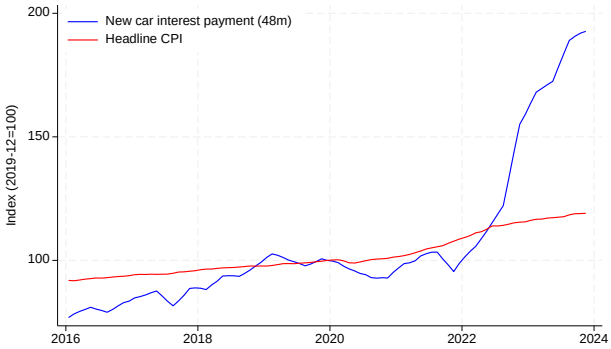
Notes: Figure 2A: blue line is net percentage of domestic banks reporting increased willingness to make consumer installment loans, from the Senior Loan Officer Opinion Survey (SLOOS) on Bank Lending Practices. Red line, using the right y-axis, is the average monthly finance rate on 48-month loans for new autos. Figure 2B: blue line is the S&P/Case-Shiller U.S. National Home Price Index, normalized to 100 for December 2019. Red line, using the right y-axis, is the average monthly 30-year fixed rate mortgage from Freddie Mac. Both series are from the Board of Governors of the Federal Reserve System.
Source: FRED and author's calculations.

Figure 3

A: Mortgage interest payment and CPI



B: Car loan interest payment and CPI



Notes: Figure 3A: blue line is the monthly average mortgage interest payment of a new home, computed as the product of the 30-year mortgage rate and the home price index in Figure 2A, normalized to 100 for December 2019. Red line is the level of the headline CPI from the Bureau of Labor Statistics (BLS), also normalized to 100 for December 2019. Figure 3B: blue line is the monthly average new car interest payment, computed as the product of the average monthly finance rate on 48-month loans for new autos (Figure 2B) and the price index for new vehicles in the CPI from the BLS.
Source: FRED and author's calculations.

II. The Consumer Sentiment Anomaly

This section first confirms that the current level of consumer sentiment is lower than what should be expected given the unemployment rate and current official inflation measures. Concerns over the cost of living remain elevated despite falling official inflation. We then develop a survey-based measure of concerns over borrowing costs, which has historically tracked interest rates and credit supply well. We document that this measure is currently at its highest level since the Volcker-era and plays a large role in driving concerns about the cost of living.

Measuring consumer sentiment

Our preferred measure for consumer sentiment is the Index of Consumer Sentiment (ICS) in the Surveys of Consumers by the University of Michigan. The ICS is calculated by summing five subindicators, adjusted by a scalar A and a constant c:

$$ICS = A \cdot (PAGO\_R + PEXP\_R + BUS12\_R + BUS5\_R + DUR\_R) + c\,.$$

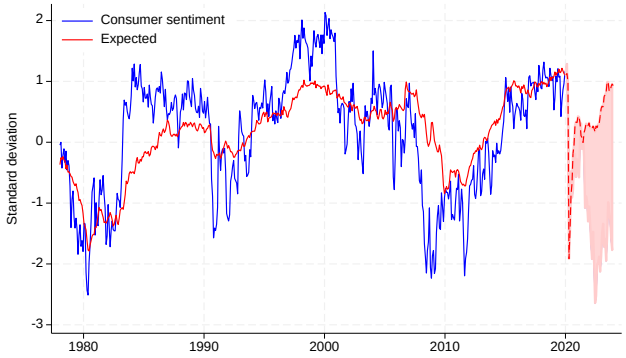
The indicators are expressed as relative scores, equal to the percentage of respondents providing favorable replies minus the percent providing unfavorable replies, plus 100 to survey questions on economic issues.[7] The survey obtains a random nationally representative sample by drawing from a list of all possible cell telephone numbers in the 48 contiguous U.S. states and the District of Columbia. The questions for the subindicators are:

- *PAGO_R*: "Would you say that you (and your family living there) are better off or worse off financially than you were a year ago?"
- *PEXP_R*: "Now looking ahead--do you think that a year from now you (and your family living there) will be better off financially, or worse off, or just about the same as now?"
- *BUS12_R*: "Now turning to business conditions in the country as a whole--do you think that during the next twelve months we'll have good times financially, or bad times, or what?"
- *BUS5_R*: "Looking ahead, which would you say is more likely--that in the country as a whole we'll have continuous good times during the next five years or so, or that we will have periods of widespread unemployment or depression, or what?"
- *DUR_R* = "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 now is a good or bad time for people to buy major household items?"

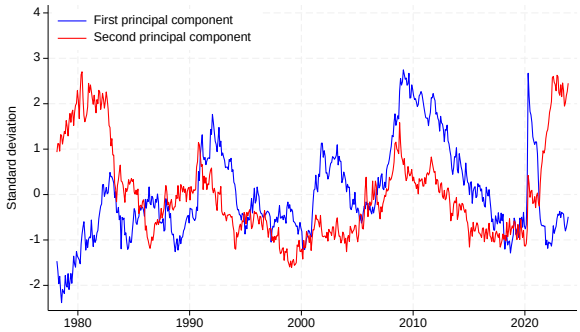
[7] *A* is the inverse of the 1966 base period (1/6.7558). The constant *c* is 2.0 since 1981:12 and was 2.7 from 1972:4 to 1981:11. There was no constant until 1972:4, except for one ad hoc adjustment in 1972:1. For more information, see https://data.sca.isr.umich.edu/.

Figure 4

A: Actual and expected consumer sentiment given unemployment and inflation



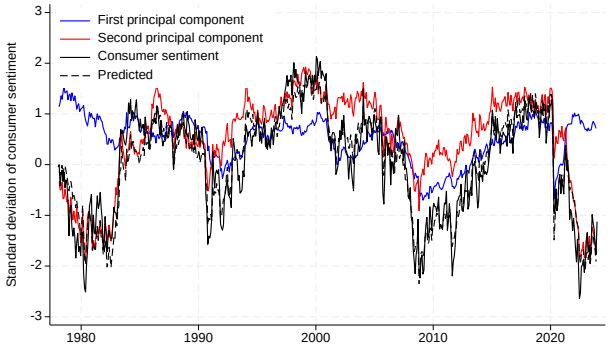
B: The first two principal components of consumer sentiment questions



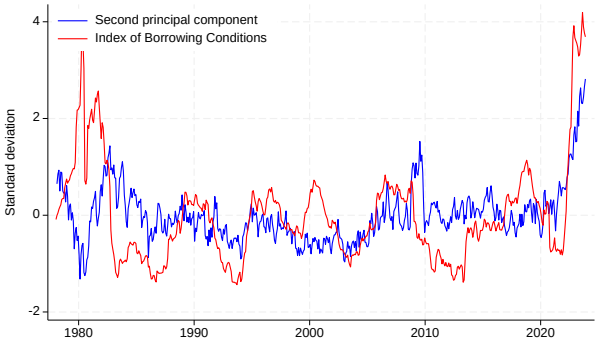
Notes: Figure 4A: blue line is Index of Consumer Sentiment (ICS, standardized). Red line is predicted consumer sentiment from a linear model using the U-3 unemployment rate and 12-month growth of headline CPI price index as inputs. Figure 4B: blue and red lines are the first and second principal component of answers to secondary consumer sentiment questions that are not directly incorporated in the ICS, estimated for the 1978-2019 period. For the full list of secondary questions, see Appendix Table 1.
Source: University of Michigan, FRED, and author's calculations.

Figure 5

A: Predictive power of principal components for consumer sentiment



B: Residual second principal component and borrowing conditions



Notes: Figure 5A: outputs of linear model that predicts Index of Consumer Sentiment (standardized) using the first two principal components of secondary consumer sentiment questions. Blue line is the contribution from the first principal component, the red line is the contribution from the second principal component. Solid and dashed black lines are actual and predicted consumer sentiment. Figure 5B: blue line is the variation in the second principal component that cannot be explained by the 12-month growth rate of headline CPI and the first principal component. We construct this measure by retrieving the residual of a linear regression of the second principal component on the two other variables. Red line is the first principal component of (i) the percentage growth of the 30-year fixed mortgage rate and (ii) the rate on 48-month auto loans, both relative to the average of their 1-year, 2-year and 3-year lags, and (iii) the Federal Reserve Board's diffusion index of in the SLOOS, estimated on monthly data from 1978 to 2019.
Source: University of Michigan, FRED, and author's calculations.

With unemployment at historical lows and official inflation declining from high levels, consumer sentiment can be expected to have improved dramatically. Instead, it has remained depressed, showing a remarkable divergence between expected levels based on a simple linear model using unemployment and CPI inflation and actual outturns (Figure 4A), which had fit well since the 1970s. The current gap is equivalent to almost two standard deviations of the ICS. We argue that much of this gap can be explained by the historical increase in the cost of money paid by households.

Current cost of living concerns correlate with borrowing conditions

The Surveys of Consumers questionnaires also contain questions that are not incorporated in the ICS. The answers to these questions can still provide insight into why consumers are more pessimistic than expected, however. We grouped together questions that are not *in* the ICS but do provide relevant context to its measurement (see Appendix Table 1 for a full list). We decompose the answers to this group of secondary questions into two principal components: concerns about income and concerns about the cost of living.[8] Together, these principal components account for 89 percent of the variation in consumer sentiment from 1978 to 2023. The largest contribution (67 percent) comes from the second principal component (Figure 5A). The cost of living seems to weigh heaviest on consumers' minds.

The first principal component of the secondary questions, estimated on pre-Covid data only and plotted in Figure 4B, captures concerns over incomes. It has historically tracked unemployment (Appendix Figure 1A) and economic activity. The concerns indexed in this first principal component peaked in the aftermath of the 1981–1982 recession, the early 1990s recession, the early 2000s recession, the Great Recession, and the Covid recession. It is currently at a low level, comparable to 2019 and to the dotcom era. Concerns over income are thus consistent with the current environment of low unemployment.

The second principal component, also plotted in Figure 4B, captures concerns over the cost of living. It is strongly correlated with headline and core inflation (Appendix Figure 1B), peaking during the inflationary cycle of the early 1980s, the early 1990s, the late 2010s, and the recent Covid period. These peaks also coincided with positive oil price shocks, indicating a good fit between official inflation rates and concerns over the cost of living. The residual variation in the second principal component that cannot be explained by variation in official inflation has increased sharply during the Covid period, however.

This residual variation correlates strongly with both the real growth of interest expenses for mortgages and the percentage of banks reporting increased willingness to make consumer installment loans (as measured in the Senior Loan Officer Opinion Survey or SLOOS). Figure 5B plots the residual of the second principal component against a composite index of these two

[8] Principal component analysis (PCA) transforms high-dimensional data with a large set of variables into a small number of new orthogonal variables that explain the greatest variance of the underlying data. In macroeconometric time series analysis, PCA has been used extensively for dimensionality reduction in large now- and forecasting models, most prominently dynamic factor models (e.g., Stock and Watson, 2002, 2011).

variables.[9] Alternatively, Table 3 in the Appendix shows these regressions on the entire sample, with and without including the composite index of borrowing conditions as a right-hand side variable. Including borrowing conditions improves the model's explanatory power of consumer sentiment and weakens the importance of headline inflation for consumer sentiment. These results indicate that the gap between consumers' level of concern and official inflation rates may be explained by the exclusion of the cost of money from official measures.[10]

Concerns over cost of money are at historic highs

We perform one more test of our hypothesis that consumer sentiment is depressed because of concerns over the cost of money as a component of the cost of living. Instead of discerning underlying principal components, we select questions in the secondary group that directly speak to either concerns over consumer prices or concerns over borrowing costs. We use these questions to construct an Inflation Index and a Cost of Money index, respectively. The Inflation Index summarizes the variation in the answers to six questions on prices included in official price indices, including questions on the general price level, prices of durables, vehicle prices, and gas prices.[11] The Cost of Money Index summarizes the variation in the answers to six questions on the borrowing costs for durables, vehicles, and homes. While the previous section shows that unemployment and inflation do not fully account for consumer sentiment, and that the unaccounted-for gap correlates with borrowing costs, these two indices make it possible to demonstrate that the cost of borrowing money is in fact a pressing concern for consumers.

