

STATE OF INDIANA  
REGULATORY COMMISSION

FILED  
November 2, 2018  
INDIANA UTILITY  
REGULATORY COMMISSION

STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

PETITION OF SWITZERLAND COUNTY NATURAL )  
GAS COMPANY, INC. FOR AUTHORITY TO )  
CHANGE ITS RATES, CHARGES, TARIFFS, RULES, )  
AND REGULATIONS )

CAUSE NO. 45117

INDIANA OFFICE OF UTILITY CONSUMER COUNSELOR

PUBLIC'S EXHIBIT NO. 6

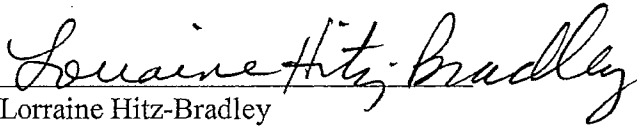
TESTIMONY OF OUCC WITNESS

JENNIFER L. REED

IURC  
PUBLIC'S  
EXHIBIT NO. 6  
12-21-18  
DATE REPORTER

NOVEMBER 2, 2018

Respectfully submitted,

  
Lorraine Hitz-Bradley  
Atty. No. 18006-29  
Deputy Consumer Counselor

**TESTIMONY OF OUCC WITNESS JENNIFER L. REED**  
**CAUSE NO. 45117**  
**SWITZERLAND COUNTY NATURAL GAS COMPANY, INC.**

**I. INTRODUCTION**

1   **Q:   Please state your name and business address.**

2   A:   My name is Jennifer L. Reed, and my business address is 115 W. Washington  
3       Street, Suite 1500 South, Indianapolis, Indiana, 46204.

4   **Q:   By whom are you currently employed and in what capacity?**

5   A:   I am a Utility Analyst in the Natural Gas Division of the Indiana Office of Utility  
6       Consumer Counselor ("OUCC"). For a summary of my education and  
7       professional experience, and general preparation for this case, please see  
8       Appendix JLR-1 attached to my testimony.

9   **Q:   What is the purpose of your testimony?**

10  A:   I testify on macroeconomic analysis, including interest rates, growth, and  
11       inflation. This testimony is in direct support of Mr. Bradley E. Lorton's Return  
12       On Equity ("ROE") testimony concluding that 9.1% would be a reasonable and  
13       appropriate ROE for Switzerland County Natural Gas Company, Inc.  
14       ("Switzerland" or "Petitioner").

15  **Q:   Please summarize your testimony on macroeconomic and capital market**  
16  **trends influencing cost of equity.**

17  A:   I examined three macroeconomic variables that can influence the cost of equity  
18       capital. First, I examined interest rates. Interest rates on 5-year, 10-year, 20-year  
19       and 30-year bonds remain low by historical standards, and recent increases have  
20       been modest.

1           Second, I examined economic growth trends. Congressional Budget  
2           Office ("CBO") forecasts real Gross Domestic Product ("GDP") growth over the  
3           next 10 years to range from 3.3% in 2018, declining to 2.4% in 2019, 1.8% in  
4           2020, 1.5% for the period 2021-2022, and 1.7% in the period 2023-2028. These  
5           projections do not point to a period of high inflation and large interest rate  
6           increases.

7           Third, the economy remains in a relatively low inflation period, with the  
8           Federal Reserve still aiming to increase overall inflation to a sustainable 2% level.  
9           Even with energy price volatility in recent years, both "headline" inflation and  
10          core inflation remain low compared to earlier periods. While inflation fears are  
11          always a policy consideration for the Federal Reserve, recent experience and  
12          projections by the CBO tend to indicate inflation is under control.

## **II. PETITIONER'S ANALYSIS OF MACROECONOMIC TRENDS**

13   **Q: Did Petitioner provide analysis of trends in the macro economy?**

14   A: Petitioner's witness Mr. Ridlen had limited discussion on macroeconomic trends  
15          in his testimony. He stated "[s]ince 2010, it is undeniable that the economy of  
16          this country and specifically the State of Indiana has improved." Direct Testimony  
17          of Earl L. Ridlen, III, p. 4, lines 12-13. However, Mr. Ridlen provided no data or  
18          exhibits to support this claim.

19   **Q: Do you believe Mr. Ridlen has adequately addressed the impact of the macro**  
20          **economy on Petitioner's request for higher cost of equity?**

21   A: No. Stating that the national and statewide economic situation has improved does  
22          not account for specific areas of economic activity that impact the business

1 conditions faced by Petitioner. For example, it is true the Federal Reserve has  
2 increased the Federal Funds Rate seven (7) times in the past two years  
3 (Attachment JLR-1). However, the market rates for long-term treasury bonds  
4 have shown little growth when compared with previous economic expansions.  
5 Bond yields and interest rates are important indicators of the strength of capital  
6 markets and the availability of capital for the private sector. Mr. Ridlen's  
7 reference to the national and state macro economies provides no analysis of the  
8 trends or their impact.

### III. MACROECONOMIC TRENDS

9 **Q: Do macroeconomic factors and trends influence the cost of equity?**

10 A: Yes. The most noteworthy of these factors are interest rates, economic growth,  
11 and inflation.

12 **Q: Do economic forecast data support 9.1% as a reasonable ROE for Petitioner?**

13 A: Yes. The *CFO Magazine Business Outlook Survey*, published by Duke University  
14 in the Third Quarter 2018 (<https://www.cfosurvey.org/>) (the "CFO Survey")  
15 states, "[o]n August 20<sup>th</sup>, 2018 the annual yield on 10-yr treasury bonds was  
16 2.83%," and asked respondents for their expectations on the future rate of return  
17 for S&P 500 companies. Their responses revealed an average expected return of  
18 6.15% over the next year and 6.34% over the next 10 years. The OUCC's  
19 recommended ROE for Petitioner of 9.1% is 295 basis points above the  
20 expectations of respondents to the CFO Survey for next year, and 276 basis points  
21 above expectations for the next ten years. Survey respondents expect over the  
22 next 10 years, there is a 1-in-10 chance of the annual S&P 500 return being in a

1 range from 9.13% to 10.24%. (Attachment JLR-2.) Mr. Ridlen's ROE  
2 recommendation for 10.25% is outside the 1-in-10 chance threshold established in  
3 the survey. I emphasize these return estimates apply to companies in the S&P  
4 500, which includes many industrial companies considered more risky than  
5 regulated utilities.

**A. Bond Yields and Interest Rates**

6 **Q: Please discuss bond yields as an influencing factor on the cost of equity.**

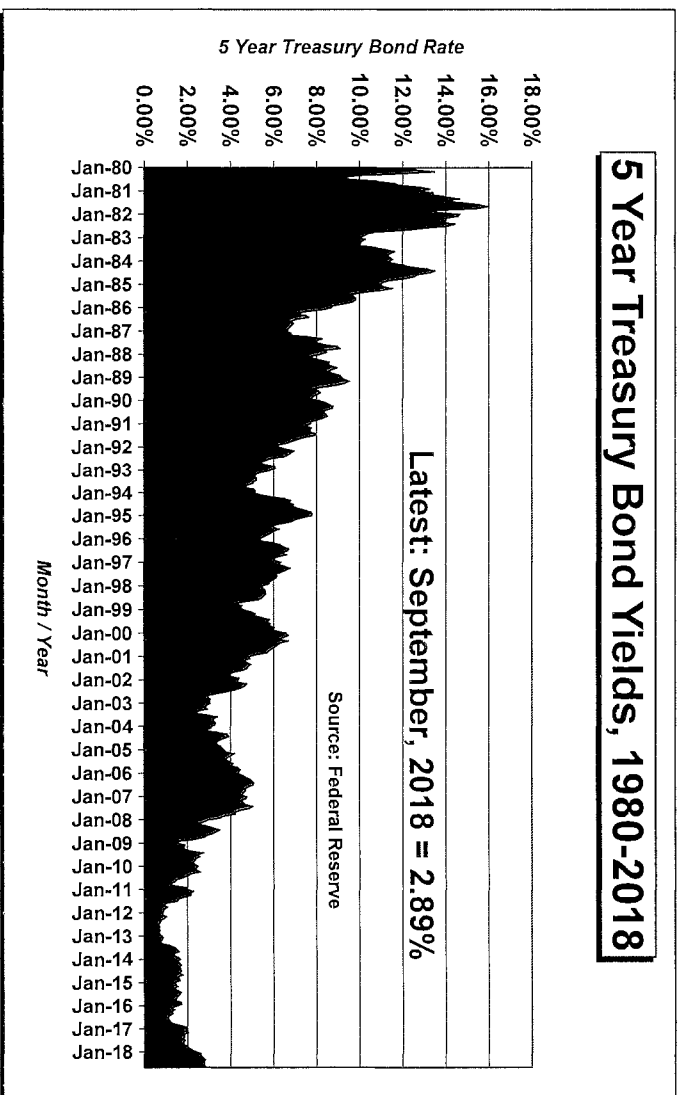
7 A: Bond yields are extremely important factors influencing the cost of equity. Yields  
8 on U.S. Treasury Bonds are commonly used to establish the risk-free rate of  
9 return in Capital Asset Pricing Model and other risk premium analyses.  
10 Moreover, changes in bond yields and interest rates affect investor expectations.