The current levels of the specific questions about borrowing costs are worth investigating. Appendix II contains the figures that plot the answers to these questions over time. The share of households that find it a bad time to buy a car because interest rates are high stood at 34 percent in November (30 percent in December), the highest level ever (Appendix Figure 3). 68 percent (64 percent in December) of respondents found it a bad time to buy a house because interest rates are high, the highest level since 1982 (Appendix Figure 4).

The two indices, plotted in Figure 6A, capture distinct elements of consumer sentiment. Concerns over inflation rose until 1980, when they declined precipitously after the Volcker shock. They spiked again during the oil shocks of 1990 and 2008. In the 2021-2023 period, they climbed to historic highs before reversing again after inflation peaked in mid-2022.

Concerns over the level of interest rates show two clear peaks. The first is during the Volcker era, when the Federal Funds rate and mortgage rates exceeded 15 percent. Concerns dropped sharply after the Fed eased policy in 1982 (Figure 6B). There were small spikes of negative

[9] This composite is the first principal component of (i) the 12-month growth rate of the 30-year fixed mortgage rate and (ii) the Federal Reserve Board's diffusion index of banks' willingness to lend to consumers in the SLOOS, estimated on monthly data from 1978 to 2019.

[10] As we explain in more detail in section III, until 1983, official CPI inflation did include the cost of borrowing through the cost of home ownership component. Indeed, Figure 5B shows that in the early 1980s, borrowing conditions were not correlated with residual variation in consumer sentiment.

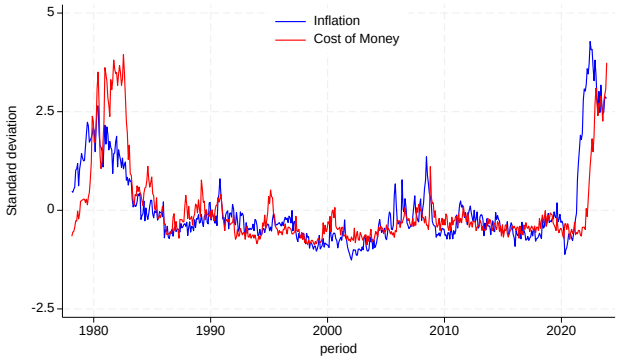
[11] We do not include questions on home prices, because these are not directly captured in the current CPI and PCE.

sentiment around the peaks of Fed tightening cycles in 1989, 1995, and 2000. Another small spike occurred at the height of the Global Financial Crisis, when banks tightened lending standards. We are currently experiencing the second large peak in consumer concerns over the level of interest rates. The Cost of Money Index shows levels not seen since 1982. The Fed has paused tightening and long yields seem to have peaked, and so the level of concern has reached a plateau - but it has not yet reversed.

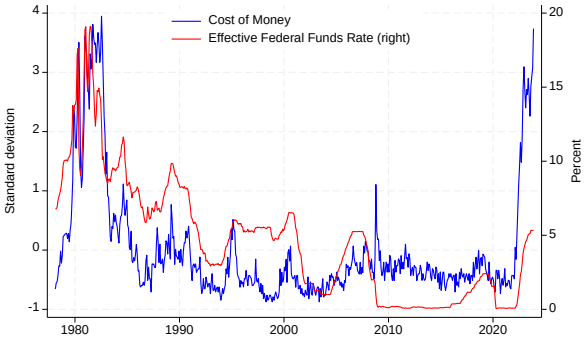
These peaks occur when real interest rates and credit conditions diverge from what can be expected given official inflation rates and unemployment. To break the inflationary psychology of 1970s, Volcker kept the real policy rate high while inflation fell. Currently the Federal Reserve is keeping its policy rate in restrictive territory despite cooling inflation. While unemployment and inflation have historically been the main drivers of consumer sentiment, there are times when they do not fully explain its variation. In these periods, concerns over borrowing costs must be included as an important driver of consumer sentiment.[12]

Figure 6

A: Concerns over inflation and cost of money



B: Concerns over cost of money and effective federal funds rate



Notes: Figure 6A: blue line is the Inflation Index, which summarizes the variation in the answers to six questions on prices included in official price indices, including questions on the general price level, prices of durables, vehicle prices, and gas prices. It is the first principal component of the standardized answers to these questions. The Cost of Money Index is the first principal component of the standardized answers to six questions on the borrowing costs for durables, vehicles, and homes. Appendix II contains the figures that plot the answers to these questions over time. Figure 6B: blue line is the same as the red line in Figure 6A. Red line is the effective federal funds rate.
Source: University of Michigan, FRED, and author's calculations.

[12] What matters both in theory and in the data is the percentage growth in interest rates faced by consumers, not the percentage point change. The growth rate of the spot price consumers pay for borrowing (i.e., the inflation rate of the cost of money) is currently at record highs.

III. Interest rates and Inflation

Current BLS methodologies do not measure how the cost of money affects the cost of living for consumers. Interest rates are not included in the CPI. This was not always the case. In this section, we discuss briefly how interest costs manifest as higher prices borne by consumers in three important markets. We then construct an alternative measure of the cost of living, building on past measurement methodologies by adding mortgage costs, consumer loans and lease prices for automobiles, and personal interest payments. Our preferred alternative measure explains the seeming gap between the sentiment that would be expected given the unemployment rate and the official inflation rate. It greatly improves the out of sample fit of the traditional two variable model during the pandemic era. We estimate that the consumer sentiment gap using the alternative CPI would be nearly 75 percent smaller in 2023 than the gap using current CPI inflation.

Housing

Housing is a complicated good for inflation measurement. On the one hand, it is the largest fixed investment that most Americans make in their lifetimes.[13] On the other hand, it provides a service – shelter—that is consumed daily. The median American purchases zero houses per year. Between 1953 and 1983, the BLS valued homeownership in the CPI basket without disentangling its two qualities or considering the timing of purchases. This methodology produced a measure that broadly captured changes in the expenses of new homeowners, taking house prices, mortgage interest rates, property taxes and insurance, and maintenance costs as inputs.[14]

This procedure led to a significant overstatement of the CPI (Gillingham 1980, 1983). It also ensured that measured inflation was directly responsive to monetary policy, with inflation rising mechanically with interest rate hikes (Bolhuis et al, 2022b). Notwithstanding these effects, the CPI did directly reflect the costs that renters who wished to own homes would face were they to enter the housing market.

In 1983, after much study, the BLS opted for a more theoretically grounded measure, in which housing-as-consumption is separated from housing-as-investment. The new methodology exchanged homeownership costs for owners' equivalent rent (OER) (Gillingham and Lane 1982). By estimating what a homeowner would receive for their home on the rental market, the BLS isolated owner-occupiers' consumption of residential services.[15] While this measure more accurately reflects housing-as-consumption, it has far-reaching effects for cost-of-living

[13] This discussion borrows heavily from earlier papers on changes in CPI methodology by a subset of the authors, i.e., Bolhuis et al. (2022a, b).
[14] More specifically, the home-purchase expenditure weight was the net purchase of owner-occupied houses in the survey period, and the mortgage-interest expenditure weight was the total interest (undiscounted) that would be paid over half the term on all mortgages incurred during the survey period (Duggan et al. 1997).
[15] For a discussion of methodology and how utilities are treated, see Verbrugge (2012).

measurements.[16] Owners' equivalent rent now constitutes 26 percent of the headline CPI basket and 30 percent of core CPI.[17] Mortgage costs are a decisive factor in consumers' assessment of their ability to make what for many Americans amounts to the most meaningful purchase of their lives. The exclusion of these costs means that the current methodology excludes a central part of consumers' financial well-being.[18]

Automobiles

New and used vehicles combine to represent nearly 7 percent of the CPI.[19] To measure new vehicle prices, the BLS relies on a dataset that contains 250,000 transactions per month, as reported by participating dealers across the country.[20] The approach on used cars and trucks is broadly similar.[21] Both approaches exclude financing costs.

That is a striking omission in a world with liquidity constraints. In the United States, the vast majority of car purchases are financed with loans. Consumer credit reporting company Experian estimates that 80 percent of new cars were financed with an average term of three years in the third quarter of 2023 (Zabritski 2023). Auto debt totals $1.6 trillion dollars in the third quarter of 2023. This is the same amount as student loan debt, and about 10 percent of total debt on household balance sheets. Only mortgage debt is a larger liability (Federal Reserve Bank of New York, 2023). Given auto debt's significance as a percentage of total debt and the car-centric culture in the United States, consumers are likely to closely monitor the financing costs of their automobiles. It remains absent, however, from measurements of the cost of living.

Leased automobiles, which receive a weight that is slightly less than 1 percent in the CPI basket, are included in the CPI as their own line item. The value used in the leased cars and trucks index includes the lease rent charge, which is the finance fee portion of a monthly lease payment and resembles the interest on a loan, alongside such data points as the vehicle base price, dealer preparation charges, and applicable taxes.[22] One can argue that leasing prices do a better job of capturing the actual costs borne by prospective vehicle buyers and should receive, if not the full weight of auto purchases, a larger share. Additionally, for owner-drivers, it seems lease prices would play the same role as rents for measuring the amount of utility received from driving one's own car.

[16] The introduction of OER also impacted the extent to which the Federal Reserve can endogenously "lean against the wind" of higher home prices by responding to home price inflation which was embedded in the CPI before the adjustment in 1983. See Shenai (2018) for a discussion.
[17] Shelter is also the most cyclically sensitive inflation component (Stock and Watson, 2020). Combined with its large weight, shelter accounts for a substantial part of the comovement between official inflation and measures of slack.
[18] They are also absent from the Federal Reserve's preferred measure, the price index for Personal Consumption Expenditures (PCE).
[19] For core CPI, this is around 10 percent.
[20] This discussion is based heavily on: https://www.bls.gov/cpi/factsheets/new-vehicles.htm
[21] For more information, see: https://www.bls.gov/cpi/factsheets/used-cars-and-trucks.htm
[22] See https://www.bls.gov/cpi/factsheets/leased-cars-and-trucks.htm

Other interest rate-linked purchases

The cost of money also shapes consumer sentiment through the use of credit cards and other forms of financing. Since the onset of the pandemic, the share of purchases made using cash has fallen precipitously (Cubides and O'Brien 2023). Currently, consumers use cash for less than one fifth of their total purchases. Credit cards are used for 31% of transactions. $1.1 trillion dollars of credit card debt was outstanding in the third quarter of 2023 (New York Fed 2023). The average credit card holder has roughly $7,000 in credit card debt, and overall credit card balances have increased about 20 percent since the start of the pandemic according to LendingTree.[23] After the start of the Fed's rate hiking campaign, average interest rates on credit card plans increased from 15 percent in early 2022 to 21 percent in August 2023.[24] This makes the cost of borrowing money a considerable factor in many consumers' costs of living.

Purchases that are made using an interest-linked instrument are not weighted separately in the CPI. It is not easy to strip financing costs from purchases more generally, not least because many consumers use credit cards without ever maintaining a balance or paying interest. LendingTree estimates this to be around 50 percent of consumers (LendingTree 2023). Still, measurements of the cost of living that exclude financing costs or do not separate them out from the overall costs of purchases will understate the pressure under which consumers, who rely on credit for many purchases, have found themselves following the recent tightening of monetary policy.

Alternative measures

We develop alternative measures that address the possible shortcomings of the current methodology for measuring the cost of living. We measure housing using the imperfect pre-1983 homeownership costs instead of owners' equivalent rent; we include average car lease payments in place of the retail price of automobiles; and we attempt to include personal interest payments as a separate BLS line item.

First, we reconstruct pre-1983 homeownership costs for the last 40 years. To do this, we estimate the relationship between the older CPI homeownership category and its subcomponents, e.g., mortgage rates and housing prices.[25] We extrapolate this relationship forward and replace OER with this measure for every period from 1984 forward. This is an oversimplification because weights in the CPI basket would have changed, but it is nonetheless

[23] See https://www.lendingtree.com/credit-cards/credit-card-debt-statistics/
[24] This is a smaller percentage increase than other markets due to the already high level and statutory limits.
[25] Formally, we run a linear regression of the 12-month growth of CPI homeownership costs on 12 lags of the growth rate of home prices, 30-year mortgage rates, and the product of these two variables. We then use the estimated model to predict what the inflation rate of homeownership costs would have been for the post-1983 period. CPI data are from Bolhuis et al. (2022b) and mortgage rates are from Freddie Mac. We use median home prices from the U.S. Census Bureau for the period before 1988 and the S&P/Case-Shiller U.S. National Home Price Index from 1989 onwards. Given that the latter are reported with a lag, we extrapolate home prices using Zillows' Home Value Index if the Case-Shiller measure is missing. This is similar to the approach pursued by Barton and Lee (2022) which extended the work of Hazell et al. (2020). Results appear consistent for overlapping periods.

an instructive measure. This pre-1983 methodology makes it possible to measure the cost of housing as faced by the prospective buyer.[26]

Figure 7 plots our alternative series against official CPI inflation. Alternative CPI inflation is higher during the heights of Fed tightening cycles, coinciding with the small spikes of negative sentiment in 1989, 1995, and 2000 (Section II). This suggests that even before the current episode of a low in consumer sentiment, borrowing costs were a meaningful driver of consumer sentiment.

Using this measure, we estimate that homeownership costs in the CPI would have more than doubled since the pandemic. Home prices jumped 40 percent and mortgage rates have risen more than 140 percent. Of course, the average costs of homeownership (and average mortgage interest payments or home prices) are much lower. But this is not the point of the measure, which does not estimate average costs as such but rather the cost to the marginal new homeowners buying at the spot price and closing a mortgage at the spot rate. This measure produces estimates suggesting that headline CPI would have peaked at 18 percent in November 2022 when consumer sentiment was at its lows. This was when Okun's misery index using the measurement procedure from his time would have peaked at 21.6 percent. Alternative CPI inflation would still have stood above 12 percent in August and 8 percent in November 2023. The pre-1983 measure still offers a more worrying picture of inflation in the current moment than the official inflation numbers. Below we will argue that it does much to explain depressed sentiment over the last two years.

Second, we replace the BLS measure for vehicle prices in the CPI, which is not responsive to borrowing costs, with the BLS measure of lease prices, which are. Unfortunately, the BLS does not report the costs of leased vehicles every month. Even though vehicles constitute less than 7 percent of the CPI basket, this change in measurement would have had meaningful effects on measured inflation over the last year. Overall year-on-year CPI inflation would have been 0.6 percentage points higher on average over the last 12 months for which data are available—a meaningful difference (Figure 8). In September of 2023—the last month for which lease prices were available from BLS--the price to lease a car or truck had risen 4.6 percent over the previous 12 months while the BLS reported that the price of a new vehicle had risen 2.5 percent and the price of a used vehicle had declined 8.0 percent. More accurately gauging what consumers are paying in financing for automobiles—instead of the headline price—would have led to higher inflation measures.

Third, we create a measure that separates personal interest payments from the cost of purchases. To do this, we turn to the Personal Consumption Expenditures (PCE), which contains the Bureau of Economic Analysis' (BEA) measurement of personal interest payments. These do not include mortgage payments and now account for almost 3 percent of the sum of personal consumption expenditures and interest payments (Figure 9A). Personal interest payments were up 43 percent over the last twelve months ending in November (Figure 9B).

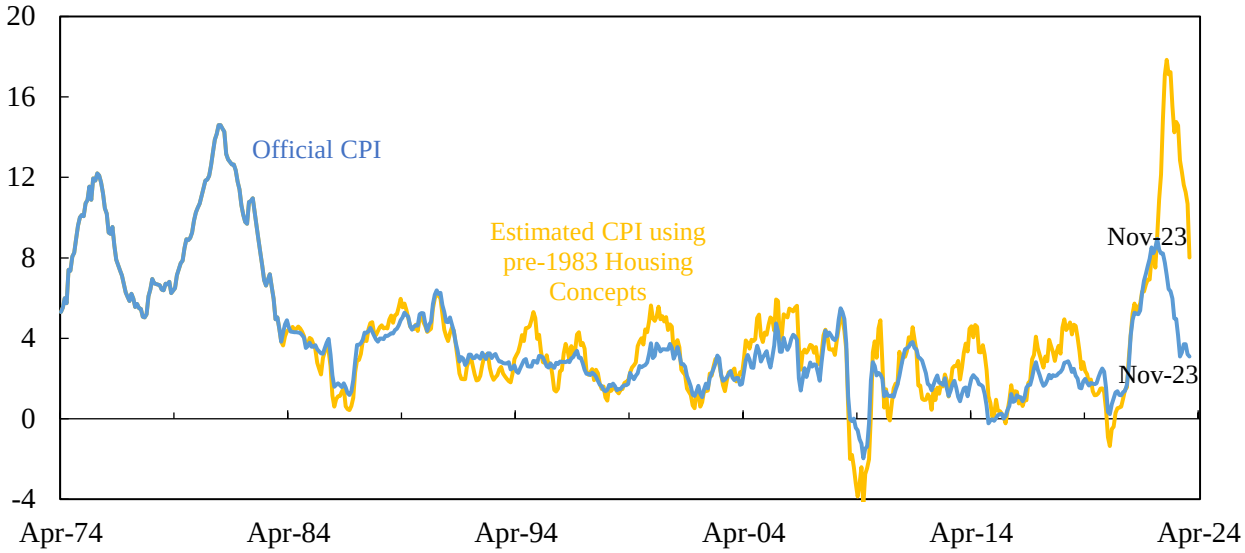
[26] CPI weights come from the dataset assembled by Bolhuis et al. (2022b).

When interest paid is considered as a cost borne by consumers and included in the CPI, the year-on-year inflation rate increases by one percentage point throughout the last year.[27] When both personal interest payments and the cost of homeownership are accounted for in the CPI, the inflation rate increases from 3 to 9 percent in November (Figure 10). Including the cost of money as part of purchases makes for a higher rate of measured inflation than in conventional methodologies.

Figure 7

Official and Estimated CPI using pre-1983 housing methods, 1974-2023

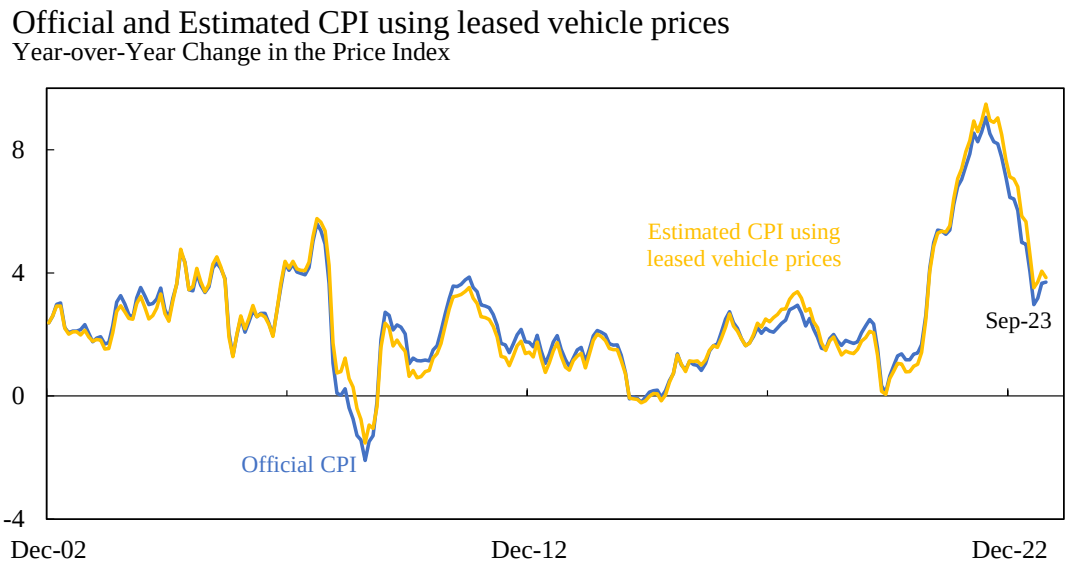
Year-over-Year Change in the Price Index



Note: 1983 is excluded during the transition, see text for imputation procedure.
Source: Bureau of Labor Statistics; Authors' Calculations.

[27] We assume that expenditures in the CPI increase by the share of personal interest payments relative to the sum of personal consumption expenditures and personal interest payments. We use a constant weight of 2.5 percent. This is a conservative assumption, since the PCE uses a broader definition of consumption which also includes items that are not paid out of pocket. In practice, the size of personal interest payments relative to payments for items in the CPI is therefore higher than what we assume.

Figure 8

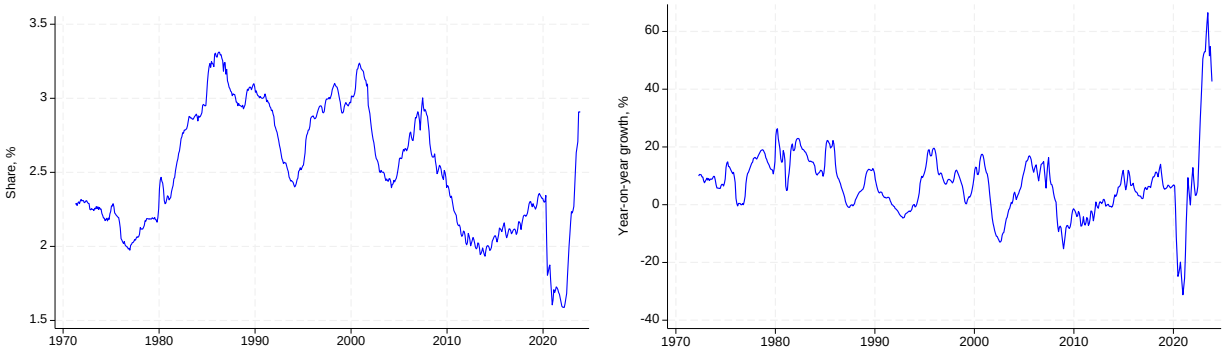


Note: Lease data is imputed for months missing
Source: Bureau of Labor Statistics; Authors' Calculations.