11 **Q: Please compare current and historical trends in bond yields.**

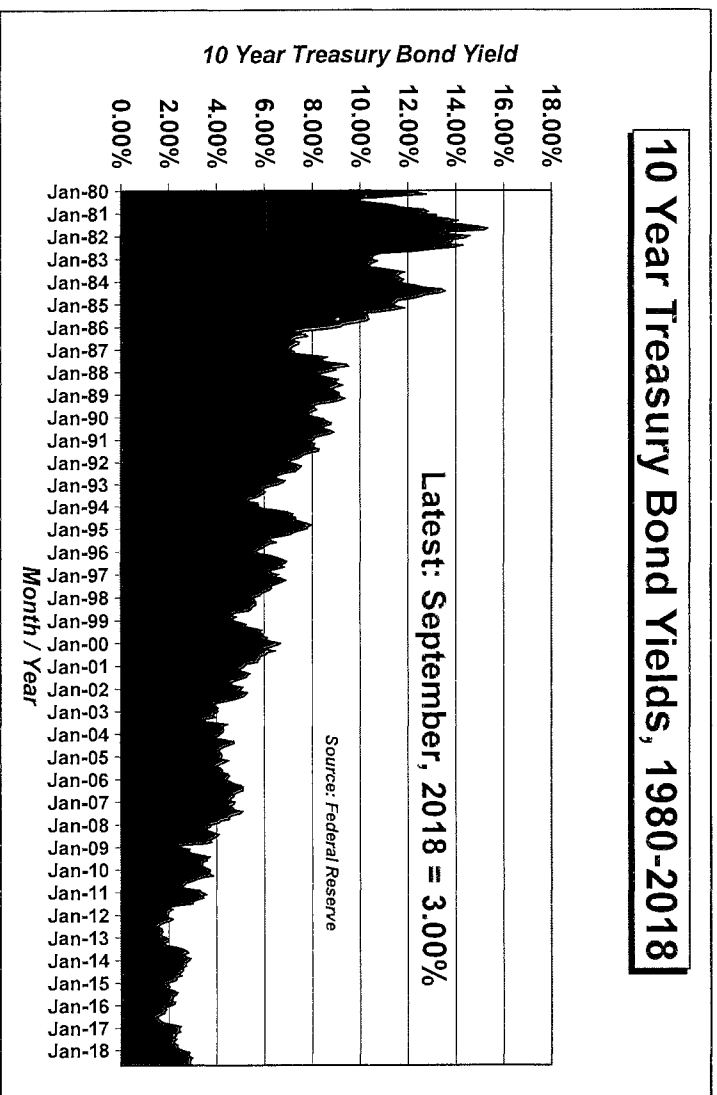
12 A: Despite economic data improvements and increases in the Federal Funds rate,  
13 long-term Treasury bond yields remain low compared to earlier historical periods.  
14 Lower yields are a long-run phenomenon over the past two decades. Graphs 1  
15 through 4 below show the monthly interest rate trend on 5-year, 10-year, 20-year  
16 and 30-year Constant Maturity Treasury Bonds as reported by the Federal  
17 Reserve. These graphs illustrate the American economy remains in a period with  
18 bond yields well below those of the 1980s and 1990s. At the end of September  
19 2018, long-term bond yields remained comparatively low, as indicated below in  
20 Graphs 1 through 4.

21 (<https://www.federalreserve.gov/datadownload/Choose.aspx?rel=H15>.)

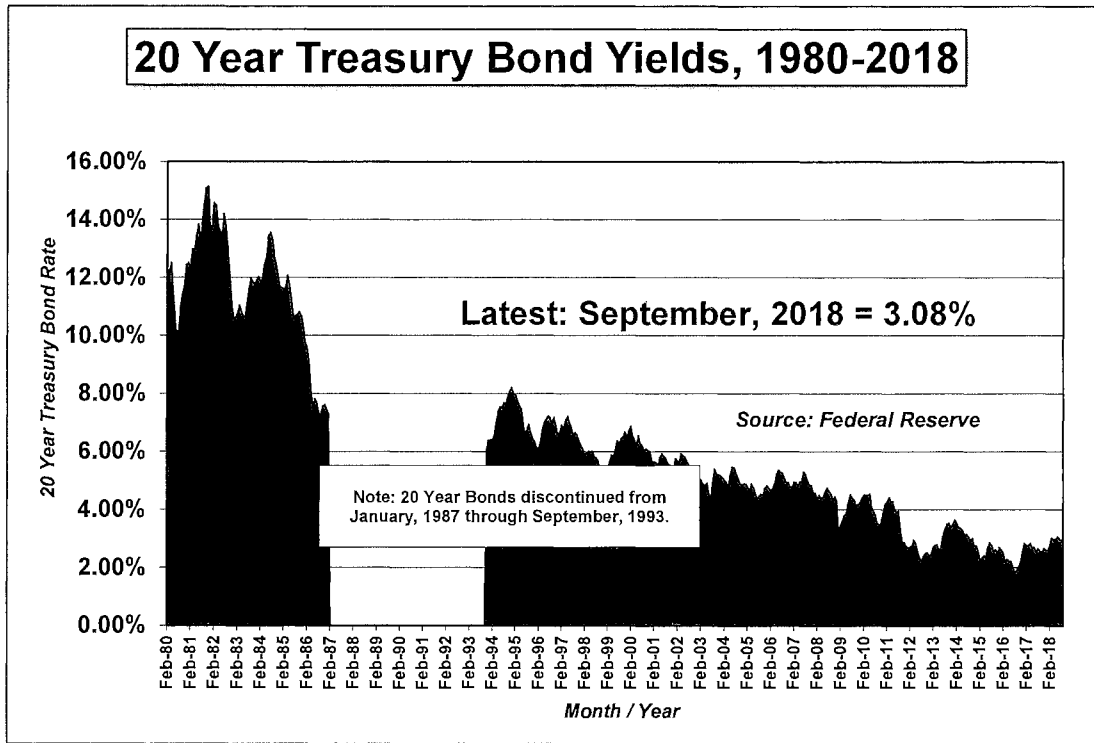
GRAPH 1



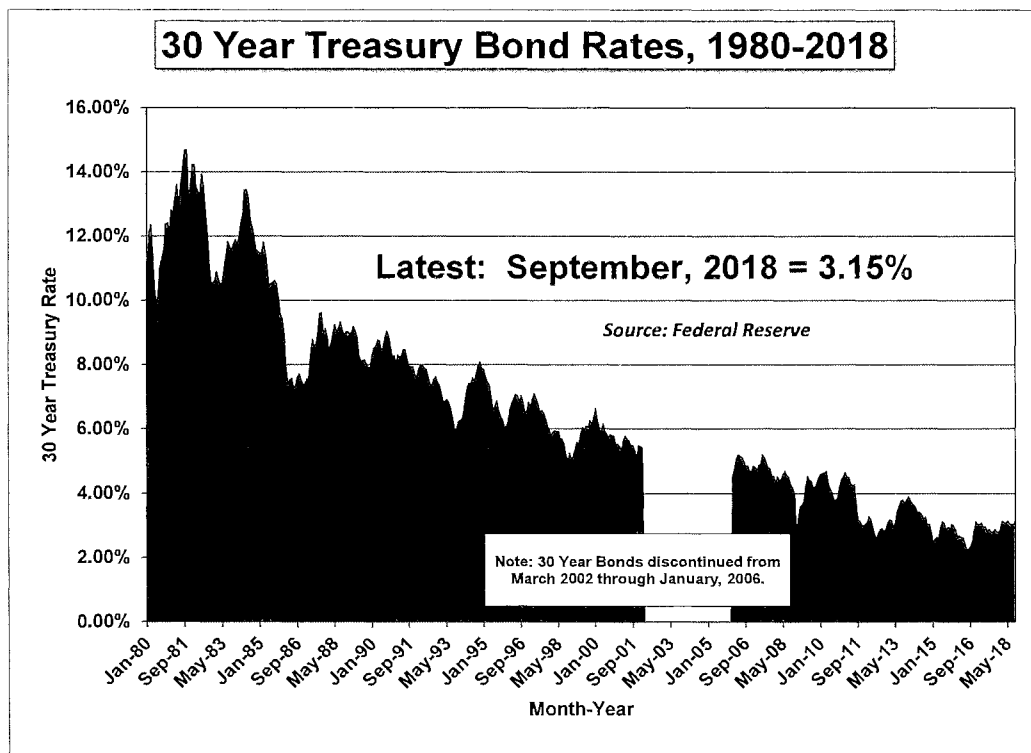
GRAPH 2



GRAPH 3



GRAPH 4



**B. Economic Growth**

1    **Q:    How does economic growth influence cost of equity?**

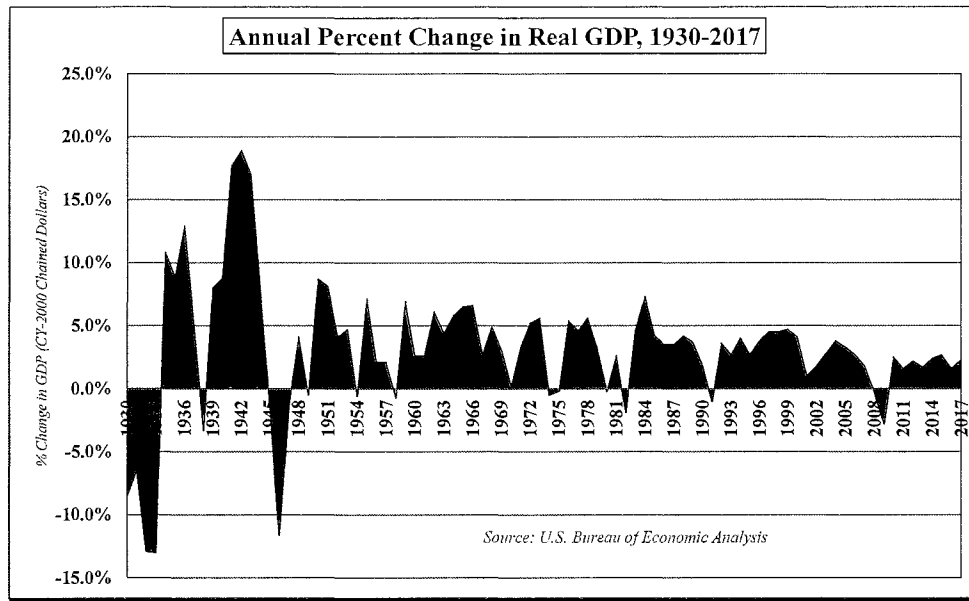
2    A:    Economic growth primarily influences cost of equity through interest rates and  
3           investor expectations. A booming, high-growth economy tends to put upward  
4           pressure on interest rates. A lackluster or recessionary economy tends to lead to  
5           stagnant or falling interest rates.

6                 Data from the U.S. Department of Commerce, Bureau of Economic  
7                 Analysis ("BEA") ([www.bea.gov](http://www.bea.gov)) and from the CBO provides historical  
8                 perspectives. Using BEA data, the CBO has projected 5.2% nominal growth  
9                 (growth measured in current dollars – not adjusted for inflation) in 2018. Current  
10                CBO projections indicate a 4.5% rate of nominal growth for the period 2019, and  
11                3.9% in 2020. The CBO further projects a 3.7% nominal growth rate in 2021-  
12                2022, and 3.9% growth rate during the period 2023-2028. (Attachment JLR-3.)

13                Real economic growth is growth measured in constant (inflation adjusted)  
14                dollars. The CBO forecasts 3.3% real growth in 2018, 2.4% for 2019 and 1.8% in  
15                2020. For the period 2021-2022, growth is forecasted at 1.5%, and 1.7% for  
16                2023-2028. *Id.* Graph 5 shows annual percent changes in real GDP in the period  
17                1930 through 2017, as published by BEA. (<https://www.cbo.gov/>)



GRAPH 5



1 Prior to the 1990's, economic expansion periods included at least one or  
2 more years above 5% real growth. The U.S. economy has not experienced that  
3 level of real GDP growth on an annual basis since 1984.

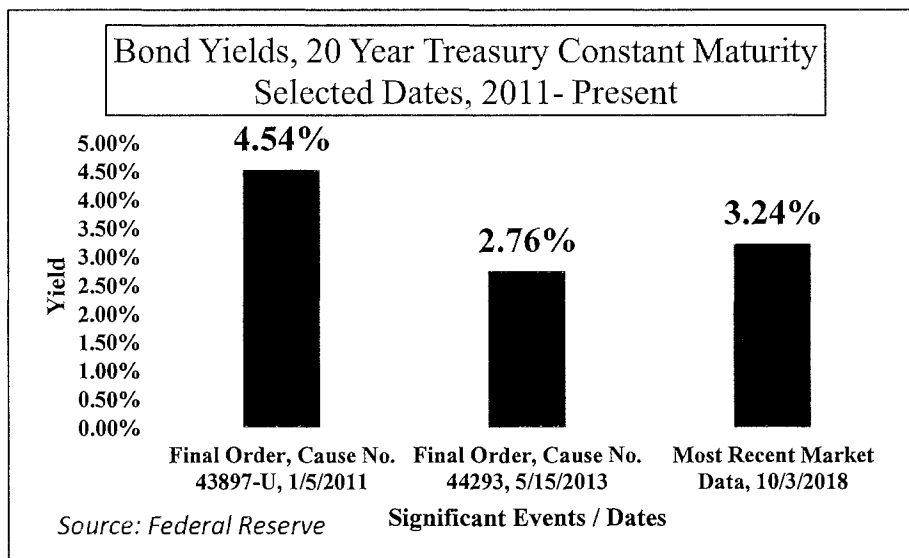
4 An analysis of recent data indicates the U.S. economy is in a mature  
5 recovery. For calendar year 2017, the economy experienced a real annual growth  
6 rate of 2.6%. (U.S. Department of Commerce, Bureau of Economic Analysis,  
7 <http://www.bea.gov>.)

8 **Q: Mr. Ridlen suggests ROE should rise because the economy expanded since**  
9 **2010. Do you agree?**

10 **A:** No. Mr. Ridlen refers to the state of the economy at the time of Petitioner's 2010  
11 rate case (Cause No. 43897-U). His argument appears to be that because the  
12 economy is stronger now, the ROE should be greater than the 9.90% established  
13 in that rate case. However, the rate of economic expansion has not been  
14 dependent upon large increases in return on capital. The Indiana Utility

1 Regulatory Commission ("Commission") issued the Final Order in Switzerland's  
2 rate case (Cause No. 43897-U) on January 5, 2011, at the time when the yield on  
3 20-Year Treasury Bonds was 4.54%. Petitioner's last rate case (Cause No.  
4 44293) maintained the 9.90% ROE; on the date of the final order, the same  
5 Treasury Bond yield was 2.76%. Since 2009, in spite of improvements in the  
6 economy, the yield on 20 -Year Treasury Bonds remains well below what the  
7 Petitioner's yield was when its current ROE was established. See Graph 6 below.

**GRAPH 6**



8  
9 Mr. Lorton's DCF analysis arrived at a 9.1% ROE using a growth rate (g) of  
10 6.5%, which is well above the 5.2% growth rate currently being experienced by  
11 the economy according to the CBO. Mr. Ridlen's 1:1 relationship between  
12 economic expansion and ROE is not accurate based on calculations of return and  
13 growth.

**C. Inflation**

1   **Q:    In your analysis, have you taken into account current and projected**  
2   **inflation?**

3   A:    Yes. I examined historical and projected rates of inflation from both government  
4           and private sector sources, including the Bureau of Labor Statistics, the CBO, and  
5           Duff & Phelps in the annual SBBI Ibbotson Yearbook.