Figure 9

A: Personal interest payments relative to personal consumption expenditures

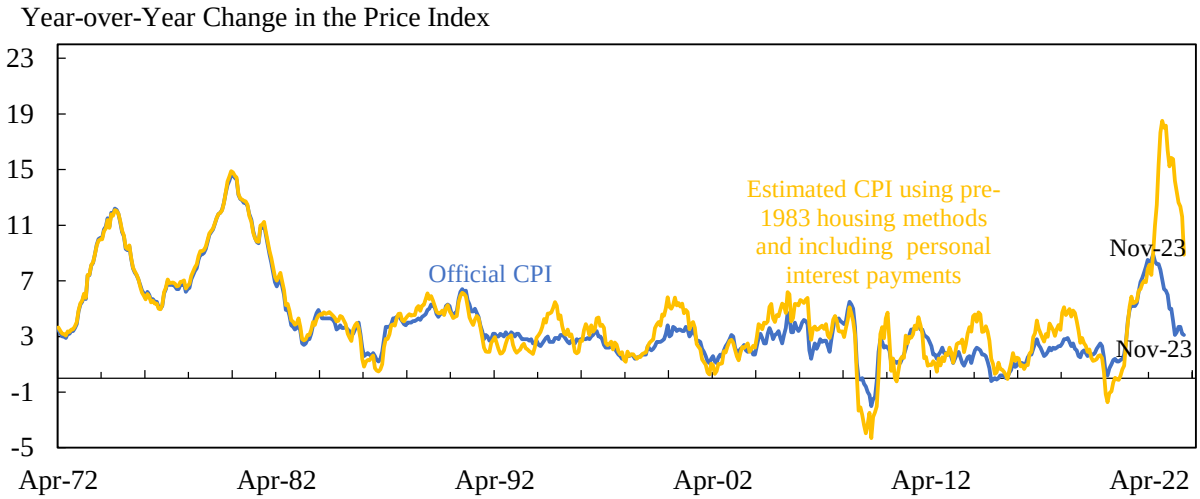
B: Growth in personal interest payments



Notes: Figure 9A: blue line is personal interest payments, expressed relative to the sum of personal consumption expenditures and personal interest payments (in percentages). Personal interest payments exclude mortgage payments. Figure 9B: 12-month growth rate of personal interest payments over time.
Source: FRED, and author's calculations.

Figure 10

Official and Estimated CPI using pre-1983 housing methods and including personal interest payments, 1972-2023



Note: Personal interest payments exclude mortgage payments. See text for pre-1983 imputation procedure.
Source: Bureau of Economic Analysis; Authors' Calculations.

Explaining consumer sentiment using alternative inflation measures

Finally, we show that using our alternative methodology for CPI inflation does much to resolve the puzzle of continued depressed consumer sentiment in a situation of low unemployment and falling official inflation. We run a set of simple linear regressions on data from 1978 to 2019:

$$y_t = \beta_\pi \pi_t + \beta_u (u_t - u_t^*) + \beta_s g_t + \epsilon_t \ (1) \ ,$$

where y_t is consumer sentiment, π_t is a measure of year-on-year CPI inflation, $u_t - u_t^*$ is the unemployment gap, measured as the difference between the U-3 unemployment rate and its long-term natural rate as estimated by the Congressional Budget Office. [28] g_t is the 12-month growth rate of the US stock market, as proxied by the Wilshire 5000 Total Market Index.

Table 1 summarizes the regression output. Equation (1) is estimated on pre-Covid data using headline CPI inflation in column (1). But when we predict consumer sentiment for the 2020-2023 period using this model, we see the expected gap appear, with sentiment appearing considerably more depressed than predicted (Figure 11A). Throughout 2023, this gap stood at 2.1 standard deviations of consumer sentiment, on average.

Table 1: Regression Output

	(1)	(2)
π_t (official CPI)	-0.18***	
	(0.01)	
$u_t - u_t^*$	-0.40***	-0.44***
	(0.01)	(0.01)
g_t	0.02***	0.02***
	(0.002)	(0.002)
π_t (alternative CPI)		-0.16***
		(0.01)
Observations	573	573
R-squared	0.70	0.58

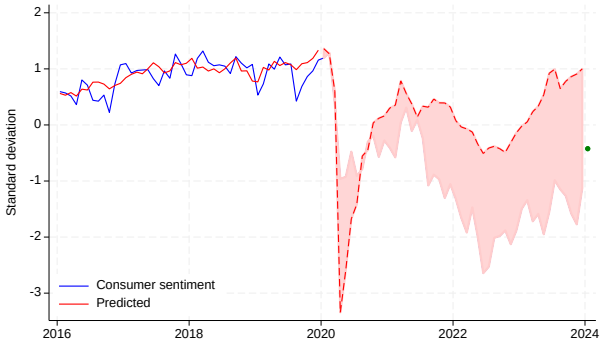
Notes: Models estimated on data for 1978-2019. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: FRED, and author's calculations.

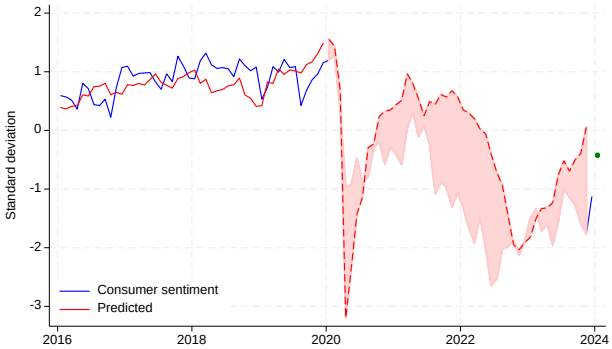
[28] The unemployment gap provides a better proxy for labor market conditions than the unemployment rate, because it is more strongly correlated with wage growth and accounts for variation in frictional unemployment over time due to the composition of the labor force. Daly et al. (2012) and Sahin et al. (2014) discuss how search and matching in the labor market gives rise to changes in the natural rate of unemployment and shifts in the Beveridge Curve. See Daly et al. (2013) for evidence of the importance of the wage gap for wage growth. Katz and Krueger (1999) showed how a high-pressure labor market affects numerous measures of worker compensation.

Figure 11

A: Model using headline CPI



B: Model using alternative CPI



Notes: Figure 11A: Blue line is standardized ICS. Solid red line is in-sample predicted ICS using model in column (1) of Table 1. The dashed red line is the out-of-sample prediction. Preliminary reading for January 2024 in green. Figure 11B: Same but using model in column (2).
Source: University of Michigan, FRED, and author's calculations.

We change this simple model in one way by replacing official CPI inflation using our alternative measure that explicitly accounts for the costs of homeownership and personal interest payments.[29] When in column (2) we predict consumer sentiment for the 2020-2023 period using the augmented model, the gap closes completely at end-2022 (Figure 11B). In 2023, the sentiment gap was 0.6 standard deviations on average. Accounting for the cost of money thus closes the gap by more than 70 percent. [30] Furthermore, the preliminary reading for January 2024, which was a considerable jump from December, closes most of the gap that had opened at the end of 2023.

[29] We do not use our alternative measure for vehicle inflation, because interest payments for car loans are already included in the PCE's personal interest payments.
[30] This finding is robust to using a full year of lags for the right-hand side variables. Results available upon request.

IV. Global evidence

This section examines consumer sentiment across different countries and evaluates the extent to which consumer sentiment aligns with official inflation, unemployment, interest rates, and stock market performance internationally. Our findings suggest that the United States is not unique in exhibiting a discrepancy between predicted and actual consumer sentiment.[31] Consumer sentiment is lower than expected in nine of 10 countries in our sample. Further, we show that the gaps between predicted and actual consumer sentiment are correlated with the growth of borrowing costs as proxied by the 12-month growth rate of 10-year government bond yields. Additionally, we discuss the "referred pain" hypothesis and fail to find supportive evidence.

Consumer sentiment is lower than expected in most countries

We collect monthly data for 10 advanced OECD countries with datasets spanning up to 50 years between 1973 and 2023. Countries have different observation start dates due to data availability constraints. The variables collected include 10-year government bond yields, official consumer price indices, unemployment rates, and stock market performance indices. We collected sentiment data from the OECD's Consumer Confidence Index (CCI). Like the ICS in the US, the CCI serves as a predictor for upcoming trends in household spending and saving habits. It is based on individual responses about anticipated personal financial conditions, general economic outlook, unemployment concerns, and saving capacity. A score exceeding 100 reflects an uptick in consumer optimism regarding the future economy. Conversely, scores below 100 signify a negative perception of future economic progress. The same is true for the US consumer sentiment survey.

For each country, we fit a simple linear regression model on pre-pandemic data:

$$y_{it} = \beta_\pi \pi_{it} + \beta_u u_t + \beta_s g_t + \epsilon_t \ (2)\ ,$$

where y_t is consumer sentiment, π_t is a measure of 12-month CPI inflation, u_t is the official unemployment rate, and g_t is the 12-month growth rate of the stock market index.[32]

Our analysis shows that the United States is not alone in experiencing a divergence between predicted and actual consumer sentiment. However, the extent of this gap varies significantly

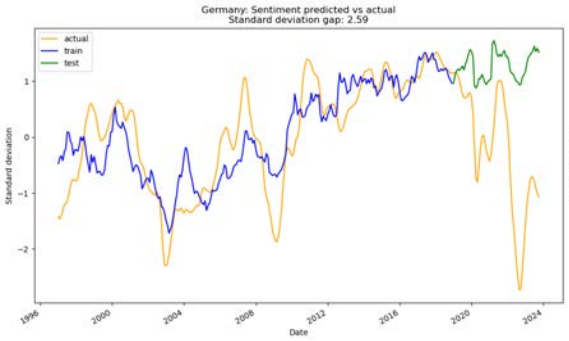
[31] See Burn-Murdoch (2023) for an analysis of four of our countries. Our results align somewhat, with a notable departure for Germany. His analysis was inspired by a Twitter thread by user @Quantian1. @Quantian1 highlighted the sentiment gap and highlighted the effect of interest rates becoming stronger post-pandemic in line with our findings in the U.S. and Internationally.

[32] We are using the U-3 unemployment rate. We do not use an unemployment gap because estimates of the natural unemployment rate are not available for enough countries. It's important to emphasize that this is only a threat to the identification of the impact of higher borrowing costs on sentiment in our panel if the cross-country variation in the growth of interest rates during the pandemic is correlated with the unobserved changes in natural rate of unemployment, which we deem unlikely.

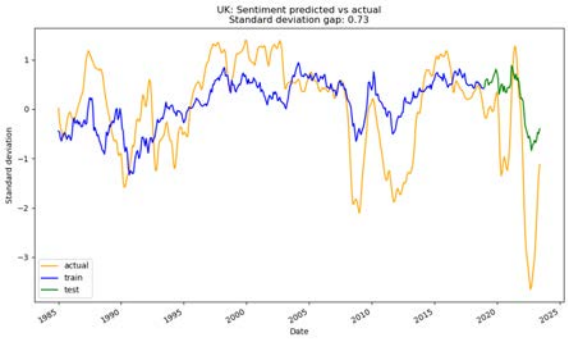
among countries as can be seen in Figure 12. For instance, the United Kingdom and France showed small gaps, while the discrepancies between predicted and actual sentiment for the United States, Germany, Austria, and Spain are large.[33]

Figure 12

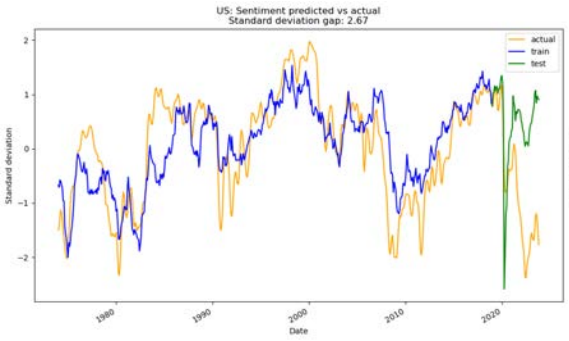
A: Germany



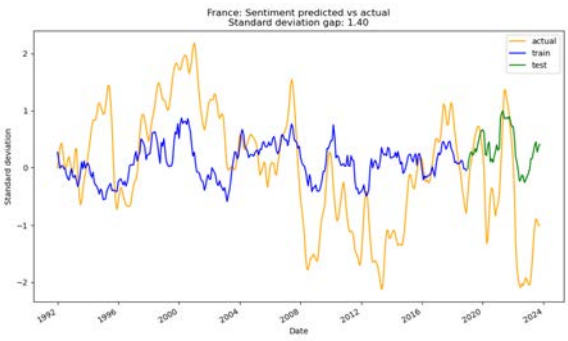
B: United Kingdom



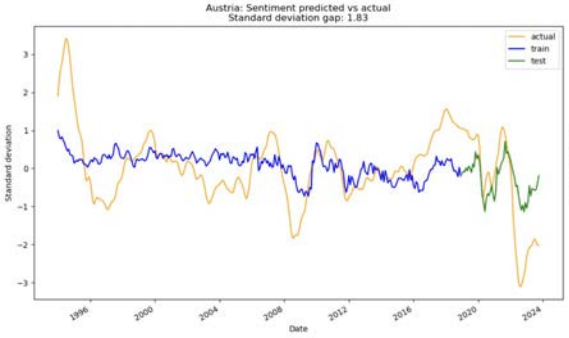
C: United States



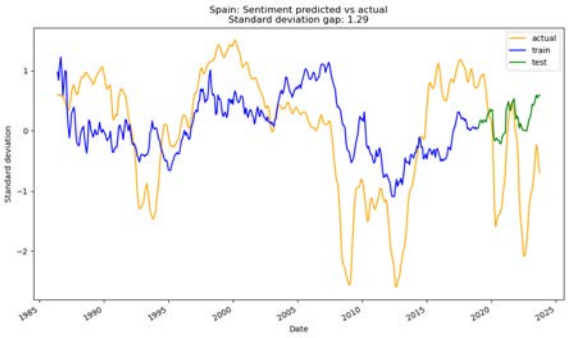
D: France



E: Austria



F: Spain



Notes: Figure 12A: Predicted and actual consumer sentiment in Germany. Figure 12B: Predicted and actual consumer sentiment in the UK. 12C: Predicted and actual consumer sentiment in the United States. 12D: Predicted and actual consumer sentiment in France. 12E: Predicted and actual consumer sentiment in Austria. 12F: Predicted and actual consumer sentiment in Spain.
Source: Haver Analytics, OECD, author's calculations.

[33] It does not appear to be the case that U.S. consumers interpret data in different ways from other countries. Use of UK, French, or German coefficients in a Oaxaca decomposition does little to reduce the observed American gap (Oaxaca, 1973).

These gaps are significant relative to the normal movement of the index. Table 2 shows gap sizes for country models including and excluding interest rates. The inclusion of interest rates decreases the divergence between actual and predicted consumer sentiment in all countries. However, interest rates themselves do less to explain the gap than alternate measures of inflation in the United States that include the cost of money borne by consumers more accurately. The table shows that gaps exceed two standard deviations in the United States, Germany, and Sweden. It also shows every country had positive gaps except for the UK model including interest rates, and six of the 10 countries had gaps of at least one standard deviation when including interest rates, and seven countries had gaps of at least one standard deviation when excluding interest rates.

Table 2: Consumer Sentiment Gaps

Country	Excluding interest rates		Including interest rates	
	Gap (Index)	Gap (σ)	Gap (Index)	Gap (σ)
Austria	2.28	1.83	2.14	1.72
Finland	2.87	1.46	2.37	1.20
France	1.93	1.40	0.94	0.68
Germany	3.52	2.59	3.49	2.57
Italy	1.72	1.13	0.63	0.42
Luxembourg	2.19	1.14	2.19	0.91
Spain	3.48	1.29	2.98	1.11
Sweden	4.87	2.92	4.68	2.81
UK	1.57	0.73	-0.17	-0.07
US	4.08	2.67	4.04	2.65

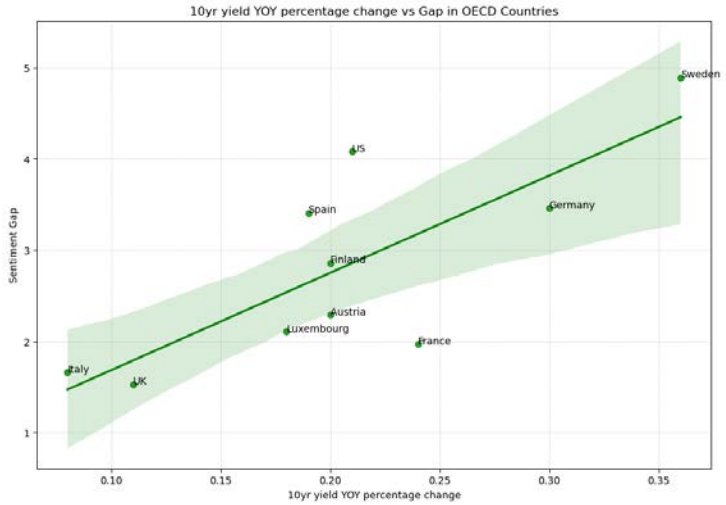
Notes: Divergence between predicted and actual consumer sentiment stated as standard deviations from the historical mean and as consumer sentiment index points. Divergence for regressions including interest rates and excluding interest rates.
Source: Haver Analytics, OECD, author's calculations.

Consumer sentiment gaps are correlated with interest rates

To understand the relationship between gap size and the recent rise of the cost of money across countries we calculate the year-over-year change in 10-year government bond yields and plot the change against the size of the gaps for each country. We find that the growth of

interest rates is strongly correlated with the variation in gaps, as can be seen in Figure 13. This finding further supports our hypothesis that depressed consumer sentiment can be explained by a sharp rise in borrowing costs that are not captured in traditional consumer price indexes.[34]

Figure 13



Notes: Figure 13: Green line shows the linear relationship between cross-country consumer sentiment gaps (latest reading in 2023) and the year-over-year change in 10-year yields. Shading represents 95% confidence intervals.
Source: Haver Analytics, OECD, author's calculations.

Higher borrowing costs have strained housing affordability worldwide

This sharp rise of the cost of borrowing has perturbed mortgage markets significantly—with mortgage rates rising by more than 200 basis points in nearly all advanced economies. Higher borrowing costs, coupled with a shortage of available homes, have significantly strained housing affordability, creating a deeply felt pain point for consumers across countries regardless of the prevailing housing financing structure in their country.[35] Particularly in countries with a high proportion of adjustable-rate mortgages, real house prices have fallen to the chagrin of homeowners. This fall has not been large enough to offset the increase in mortgage payments required for new buyers. In the United States, where long-term fixed-rate mortgages predominate, a reduction in home supply, partly due to existing homeowners being deterred from selling by higher potential mortgage payments on their next home, has led to a "lock-in" effect. The Federal Reserve's rate hikes have pushed mortgage rates to two-decade highs while house prices have yet to come down towards pre-pandemic levels.[36] The market is in stasis with both homeowners and would-be buyers reporting high levels of disappointment. None of

[34] Moreover, a similar correlation was observed with overnight and 2-year government bond yields. Results available upon request.
[35] Using data from 2013, Badarinza et al. (2018) document the share of Adjustable Rate Mortgages (ARMs) varying from a low of 8 percent and 16 percent in the US and Germany to a high of 97 percent and 85 percent for Finland and Spain. Sweden and the U.K. both stood around 50 percent. Biljanovska et al. (2023) show that regardless of mortgage regime, affordability tended to rise as rates declined in 2000s.
[36] See https://www.imf.org/en/Blogs/Articles/2024/01/11/housing-affordability-remains-stretched-amid-higher-interest-rate-environment

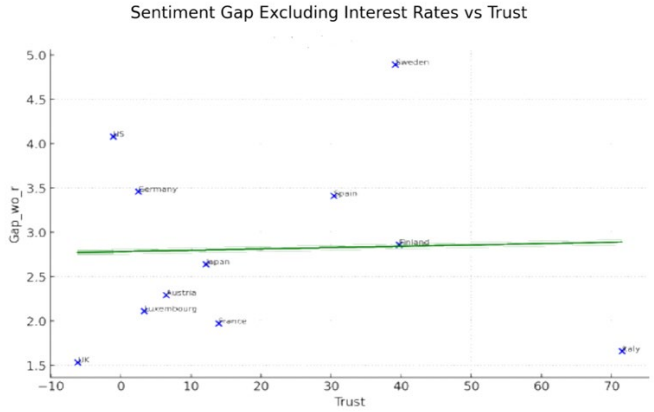
the common treatments of using economic data to predict consumer sentiment fully encapsulates this situation across countries. Borrowing costs are the key variable.

Referred pain theory does not seem to explain gaps internationally

Another popular hypothesis attempting to explain depressed consumer sentiment is the "referred pain theory": consumers' bad mood is due to increases in political and cultural conflict and a dissatisfaction with institutions.[37] To test this hypothesis we collected data on trust in government from the OECD and calculated the change in trust between 2018 and 2021 or 2022, depending on data availability. [38] Our analysis shows that, when plotted against gap sizes in OECD countries, we fail to observe any meaningful correlation between divergence of predicted and actual consumer sentiment, and changes of trust in government in our sample (Figure 14).

Overall, our cross-country comparison for 10 OECD countries concludes that the phenomenon of a discrepancy between predicted and actual consumer sentiment is not unique to the United States but is prevalent across multiple countries. The extent of this gap varies by country and is highly correlated with interest rate changes. Additionally, we do not find evidence that the discrepancy between predicted and actual consumer sentiment is correlated with changes in trust in government across countries. Although not dispositive, the ordering produced is hard to square with many US-centric hypotheses.

Figure 14



Notes: Figure 14: Green line shows the linear relationship between change in trust in government and the divergence between predicted and actual consumer sentiment. Shading represents 95% confidence intervals.
Source: Haver Analytics, OECD, author's calculations.

[37] See Ip (2023).

[38] Trust in government refers to the share of people who report having confidence in the national government. The data reflect the share of respondents answering "yes" (the other response categories being "no", and "don't know") to the survey question: "In this country, do you have confidence in… national government?". OECD (2024), Trust in government (indicator). doi: 10.1787/1de9675e-en (Accessed on 10 January 2024)

VI. Discussion and conclusion

The gap between economists' measurements of economic well-being and consumer sentiment has puzzled many. By the middle of 2023, commentators were speaking of a "vibecession": a recession experienced not in rising costs of living or growing unemployment but in "vibes" (Levin 2023). Was consumer sentiment, which should have been high given GDP growth, declining prices, and continued strong employment in 2023, presaging a recession? While sentiment is a crucial variable in predicting the path of the economy, this paper presents a more tangible explanation of the lag in consumer sentiment: consumers are including the cost of money in their perspective on their economic well-being, while economists are not.