6   **Q:    Please explain the Federal Reserve Policy on inflation and interest rates.**

7   A:    In spite of some inflation fears among investors, by historical standards the U.S.  
8           economy remains in a relatively low inflation period. More importantly, the  
9           Federal Reserve continues to target an inflation level of 2%. In his *Semiannual*  
10          *Monetary Policy Report to the Congress* (July 18, 2018), Federal Reserve Chair  
11          Jerome H. Powell supports the goals Congress has set for monetary policy to  
12          maximize employment and price stability. Chairman Powell further explained the  
13          Federal Open Market Committee ("FOMC") expects continued gradual increases  
14          in future interest rates in order to maintain the Fed's low and stable inflation  
15          target:

16               Over the first half of 2018 the FOMC has continued to gradually  
17               reduce monetary policy accommodation. In other words, we have  
18               continued to dial back the extra boost that was needed to help the  
19               economy recover from the financial crisis and recession.  
20               Specifically, we raised the target range for the federal funds rate by  
21               1/4 percentage point at both our March and June meetings,  
22               bringing the target to its current range of 1-3/4 to 2 percent. In  
23               addition, last October we started gradually reducing the Federal  
24               Reserve's holdings of Treasury and mortgage-backed securities.  
25               That process has been running smoothly. Our policies reflect the  
26               strong performance of the economy and are intended to help make  
27               sure that this trend continues. The payment of interest on balances  
28               held by banks in their accounts at the Federal Reserve has played a  
29               key role in carrying out these policies, as the current *Monetary*  
30               *Policy Report* explains. Payment of interest on these balances is

1           our principal tool for keeping the federal funds rate in the FOMC's  
2           target range. This tool has made it possible for us to gradually  
3           return interest rates to a more normal level without disrupting  
4           financial markets and the economy. As I mentioned, after many  
5           years of running below our longer-run objective of 2 percent,  
6           inflation has recently moved close to that level. Our challenge will  
7           be to keep it there. Many factors affect inflation--some temporary  
8           and others longer lasting. Inflation will at times be above 2 percent  
9           and at other times below. We say that the 2 percent objective is  
10          "symmetric" because the FOMC would be concerned if inflation  
11          were running persistently above or below our objective.

12          See,

13          <https://www.federalreserve.gov/newsevents/testimony/powell20180717a.htm>

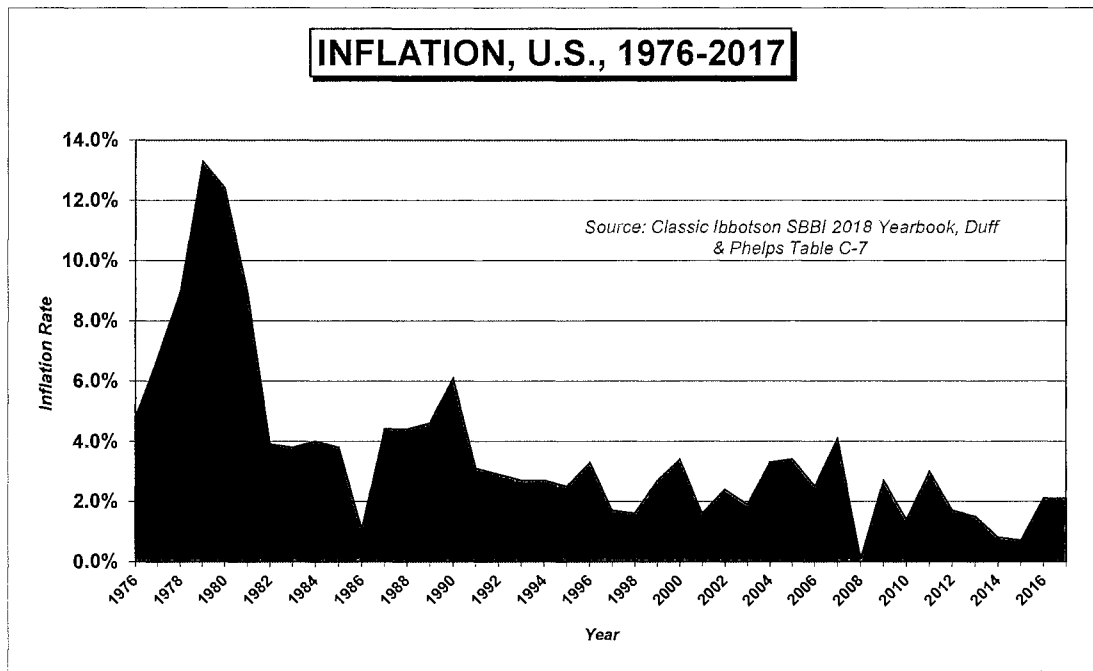
14      **Q: Please describe the trends in the rate of inflation.**

15      A: The overall (also called "headline") Consumer Price Index ("CPI") has remained  
16          at 2.1% for the past two years. (CPI data from U.S. Department of Labor, Bureau  
17          of Labor Statistics, [www.bls.gov](http://www.bls.gov).) As of the end of August 2018, the unadjusted  
18          CPI for "All Urban Consumers" stood at 252.146, 2.7% higher than its August  
19          2017 level of 245.519. (<https://www.bls.gov/news.release/cpi.t01.htm>)

20          Annual inflation rates from 1976 through 2017 indicate the United States  
21          remains subject to low inflation, despite recent volatile energy costs. Current  
22          inflation is nowhere near levels experienced in earlier decades. Data from Duff &  
23          Phelps, which I have recreated below in Graph 7, indicates inflation evaporated in  
24          2008, falling from 4.1% in 2007 to 0.1%. Inflation rebounded slightly in 2009 to  
25          2.7%, retreated to 1.4% in 2010, and was 3.0% in 2011. However, inflation fell to  
26          1.7% in 2012, 1.5% in 2013, 0.8% in 2014, 0.7% in 2015 and 2.1% in 2016 and  
27          2017. This compares to an annual average of 3.0% between 1990 and 2000, and

5.2% between 1980 and 1990 (Duff & Phelps, *2018 Classic Ibbotson SBBI Yearbook*, Table C-7). (Attachment JLR-4.)

GRAPH 7



Moreover, the latest forecast from the CBO projects modest increases over the next decade in both the overall CPI and the Core CPI, which excludes highly volatile commodities such as energy. The CBO projects a 2.0% increase in the overall CPI for 2018, followed by 2.3% in 2019, 2.4% in 2020, and 2.5% in 2021-2022, with increases in the period 2023-2028 averaging 2.4% per year. (Attachment JLR-3.) The Federal Reserve Bank of Philadelphia projects core inflation at 2.3% in 2018 and 2.4% in 2019. It also projected continued low headline inflation:

The forecasters expect current-year headline CPI inflation to average 2.4 percent, down slightly from 2.5 percent in the last

1 survey. Core CPI inflation for 2018 will be 2.3 percent, down 0.2  
2 percentage point from the previous estimate.

3 The forecasters predict current-year headline Personal  
4 Consumption Expenditure ("PCE") inflation to average 2.1  
5 percent, unchanged from the last survey. Core PCE inflation for  
6 2018 will be 2.0 percent, down 0.2 percentage point from the  
7 previous estimate.

8 Over the next 10 years, 2018 to 2027, the forecasters expect  
9 headline CPI inflation to average 2.20 percent at an annual rate,  
10 down 0.1 percentage point from the previous estimate. The  
11 corresponding estimate for 10-year annual-average PCE inflation  
12 is 2.00 percent, unchanged from the estimate of three months ago.

13 (Attachment JLR-5, p. 4.)

14 Even with the 2018 core inflation increase, my research and analysis shows  
15 inflation remains low by historical standards. Low inflation rates support lower  
16 interest rates and lower costs of financing capital investment, including utility  
17 plant investments.

#### **D. Macroeconomic Conclusions**

18 **Q: What conclusions have you reached about the macroeconomic trends that**  
19 **influence cost of equity?**

20 A: Recent trends in interest rates, inflation, and economic growth have shown  
21 upward movement, but do not suggest a return to an inflationary economy.  
22 Instead, recent trends point to a continuing, but mature economic recovery.  
23 Inflation projections stay in the 2% range, and interest rate increases are expected  
24 to be gradual. Petitioner's proposed 10.25% cost of equity far exceeds market  
25 expectations, even for a more risky stock portfolio like the S&P 500 containing

1 many industrial companies. Consequently, Mr. Lorton's recommended ROE of  
2 9.10% is much more in line with current economic conditions.