This paper shows that the current gap is not unique to the United States or this cycle. Consumers are digesting economic data in a way that is consistent with consumer sentiment during previous bursts of high inflation and increasing interest rates. The inclusion of borrowing costs into an alternative measure of CPI inflation significantly narrows the gap between predicted and actual consumer sentiment. Cross-country evidence confirms that consumers around the world care about the cost of money. We find little evidence that the United States, despite its rising partisanship, social distrust, and large reported levels of overall "referred pain" differs meaningfully from other Western democracies.

In the December reading of the Index of Consumer Sentiment from the University of Michigan, which showed a marked increase in overall sentiment, still only 29 percent of respondents said that now was a good time to buy a car while 67 percent said it was a bad time. The feelings towards house purchases were even worse: 16 percent said it was a good time to buy, while a whopping 82 percent said it was a bad time. Since these purchases are integral to American consumers' sense of their economic well-being but their full price is not included in official inflation measures, it is no wonder that sentiment lags traditional measures of economic performance.

In January, after the majority of the research for this paper was completed, the preliminary reading of consumer sentiment jumped to its highest level since 2021. This is consistent with our hypothesis that the moderation in the growth rate of borrowing costs in recent months would help consumers significantly. We hesitate to forecast a future path of consumer sentiment for many reasons outlined in the paper. Extrapolating from past relationships estimated during a time of uniformly low inflation is difficult. At the same time, to the extent that the Federal Reserve can normalize policy soon, our findings suggest the possibility for a further rise in consumer sentiment. Partisanship, distrust, and inequality could all serve to dampen that effect.

We conclude with recommendations for future research. As with so many models calibrated on post-1980 data, a period that saw little variance in inflation and changes in interest rates, the misery index relationship appears to have broken down following the first post-Volcker jump in inflation and interest rates. Previous business cycles were periods of Federal Reserve success, with rate hikes reliably leading to declines in inflation and neutral interest rates continuing a

downward trend. Some models may not work anymore, but we cannot yet know if we are in a new economic paradigm. This paper takes a first step in moving away from models that rely on periods with no true bouts of inflation, but it will be crucial to look back further, consider more countries, and remain discerning about making accurate comparisons following methodological changes.

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Appendix I. Tables

Table A.1: Secondary questions in Survey of Consumers

Question 7

Responses to the query: "Why do you say so?" following the question "Would you say that you (and your family living there) are better off or worse off financially than you were a year ago?"

BETTER OFF THAN YEAR AGO			WORSE OFF THAN YEAR AGO			
Income Higher	Assets Higher	Debt Lower	Income Lower	Prices Higher	Assets Lower	Debt Higher
a	b	c	d	e	f	g

Question 36

Responses to the query: "Why do you say so?" following the question "Generally speaking, do you think now is a good time or a bad time for people to buy major household items?"

GOOD TIME TO BUY					BAD TIME TO BUY			
Prices Low; Good Buys Available	Prices Won't Come Down	Interest Rate Low Credit Easy	Borrow in Advance Rising Rates	Times Good Prosperity	Prices High	Interest Rates High; Credit Tight	Can't Afford To Buy	Uncertain Future
a	b	c	d	e	f	g	h	i

Question 38

Responses to the query: "Why do you say so?" following the question "Speaking now of the automobile market -- do you think the next 12 months or so will be a good time or a bad time to buy a new vehicle, such as a car, pickup, van, or sport utility vehicle?"

GOOD TIME TO BUY					BAD TIME TO BUY				
Low Price; Good Buys	Prices Won't Come Down	Interest Rates Low	Borrow in Advance Rising Rates	Times Good; Prosper.	Prices High	High Interest Rates	Can't Afford To Buy	Uncertain Future	Gas Prices Shortages
a	b	c	d	e	f	g	h	i	j

Question 42

Responses to the query: "Why do you say so?" following the question "Generally speaking, do you think now is a good time or a bad time to buy a house?"

GOOD TIME TO BUY						BAD TIME TO BUY				
Prices Low; Good Buys Available	Prices Won't Come Down	Interest Rate Low	Borrow in Advance Rising Rates	Times Good Prosperity	Good Investment	Prices High	Interest Rates High; Credit Tight	Can't Afford To Buy	Uncertain Future	Bad Investment
a	b	c	d	e	f	g	h	i	j	k

Source: University of Michigan's Survey of Consumers.

Table A.2: Questions Used for Inflation and Cost of Money Index

Inflation Index	Cost of Money Index
7e, 36a, 36f, 38a, 38f, 38j	36c, 36g, 38c, 38g, 42c, 42h

Source: University of Michigan's Survey of Consumers.

Table A.3: Regression Output

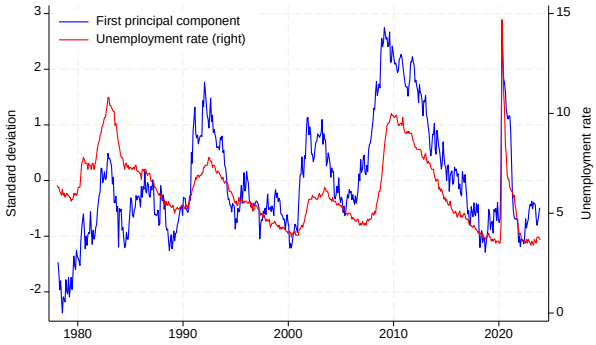
	(1) Second principal component of ICS (standardized)	(2) Second principal component of ICS (standardized)
π_t (official CPI)	0.34***	0.28***
	(0.01)	(0.01)
1st principal component	0.40***	0.46***
	(0.03)	(0.03)
Index of borrowing conditions		0.32***
		(0.04)
Observations	550	550
R-squared	0.67	0.74

Notes: Models estimated on all available data. All variables are standardized. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1
Source: FRED, and author's calculations.

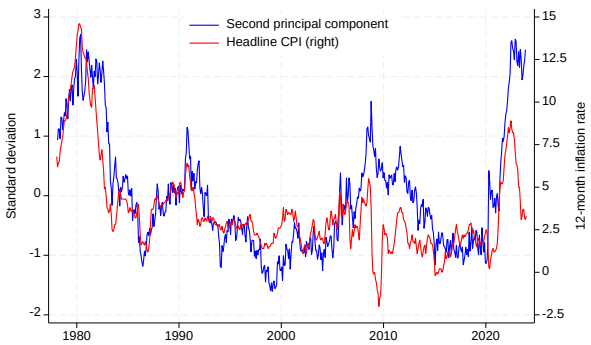
Appendix II. Figures

Figure A.1

A: First principal component and unemployment rate

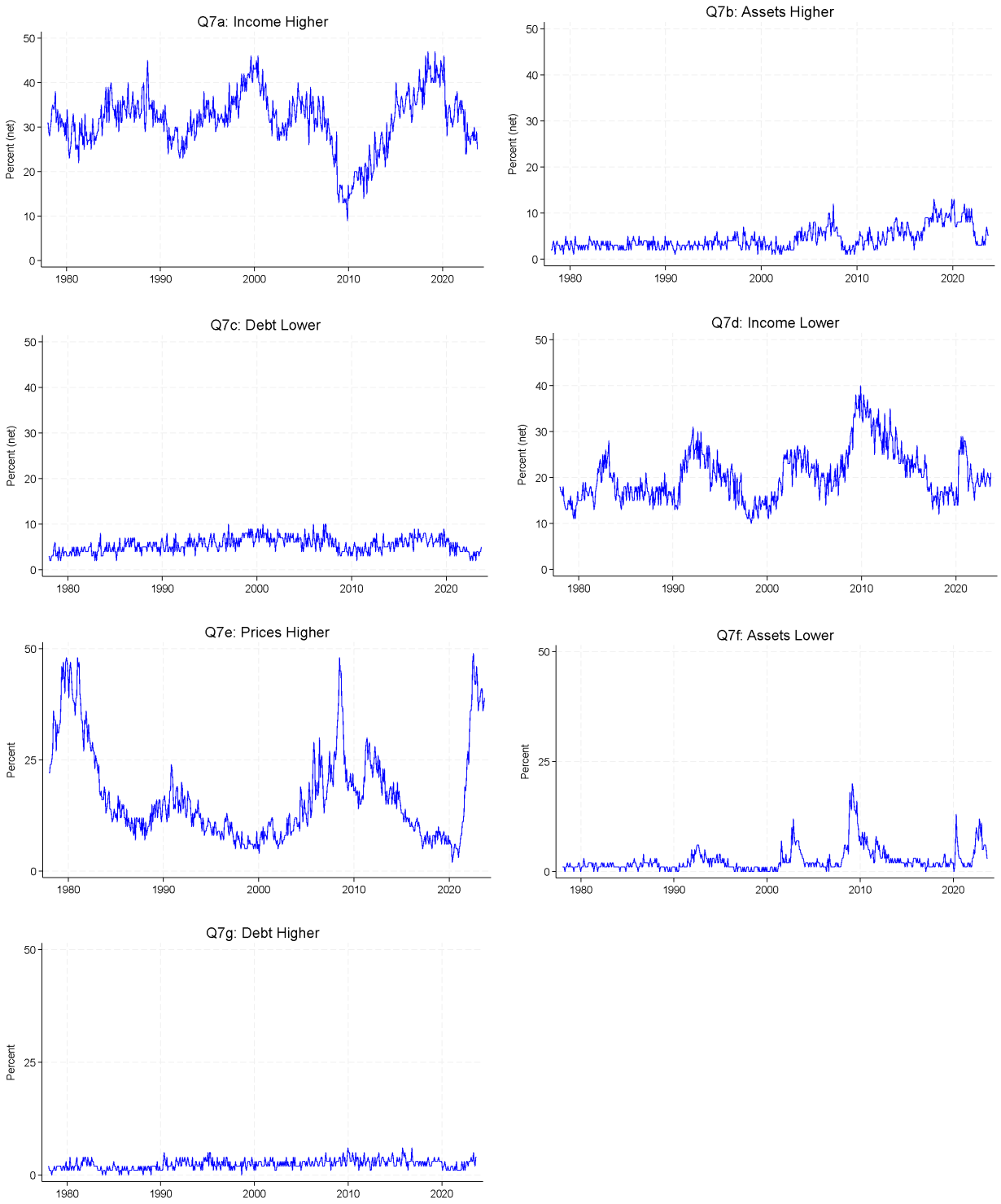


B: Second principal component and headline CPI inflation



Notes: See main text for variables.
Source: University of Michigan's Survey of Consumers, FRED, and author's calculations.

Figure A.2: Answers to question 7



Notes: See Appendix Table 1 for the list of secondary questions.
Source: University of Michigan's Survey of Consumers and author's calculations.