#### IV. RECOMMENDATIONS

3 **Q: Do you believe Mr. Lorton's recommendation will allow Petitioner access to**  
4 **capital on reasonable terms?**

5 A: Yes. Mr. Lorton's recommendation of 9.1% for cost of common equity will  
6 support Petitioner's ability to access capital on reasonable terms. My analysis of  
7 bond yield and macroeconomic data leads me to the conclusion that a double digit  
8 cost of equity is not necessary.

9 **Q: What recommendation do you offer based on the results from this analysis?**

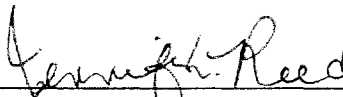
10 A: I recommend the Commission approve the 9.10% ROE as indicated in Mr.  
11 Lorton's testimony. The interest rate, economic growth, and inflation trends do  
12 not point to rapid increases in the cost of capital in the foreseeable future.

13 **Q: Does this conclude your testimony?**

14 A: Yes.

**AFFIRMATION**

I affirm, under the penalties for perjury, that the foregoing representations are true.



Jennifer L. Reed  
Utility Analyst II  
Indiana Office of Utility Consumer Counsel  
Cause No. 45117  
Switzerland County Natural Gas Company,  
Inc.

11/2/18

Date



**APPENDIX JLR-1 TO TESTIMONY OF**  
**OUCC WITNESS JENNIFER L. REED**

1   **Q:   Please describe your educational background and experience.**

2   A:   I graduated from the Kelley School of Business, Indiana University in Indianapolis,  
3       Indiana in May 2002 with a Bachelor of Science Degree with a major in Finance  
4       and a minor in Economics. I have an extensive career in the banking industry  
5       including over 16 years of experience in commercial credit. I served in various  
6       roles during my banking career including senior commercial credit analyst, senior  
7       commercial underwriter, portfolio manager and credit department manager. I am  
8       skilled in credit risk, financial risk, risk management, analyzing financial  
9       statements, business plans and financial projections. In April 2018, I began my  
10      employment at the OUCC as a Utility Analyst II in the Natural Gas Division. My  
11      responsibilities include reviewing, analyzing, and preparing testimony for rate  
12      cases, finance cases and other proceedings for Indiana natural gas utilities.

13   **Q:   Have you previously testified before the Indiana Utility Regulatory**  
14   **Commission?**

15   A:   Yes. I filed testimony in Cause No. 45101, Citizens Gas' and Indiana Municipal  
16       Power Authority's request for Gas Rate 30 approval. I also filed testimony in Cause  
17       No. 45113, NIPSCO's request for financing authority, and cost of equity settlement  
18       testimony in Cause No. 45116, Indiana Utilities Corporation's pending rate case.

1   **Q:   Please describe the review and analysis you conducted in order to prepare**  
2   **your testimony.**

3   A:    I reviewed Switzerland's Petition, Case-in-Chief and exhibits. I also prepared data  
4        requests and reviewed Petitioner's responses. I reviewed Switzerland's two most  
5        recent rate cases, Cause Nos. 43897-U and 44293. I participated in meetings of  
6        the OUCC case team in this Cause.

2018 Fed Funds Meeting Outcome				
Date	Outcome	Amount of Increase / Decrease	Prior Rate	New Rate
TBD				
TBD				
9/26/2018	Increase	25 bps Increase	2.00%	2.25%
8/1/18	Maintain	No Change	1.75%	2.00%
6/13/18	Increase	25 bps Increase	1.75%	2.00%
5/2/18	Maintain	No Change	1.50%	1.75%
3/21/18	Increase	25 bps Increase	1.50%	1.75%
1/31/18	Maintain	No Change	1.25%	1.50%
12/13/17	Increase	25 bps Increase	1.25%	1.50%

Source: <https://www.federalreserve.gov>

2017 Fed Funds Meeting Outcome				
Date	Outcome	Amount of Increase / Decrease	Prior Rate	New Rate
12/13/17	Increase	25 bps Increase	1.25%	1.50%
11/1/17	Maintain	No Change	1.00%	1.25%
9/20/17	Maintain	No Change	1.00%	1.25%
7/26/17	Maintain	No Change	1.00%	1.25%
6/14/17	Increase	25 bps Increase	1.00%	1.25%
5/3/17	Maintain	No Change	0.75%	1.00%
3/15/17	Increase	25 bps Increase	0.75%	1.00%
2/1/17	Maintain	No Change	0.50%	0.75%
12/14/16	Increase	25 bps Increase	0.50%	0.75%

Source: <https://www.federalreserve.gov>

**Duke CFO magazine Global Business Outlook survey - U.S. - Third Quarter, 2018**

**On August 20th, 2018 the annual yield on 10-yr treasury bonds was 2.83%. Please complete the following:**  
**(Winsorized)**

	Mean	SD	95% CI	Median	Minimum	Maximum	Total
Over the next 10 years, I expect the average annual S&P 500 return will be: There is a 1-in-10 chance it will be less than:	1.23	4.89	0.60 - 1.87	2	-11	12.32	227
Over the next 10 years, I expect the average annual S&P 500 return will be: Expected return:	6.34	3.00	5.95 - 6.73	6	-1.45	14.71	229
Over the next 10 years, I expect the average annual S&P 500 return will be: There is a 1-in-10 chance it will be greater than:	9.68	4.27	9.13 - 10.24	10	0	21.03	227
Over the next year, I expect the average annual S&P 500 return will be: There is a 1-in-10 chance it will be less than:	-1.76	7.61	-2.75 - -0.77	0	-18.10	13.43	227
Over the next year, I expect the average annual S&P 500 return will be: Expected return:	6.15	3.66	5.68 - 6.62	6	-2.10	14.56	229
Over the next year, I expect the average annual S&P 500 return will be: There is a 1-in-10 chance it will be greater than:	10.86	5.47	10.15 - 11.57	10	0	23.27	227

Table 1-1.

**CBO's Economic Projections for Calendar Years 2018 to 2028**

	Actual, 2017	2018	2019	2020	Annual Average	
					2021– 2022	2023– 2028
Percentage Change From Fourth Quarter to Fourth Quarter						
Gross Domestic Product						
Real <sup>a</sup>	2.6	3.3	2.4	1.8	1.5	1.7
Nominal	4.5	5.2	4.5	3.9	3.7	3.9
Inflation						
PCE price index	1.7	1.8	2.0	2.1	2.1	2.0
Core PCE price index <sup>b</sup>	1.5	1.9	2.1	2.2	2.1	2.0
Consumer price index <sup>c</sup>	2.1	2.0	2.3	2.4	2.5	2.4
Core consumer price index <sup>b</sup>	1.7	2.3	2.5	2.6	2.5	2.4
GDP price index	1.9	1.8	2.1	2.1	2.2	2.1
Employment Cost Index <sup>d</sup>	2.8	3.1	3.6	3.6	3.4	3.2
Fourth-Quarter Level (Percent)						
Unemployment Rate	4.1	3.5	3.3	3.8	4.6 <sup>e</sup>	4.8 <sup>f</sup>
Percentage Change From Year to Year						
Gross Domestic Product						
Real <sup>a</sup>	2.3	3.0	2.9	2.0	1.5	1.7
Nominal	4.1	5.0	4.9	4.1	3.7	3.9
Inflation						
PCE price index	1.7	1.8	1.9	2.1	2.1	2.0
Core PCE price index <sup>b</sup>	1.5	1.8	2.0	2.2	2.2	2.0
Consumer price index <sup>c</sup>	2.1	2.2	2.2	2.4	2.5	2.4
Core consumer price index <sup>b</sup>	1.8	2.1	2.4	2.6	2.6	2.4
GDP price index	1.8	1.9	2.0	2.1	2.2	2.1
Employment Cost Index <sup>d</sup>	2.6	2.9	3.4	3.6	3.5	3.2
Annual Average						
Unemployment Rate (Percent)	4.4	3.8	3.3	3.6	4.4	4.8
Payroll Employment (Monthly change, in thousands) <sup>g</sup>	181	211	182	62	25	57
Interest Rates (Percent)						
Three-month Treasury bills	0.9	1.9	2.9	3.6	3.7	2.8
Ten-year Treasury notes	2.3	3.0	3.7	4.1	4.1	3.7
Tax Bases (Percentage of GDP)						
Wages and salaries	43.1	43.2	43.5	43.9	44.1	44.3
Domestic corporate profits <sup>h</sup>	8.9	9.5	9.6	9.0	8.4	8.0

Sources: Congressional Budget Office; Bureau of Economic Analysis; Bureau of Labor Statistics; Federal Reserve.