Figure A.3: Answers to question 36

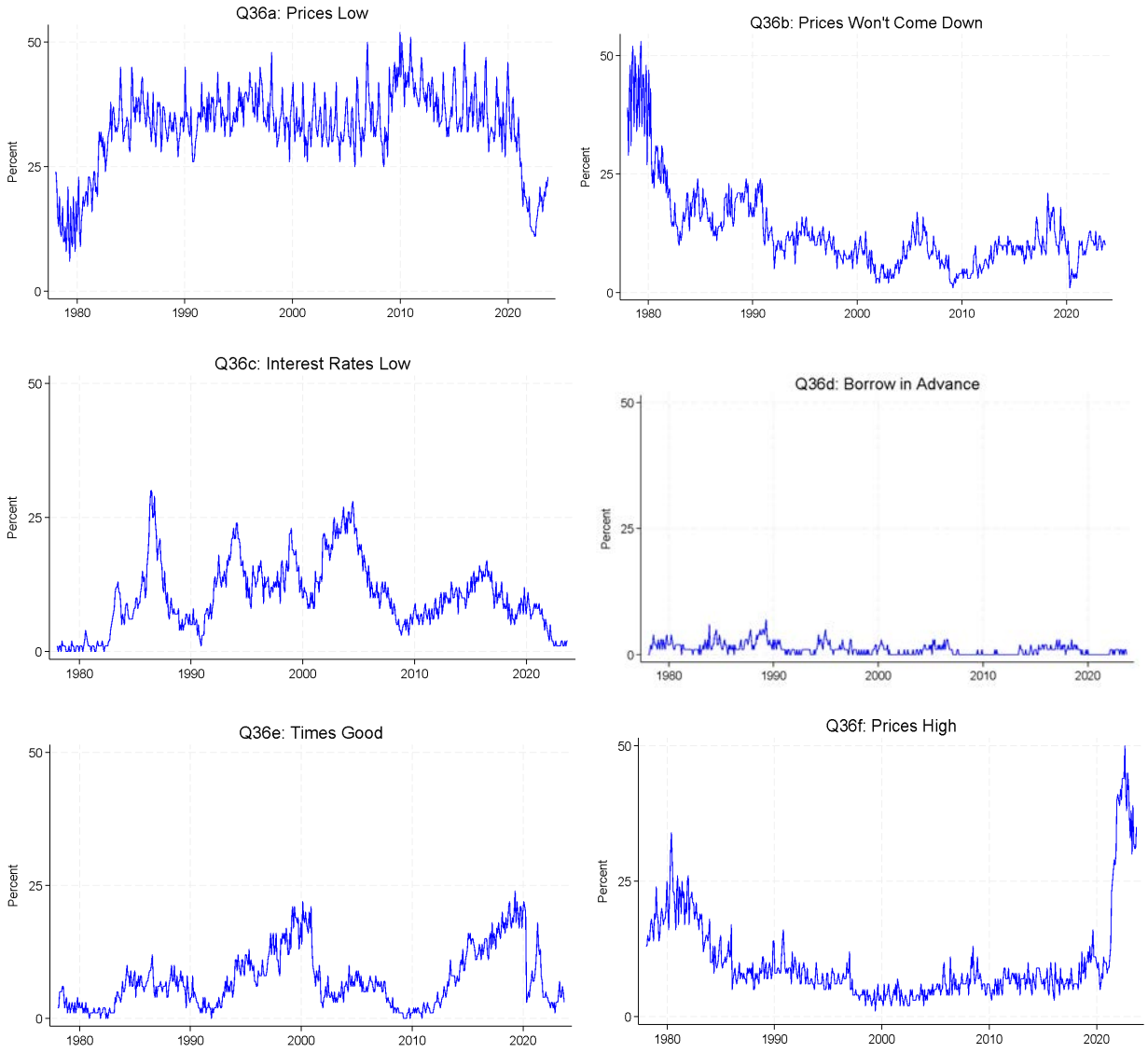
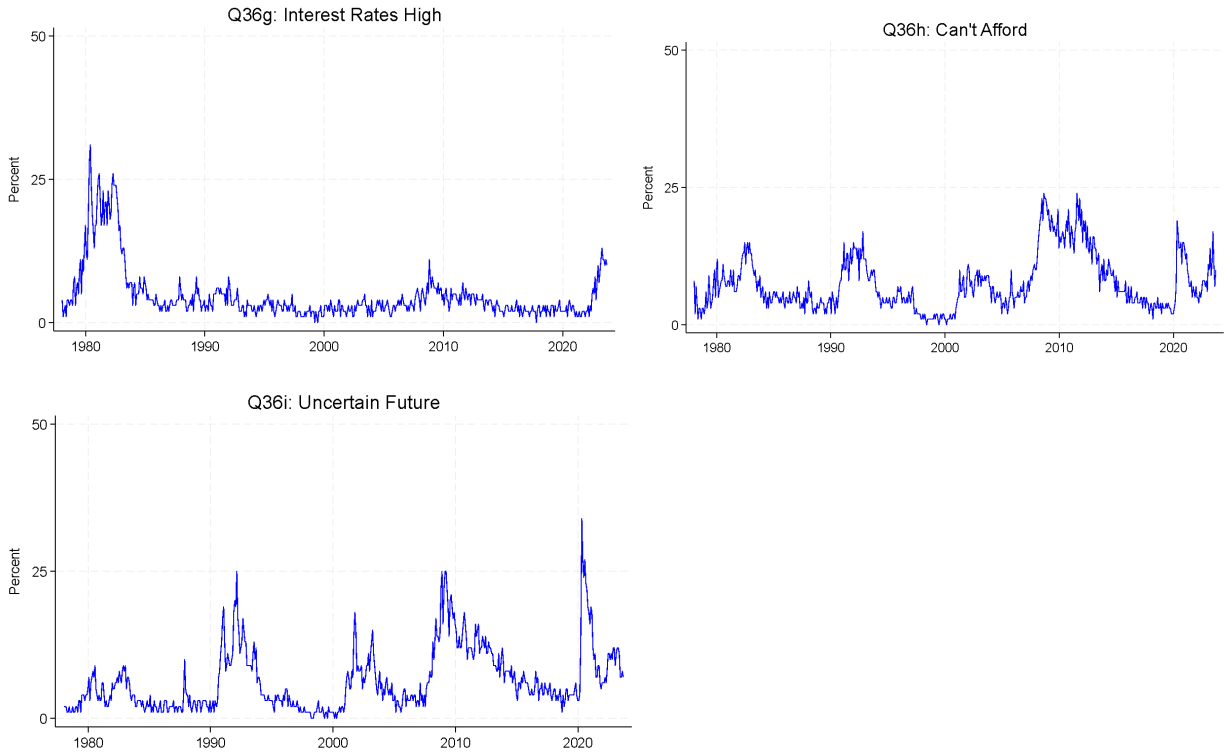


Figure A.3: Answers to question 36 (continued)



Notes: See Appendix Table 1 for the list of secondary questions.
Source: University of Michigan's Survey of Consumers and author's calculations.

Figure A.3: Answers to question 38

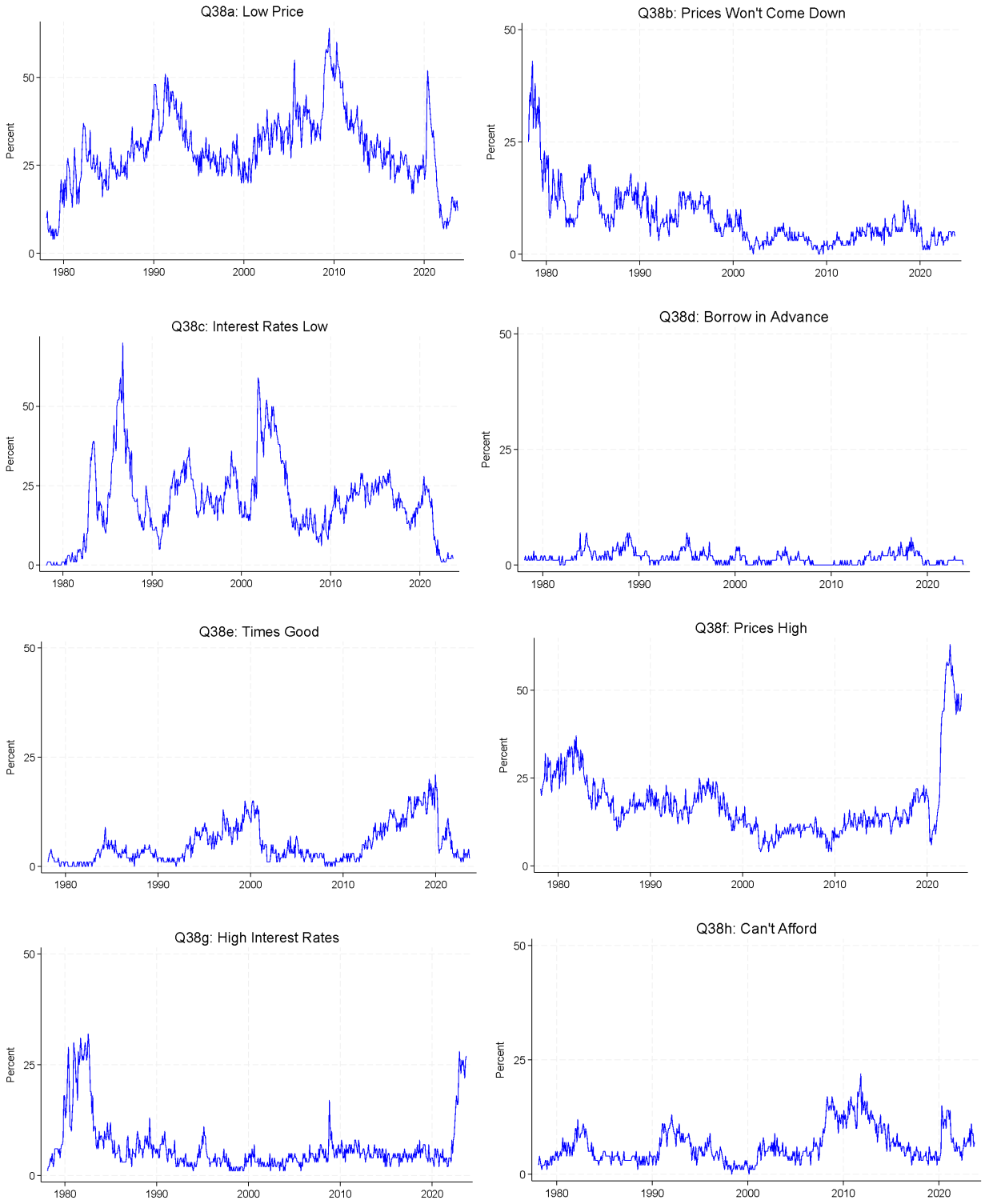
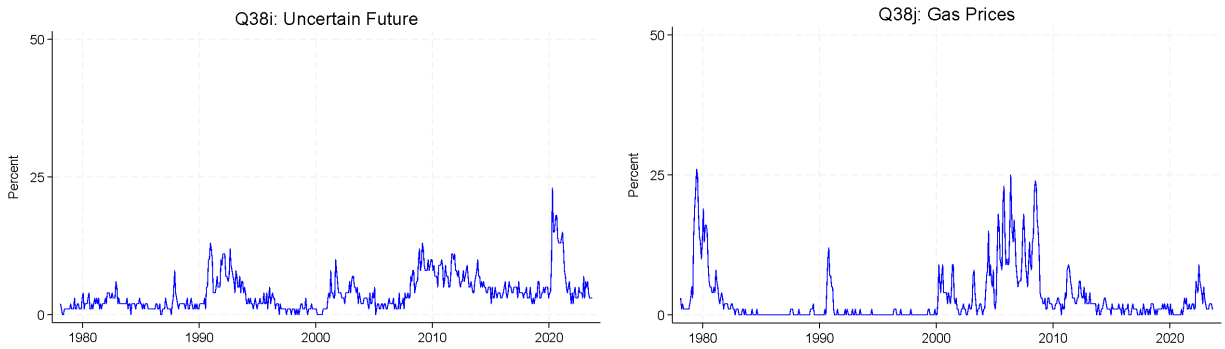


Figure A.3: Answers to question 38 (continued)



Notes: See Appendix Table 1 for the list of secondary questions.
Source: University of Michigan's Survey of Consumers and author's calculations.

Figure A.4: Answers to question 42

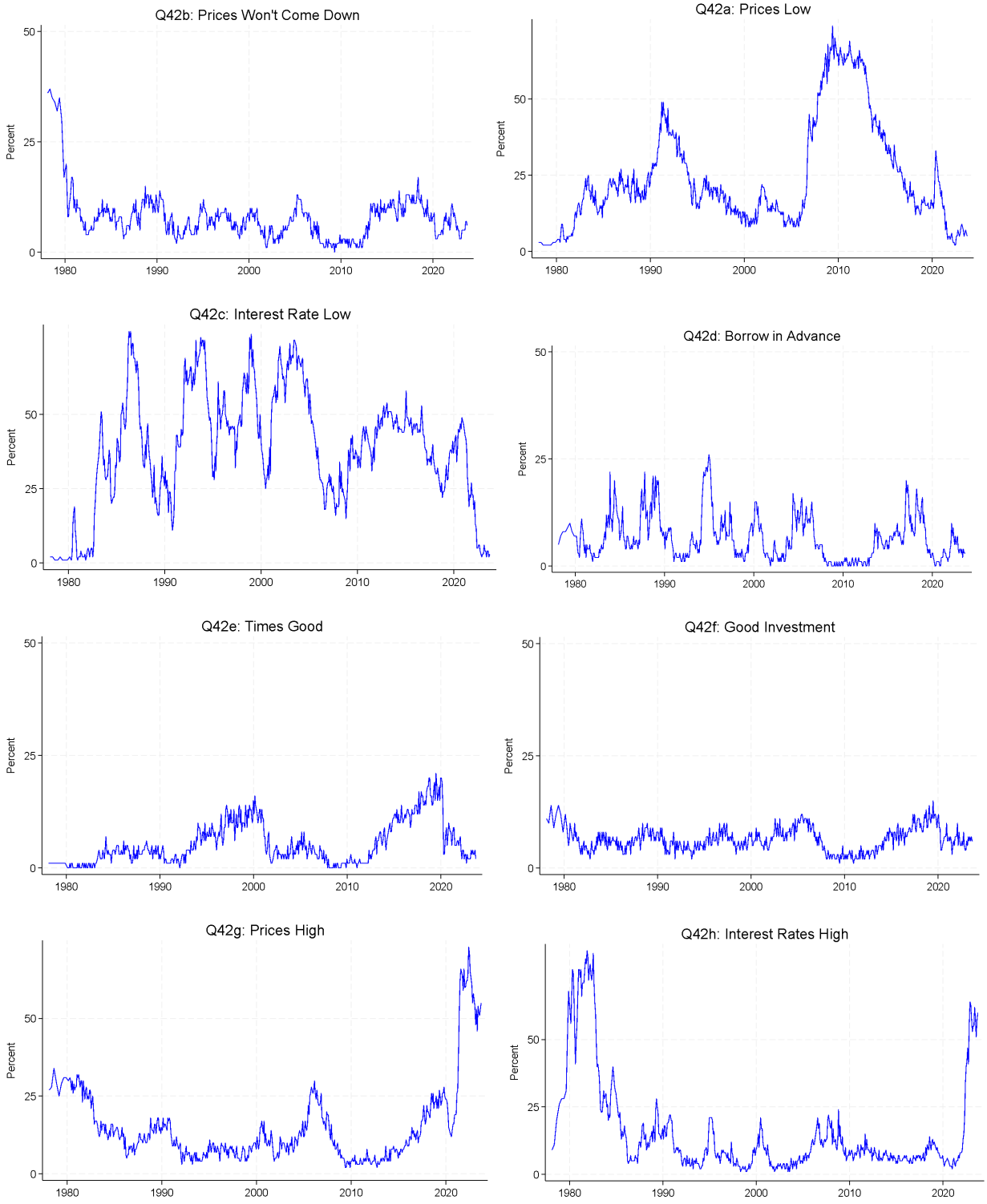
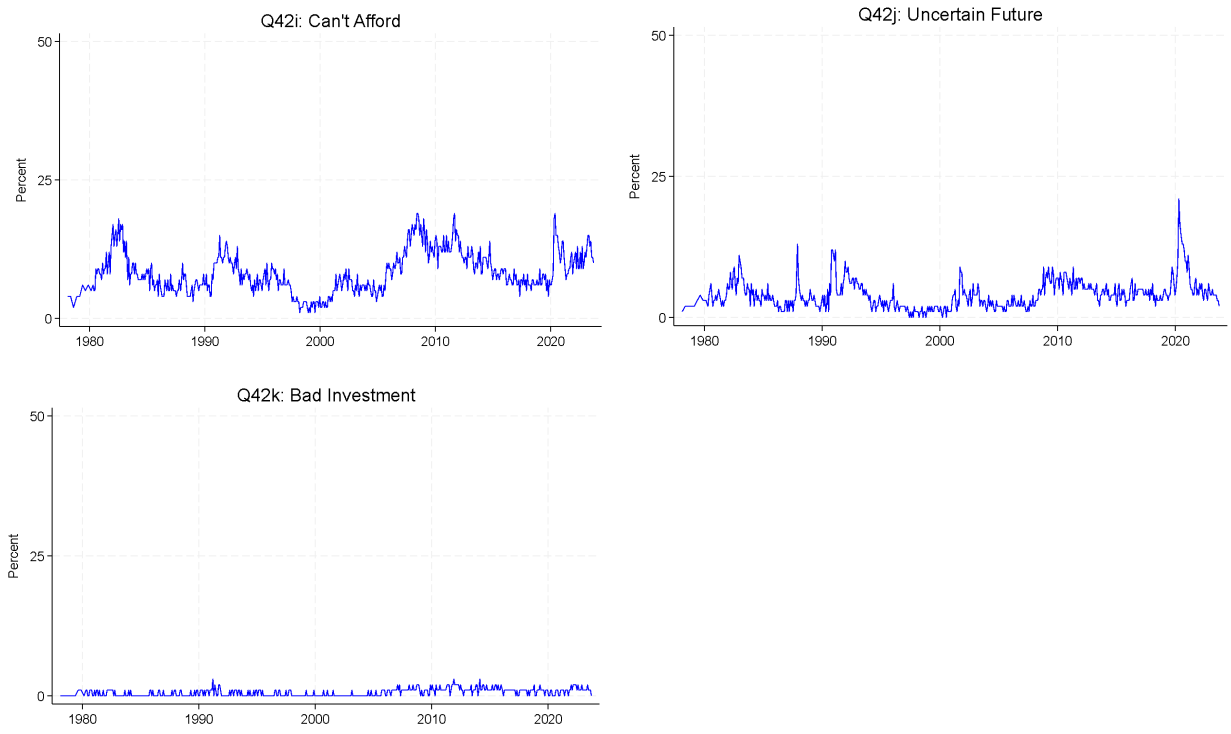
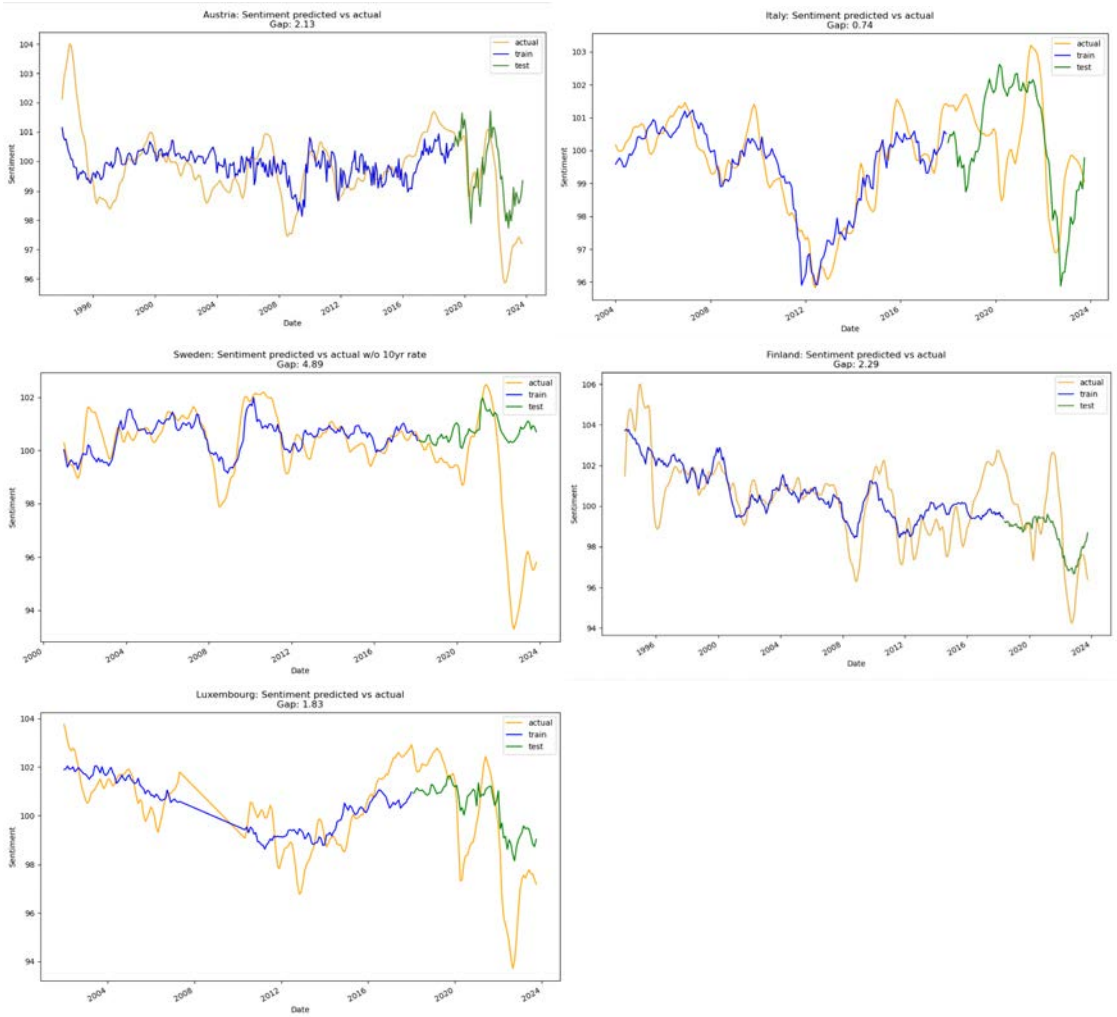


Figure A.4: Answers to question 42 (continued)



Notes: See Appendix Table 1 for the list of secondary questions.
Source: University of Michigan's Survey of Consumers and author's calculations.

Figure A.5: Gaps between predicted and actual sentiment in 11 OECD countries (Figure 11, continued)



Notes: See Figure 11 in main text.
Source: University of Michigan's Survey of Consumers, OECD consumer sentiment data, Haver and author's calculations.