Economic projections for each year from 2018 to 2028 appear in Appendix D.

GDP = gross domestic product; PCE = personal consumption expenditures.

a. Real values are nominal values that have been adjusted to remove the effects of inflation.

b. Excludes prices for food and energy.

c. The consumer price index for all urban consumers.

d. The employment cost index for wages and salaries of workers in private industry.

e. Value for the fourth quarter of 2022.

f. Value for the fourth quarter of 2028.

g. Calculated as the change in payroll employment from the fourth quarter of one calendar year to the fourth quarter of the next, divided by 12 (the average monthly amount).

h. Consists of domestic profits, adjusted to remove distortions in depreciation allowances caused by tax rules and to exclude the effect of inflation on the value of inventories.

## Appendix C-7

Inflation: Percent per annum total returns for all historical periods  
From 1926 to 2017

End Date	Start Date	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1926	-1.5																				
1927	-1.0	-2.1																			
1928	-1.5	-1.5	-1.0																		
1929	-1.1	-1.0	-0.4	0.2																	
1930	-2.1	-2.2	-2.3	-3.0	-6.0																
1931	-3.4	-3.7	-4.2	-6.2	-7.8	-9.5															
1932	-4.4	-4.9	-5.4	-6.5	-8.5	-9.9	-10.3														
1933	-3.8	-4.1	-4.5	-6.1	-6.4	-6.6	-6.0	0.5													
1934	-3.2	-3.4	-3.5	-4.0	-4.8	-4.5	-2.7	1.3	2.0												
1935	-2.6	-2.7	-2.8	-3.0	-3.5	-3.0	-1.3	1.8	2.5	3.0											
1936	-2.2	-2.3	-2.3	-2.5	-2.9	-2.9	-0.8	1.7	2.1	2.1	1.2										
1937	-1.8	-1.8	-1.8	-1.9	-2.1	-1.0	-0.2	2.0	2.3	2.4	2.2	3.1									
1938	-1.9	-1.9	-1.9	-2.0	-2.2	-1.7	-0.6	1.2	1.3	1.7	0.5	0.1	-2.8								
1939	-1.8	-1.8	-1.8	-1.8	-2.0	-1.6	-0.6	0.9	1.0	0.8	0.2	-0.1	-1.6	-0.5							
1940	-1.6	-1.6	-1.6	-1.5	-1.5	-1.3	-0.4	0.9	1.0	0.8	0.4	0.2	-0.8	0.2	1.0						
1941	-0.9	-0.5	-0.8	-0.3	-0.9	-0.4	0.6	1.9	2.0	2.0	1.9	2.0	1.7	3.3	5.2	9.7					
1942	-0.3	-0.3	-0.2	-0.1	-0.1	0.4	1.3	2.6	2.8	2.9	2.9	3.2	3.2	4.8	6.6	9.5	9.3				
1943	-0.2	-0.1	0.0	0.1	0.1	0.5	1.5	2.6	2.9	2.9	2.9	3.2	3.2	4.4	5.7	7.3	6.2	3.2			
1944	0.0	0.0	0.2	0.2	0.2	0.7	1.5	2.5	2.8	2.9	2.8	3.1	3.0	4.1	5.0	6.0	4.8	2.6	2.1		
1945	0.1	0.2	0.3	0.4	0.4	0.8	1.6	2.6	2.7	2.8	2.8	3.0	2.9	3.8	4.5	5.2	4.2	2.5	2.2	2.3	
1946	0.9	1.0	1.2	1.3	1.3	1.8	2.6	3.6	3.9	4.0	4.1	4.4	4.5	5.5	6.4	7.3	6.8	5.2	7.3	9.9	
1947	1.2	1.4	1.5	1.7	1.7	2.2	3.0	4.0	4.2	4.4	4.5	4.8	5.0	5.9	6.7	7.5	7.7	6.8	7.7	9.5	
1948	1.3	1.4	1.6	1.7	1.8	2.3	3.0	3.9	4.1	4.3	4.4	4.6	4.8	5.6	6.2	6.9	6.5	5.1	6.7	7.8	
1949	1.2	1.3	1.4	1.5	1.6	2.0	2.7	3.5	3.7	3.8	3.9	4.1	4.2	4.9	5.4	5.9	5.5	4.9	5.2	5.8	
1950	1.3	1.5	1.6	1.7	1.8	2.2	2.9	3.7	3.9	4.0	4.0	4.2	4.3	4.9	5.4	5.9	5.5	5.0	5.3	5.8	
1951	1.5	1.6	1.8	1.9	2.0	2.4	3.0	3.8	4.0	4.1	4.1	4.3	4.4	5.0	5.5	5.9	5.5	5.1	5.4	5.8	
1952	1.5	1.6	1.8	1.9	1.9	2.3	2.9	3.6	3.8	3.9	4.0	4.1	4.2	4.7	5.1	5.5	5.1	4.7	4.9	5.2	
1953	1.5	1.6	1.7	1.8	1.9	2.2	2.8	3.5	3.6	3.7	3.6	3.9	4.0	4.4	4.8	5.1	4.7	4.3	4.4	4.7	
1954	1.4	1.5	1.6	1.7	1.8	2.1	2.7	3.3	3.4	3.5	3.5	3.7	3.7	4.1	4.4	4.7	4.3	3.9	4.0	4.2	
1955	1.4	1.5	1.6	1.7	1.7	2.1	2.6	3.2	3.3	3.4	3.4	3.5	3.5	3.9	4.2	4.4	4.0	3.6	3.7	3.8	
1956	1.4	1.5	1.6	1.7	1.8	2.1	2.6	3.2	3.3	3.3	3.3	3.5	3.5	3.8	4.1	4.3	3.9	3.6	3.6	3.7	
1957	1.5	1.5	1.7	1.8	1.8	2.1	2.6	3.2	3.3	3.3	3.3	3.4	3.5	3.8	4.0	4.2	3.9	3.5	3.6	3.7	
1958	1.5	1.5	1.7	1.8	1.8	2.1	2.6	3.1	3.2	3.3	3.3	3.4	3.4	3.7	3.9	4.1	3.6	3.4	3.4	3.5	
1959	1.5	1.6	1.7	1.8	1.8	2.1	2.6	3.0	3.1	3.2	3.2	3.3	3.3	3.6	3.8	3.9	3.6	3.3	3.3	3.4	
1960	1.5	1.6	1.7	1.7	1.8	2.1	2.5	3.0	3.1	3.1	3.1	3.2	3.2	3.5	3.7	3.8	3.5	3.2	3.2	3.3	
1961	1.4	1.5	1.6	1.7	1.8	2.0	2.4	2.9	3.0	3.0	3.0	3.1	3.1	3.4	3.5	3.7	3.4	3.1	3.1	3.1	
1962	1.4	1.5	1.6	1.7	1.7	2.0	2.4	2.9	2.9	3.0	3.0	3.0	3.0	3.3	3.4	3.6	3.3	3.0	3.0	3.0	
1963	1.4	1.5	1.6	1.7	1.7	2.0	2.4	2.8	2.9	2.9	2.9	3.0	3.0	3.2	3.4	3.5	3.2	2.9	2.9	2.9	
1964	1.4	1.5	1.6	1.7	1.7	2.0	2.3	2.8	2.8	2.9	2.9	2.9	2.9	3.1	3.3	3.4	3.1	2.8	2.8	2.9	
1965	1.4	1.5	1.6	1.7	1.7	2.0	2.3	2.7	2.8	2.8	2.8	2.9	2.9	3.1	3.2	3.3	3.1	2.8	2.8	2.8	
1966	1.5	1.6	1.7	1.7	1.8	2.0	2.4	2.8	2.8	2.8	2.8	2.9	2.9	3.1	3.2	3.3	3.1	2.8	2.8	2.8	
1967	1.5	1.6	1.7	1.8	1.8	2.0	2.4	2.8	2.8	2.8	2.8	2.9	2.9	3.1	3.2	3.3	3.1	2.8	2.8	2.8	
1968	1.6	1.7	1.8	1.8	1.9	2.1	2.4	2.8	2.9	2.9	2.9	3.0	3.0	3.1	3.3	3.4	3.1	2.9	2.9	2.9	
1969	1.7	1.8	1.9	1.9	2.0	2.2	2.5	2.9	3.0	3.0	3.0	3.0	3.0	3.2	3.4	3.5	3.2	3.0	3.0	3.0	
1970	1.8	1.9	2.0	2.0	2.1	2.3	2.6	3.0	3.0	3.1	3.1	3.1	3.1	3.1	3.3	3.4	3.5	3.3	3.1	3.1	

Compound annual return

# Appendix C-7

Inflation: Percent per annum total returns for all historical periods  
From 1926 to 2017

End Date	Start Date	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
1971	1.8	1.9	2.0	2.1	2.1	2.3	2.6	3.0	3.0	3.1	3.1	3.1	3.1	3.1	3.3	3.4	3.5	3.3	3.1	3.1	3.1
1972	1.9	1.9	2.0	2.1	2.1	2.3	2.6	3.0	3.1	3.1	3.1	3.1	3.1	3.1	3.3	3.4	3.5	3.3	3.1	3.1	3.2
1973	2.0	2.1	2.2	2.2	2.3	2.5	2.8	3.1	3.2	3.2	3.2	3.3	3.3	3.3	3.5	3.6	3.7	3.5	3.3	3.3	3.3
1974	2.2	2.3	2.4	2.4	2.5	2.7	3.0	3.3	3.4	3.4	3.4	3.5	3.5	3.5	3.7	3.8	3.9	3.7	3.6	3.6	3.5
1975	2.3	2.4	2.6	2.6	2.6	2.8	3.1	3.4	3.5	3.5	3.5	3.6	3.6	3.6	3.8	3.9	4.0	3.8	3.7	3.7	3.7
1976	2.3	2.4	2.6	2.6	2.6	2.8	3.1	3.4	3.5	3.5	3.5	3.6	3.6	3.6	3.8	3.9	4.0	3.9	3.7	3.7	3.8
1977	2.4	2.5	2.6	2.7	2.7	2.9	3.2	3.5	3.6	3.6	3.6	3.7	3.7	3.7	3.9	4.0	4.1	3.9	3.8	3.8	3.9
1978	2.5	2.6	2.7	2.8	2.9	3.0	3.3	3.6	3.7	3.7	3.8	3.8	3.8	3.8	4.0	4.1	4.2	4.1	3.9	4.0	4.0
1979	2.7	2.8	2.9	3.0	3.0	3.2	3.5	3.8	3.9	4.0	4.0	4.0	4.1	4.1	4.2	4.4	4.4	4.3	4.2	4.2	4.3
1980	2.9	3.0	3.1	3.2	3.2	3.4	3.7	4.0	4.1	4.1	4.2	4.2	4.2	4.2	4.4	4.5	4.6	4.5	4.4	4.4	4.5
1981	3.0	3.1	3.2	3.3	3.3	3.5	3.8	4.1	4.2	4.2	4.3	4.3	4.3	4.4	4.5	4.6	4.7	4.6	4.5	4.5	4.6
1982	3.0	3.1	3.2	3.3	3.3	3.5	3.8	4.1	4.2	4.2	4.2	4.3	4.3	4.3	4.5	4.6	4.7	4.6	4.5	4.5	4.6
1983	3.0	3.1	3.2	3.3	3.3	3.5	3.8	4.1	4.2	4.2	4.2	4.3	4.3	4.3	4.5	4.6	4.7	4.6	4.5	4.5	4.6
1984	3.0	3.1	3.2	3.3	3.4	3.5	3.8	4.1	4.2	4.2	4.2	4.3	4.3	4.3	4.5	4.6	4.7	4.6	4.5	4.5	4.6
1985	3.1	3.1	3.2	3.3	3.4	3.5	3.8	4.1	4.2	4.2	4.2	4.3	4.3	4.3	4.5	4.6	4.7	4.6	4.5	4.5	4.6
1986	3.0	3.1	3.2	3.3	3.3	3.5	3.8	4.0	4.1	4.1	4.2	4.2	4.2	4.2	4.4	4.5	4.6	4.5	4.4	4.4	4.4
1987	3.0	3.1	3.2	3.3	3.3	3.5	3.8	4.0	4.1	4.1	4.2	4.2	4.2	4.2	4.4	4.5	4.6	4.5	4.4	4.4	4.4
1988	3.1	3.1	3.2	3.3	3.4	3.5	3.8	4.0	4.1	4.1	4.2	4.2	4.2	4.3	4.4	4.5	4.6	4.5	4.4	4.4	4.4
1989	3.1	3.2	3.3	3.3	3.4	3.5	3.8	4.1	4.1	4.2	4.2	4.2	4.2	4.3	4.4	4.5	4.6	4.5	4.4	4.4	4.4
1990	3.1	3.2	3.3	3.4	3.4	3.6	3.8	4.1	4.2	4.2	4.2	4.3	4.3	4.3	4.4	4.5	4.6	4.5	4.4	4.4	4.6
1991	3.1	3.2	3.3	3.4	3.4	3.6	3.8	4.1	4.1	4.2	4.2	4.2	4.2	4.3	4.4	4.5	4.6	4.5	4.4	4.4	4.6
1992	3.1	3.2	3.3	3.4	3.4	3.6	3.8	4.1	4.1	4.2	4.2	4.2	4.2	4.2	4.4	4.5	4.6	4.5	4.4	4.4	4.4
1993	3.1	3.2	3.3	3.3	3.4	3.6	3.8	4.0	4.1	4.1	4.1	4.2	4.2	4.2	4.3	4.4	4.5	4.4	4.3	4.3	4.4
1994	3.1	3.2	3.3	3.3	3.4	3.6	3.8	4.0	4.1	4.1	4.1	4.2	4.2	4.2	4.3	4.4	4.5	4.4	4.3	4.3	4.4
1995	3.1	3.2	3.3	3.3	3.4	3.6	3.7	4.0	4.0	4.1	4.1	4.1	4.1	4.2	4.3	4.4	4.4	4.3	4.3	4.3	4.3
1996	3.1	3.2	3.3	3.3	3.4	3.6	3.7	4.0	4.0	4.1	4.1	4.1	4.1	4.1	4.3	4.4	4.4	4.3	4.2	4.3	4.3
1997	3.1	3.2	3.2	3.3	3.4	3.6	3.7	3.9	4.0	4.0	4.0	4.0	4.1	4.1	4.2	4.3	4.4	4.3	4.2	4.2	4.2
1998	3.1	3.1	3.2	3.3	3.3	3.5	3.7	3.9	4.0	4.0	4.0	4.0	4.0	4.1	4.2	4.3	4.3	4.2	4.1	4.2	4.2
1999	3.1	3.1	3.2	3.3	3.3	3.5	3.7	3.9	3.9	4.0	4.0	4.0	4.0	4.0	4.2	4.2	4.3	4.2	4.1	4.1	4.2
2000	3.1	3.1	3.2	3.3	3.3	3.5	3.7	3.9	3.9	4.0	4.0	4.0	4.0	4.0	4.1	4.2	4.3	4.2	4.1	4.1	4.2
2001	3.1	3.1	3.2	3.2	3.3	3.4	3.6	3.8	3.9	3.9	3.9	3.9	4.0	4.0	4.1	4.2	4.2	4.1	4.1	4.1	4.1
2002	3.0	3.1	3.2	3.2	3.3	3.4	3.6	3.8	3.9	3.9	3.9	3.9	4.0	4.0	4.1	4.2	4.2	4.1	4.0	4.0	4.1
2003	3.0	3.1	3.2	3.2	3.3	3.4	3.6	3.8	3.9	3.9	3.9	3.9	3.9	3.9	4.0	4.1	4.2	4.1	4.0	4.0	4.0
2004	3.0	3.1	3.2	3.2	3.3	3.4	3.6	3.8	3.9	3.9	3.9	3.9	3.9	3.9	4.0	4.1	4.2	4.1	4.0	4.0	4.0
2005	3.0	3.1	3.2	3.2	3.3	3.4	3.6	3.8	3.9	3.9	3.9	3.9	3.9	3.9	4.0	4.1	4.1	4.0	4.0	4.0	4.0
2006	3.0	3.1	3.2	3.2	3.3	3.4	3.6	3.8	3.9	3.9	3.9	3.9	3.9	3.9	4.0	4.1	4.1	4.0	4.0	4.0	4.0
2007	3.0	3.1	3.2	3.2	3.3	3.4	3.6	3.8	3.9	3.9	3.9	3.9	3.9	3.9	4.0	4.1	4.1	4.0	4.0	4.0	4.0
2008	3.0	3.1	3.1	3.2	3.2	3.3	3.5	3.7	3.8	3.8	3.8	3.8	3.8	3.8	3.9	4.0	4.1	4.0	3.9	3.9	3.9
2009	3.0	3.1	3.1	3.2	3.2	3.3	3.5	3.7	3.8	3.8	3.8	3.8	3.8	3.8	3.9	4.0	4.0	4.0	3.9	3.9	3.9
2010	3.0	3.0	3.1	3.2	3.2	3.3	3.5	3.7	3.7	3.7	3.7	3.8	3.8	3.8	3.9	4.0	4.0	3.9	3.8	3.9	3.9
2011	3.0	3.0	3.1	3.2	3.2	3.3	3.5	3.7	3.7	3.7	3.7	3.8	3.8	3.8	3.9	3.9	4.0	3.9	3.8	3.8	3.9
2012	3.0	3.0	3.1	3.1	3.2	3.3	3.5	3.6	3.7	3.7	3.7	3.8	3.8	3.8	3.9	3.9	4.0	3.9	3.8	3.8	3.8
2013	3.0	3.0	3.1	3.1	3.2	3.3	3.4	3.6	3.7	3.7	3.7	3.7	3.7	3.7	3.8	3.9	3.9	3.8	3.7	3.7	3.8
2014	2.9	3.0	3.0	3.1	3.1	3.2	3.4	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.7	3.8	3.8	3.8	3.7	3.7	3.7
2015	2.9	3.0	3.0	3.1	3.1	3.2	3.4	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.7	3.8	3.8	3.8	3.7	3.7	3.7
2016	2.9	2.9	3.0	3.1	3.1	3.2	3.4	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.7	3.8	3.8	3.7	3.7	3.7	3.7
2017	2.9	2.9	3.0	3.0	3.1	3.2	3.3	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.7	3.8	3.8	3.7	3.6	3.6	3.7

Compound annual return

**Appendix C-7**

Inflation: Percent per annum total returns for all historical periods

From 1926 to 2017

End Date	Start Date	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1926																					
1927																					
1928																					
1929																					
1930																					
1931																					
1932																					
1933																					
1934																					
1935																					
1936																					
1937																					
1938																					
1939																					
1940																					
1941																					
1942																					
1943																					
1944																					
1945																					
1946	18.2																				
1947	13.5	9.0																			
1948	9.8	5.8	2.7																		
1949	6.8	3.2	0.4	-1.8																	
1950	4.5	3.0	2.2	1.9	5.8																
1951	6.5	4.3	3.1	3.2	5.8	6.9															
1952	5.6	3.7	2.5	2.5	4.2	3.3	0.9														
1953	5.0	3.2	2.3	2.2	3.3	2.4	0.8	0.6													
1954	4.4	2.8	1.9	1.6	2.5	1.7	0.3	0.1	-0.5												
1955	4.0	2.5	1.7	1.6	2.1	1.4	0.5	0.2	-0.1	0.4											
1956	3.9	2.5	1.8	1.7	2.2	1.7	0.8	0.8	0.9	1.6	2.9										
1957	3.8	2.6	2.0	1.9	2.3	1.9	1.2	1.3	1.4	2.1	2.9	3.0									
1958	3.6	2.5	1.9	1.9	2.3	1.8	1.3	1.3	1.6	2.0	2.5	2.4	1.8								
1959	3.5	2.4	1.9	1.8	2.2	1.8	1.2	1.4	1.5	1.9	2.3	2.1	1.6	1.5							
1960	3.3	2.4	1.8	1.8	2.1	1.8	1.3	1.4	1.5	1.8	2.1	1.9	1.6	1.5	1.5						
1961	3.2	2.2	1.8	1.7	2.0	1.7	1.3	1.3	1.4	1.7	1.9	1.7	1.4	1.2	1.1	0.7					
1962	3.1	2.2	1.7	1.7	1.9	1.6	1.3	1.3	1.4	1.6	1.8	1.6	1.3	1.2	1.1	0.9	1.2				
1963	3.0	2.2	1.7	1.7	1.9	1.6	1.3	1.3	1.4	1.6	1.8	1.6	1.4	1.3	1.3	1.2	1.4	1.6			
1964	2.9	2.1	1.7	1.6	1.9	1.6	1.3	1.3	1.4	1.6	1.7	1.6	1.4	1.3	1.2	1.2	1.4	1.4	1.2		
1965	2.8	2.1	1.7	1.7	1.9	1.6	1.3	1.4	1.4	1.5	1.7	1.5	1.4	1.4	1.4	1.3	1.5	1.6	1.6	1.9	
1966	2.9	2.2	1.9	1.8	2.0	1.7	1.5	1.5	1.6	1.7	1.9	1.8	1.6	1.6	1.6	1.6	1.7	1.9	2.0	2.2	2.5
1967	2.9	2.2	1.9	1.8	2.0	1.8	1.6	1.6	1.7	1.8	2.0	1.9	1.8	1.8	1.8	1.9	2.1	2.2	2.4	2.8	2.8
1968	3.0	2.3	2.0	2.0	2.2	2.0	1.7	1.8	1.9	2.0	2.2	2.1	2.0	2.1	2.1	2.2	2.4	2.6	2.8	3.3	3.3
1969	3.1	2.5	2.2	2.2	2.4	2.2	2.0	2.0	2.1	2.3	2.5	2.4	2.4	2.4	2.4	2.5	2.6	2.9	3.1	3.4	3.8
1970	3.2	2.6	2.3	2.3	2.5	2.3	2.2	2.2	2.3	2.5	2.7	2.6	2.5	2.7	2.8	2.8	2.9	3.2	3.4	3.7	4.1

Compound annual return



# Appendix C-7

Inflation: Percent per annum total returns for all historical periods  
From 1926 to 2017

End Date	Start Date	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
1971	3.2	2.6	2.4	2.4	2.6	2.4	2.2	2.3	2.4	2.6	2.7	2.7	2.7	2.7	2.8	3.0	3.2	3.4	3.6	4.0
1972	3.2	2.7	2.4	2.4	2.6	2.4	2.3	2.3	2.4	2.6	2.7	2.7	2.7	2.8	2.9	3.0	3.2	3.4	3.6	3.9
1973	3.4	2.9	2.6	2.6	2.8	2.7	2.6	2.6	2.8	2.9	3.1	3.1	3.1	3.2	3.3	3.4	3.7	3.9	4.1	4.4
1974	3.7	3.2	3.0	3.0	3.2	3.1	3.0	3.1	3.2	3.4	3.5	3.6	3.6	3.7	3.9	4.0	4.3	4.6	4.8	5.2
1975	3.8	3.3	3.1	3.1	3.3	3.2	3.1	3.2	3.4	3.5	3.7	3.7	3.8	3.9	4.1	4.2	4.5	4.7	5.0	5.4
1976	3.8	3.4	3.2	3.2	3.4	3.3	3.2	3.3	3.4	3.6	3.8	3.8	3.8	4.0	4.1	4.3	4.5	4.6	5.0	5.3
1977	3.9	3.5	3.3	3.3	3.6	3.4	3.3	3.4	3.6	3.7	3.9	3.9	4.0	4.1	4.2	4.4	4.7	4.9	5.1	5.4
1978	4.1	3.7	3.5	3.5	3.7	3.6	3.5	3.6	3.6	3.9	4.1	4.2	4.2	4.3	4.5	4.7	4.9	5.1	5.4	5.7
1979	4.3	3.9	3.6	3.8	4.0	3.9	3.9	4.0	4.1	4.3	4.5	4.5	4.6	4.8	4.9	5.1	5.4	5.6	5.9	6.2
1980	4.5	4.2	4.0	4.1	4.3	4.2	4.2	4.3	4.4	4.5	4.8	4.8	4.9	5.1	5.3	5.5	5.7	6.0	6.2	6.6
1981	4.7	4.3	4.2	4.2	4.4	4.4	4.3	4.4	4.6	4.8	4.9	5.0	5.1	5.3	5.4	5.6	5.9	6.1	6.4	6.7
1982	4.6	4.3	4.2	4.2	4.4	4.3	4.3	4.4	4.5	4.7	4.9	5.0	5.1	5.2	5.4	5.5	5.8	6.0	6.2	6.5
1983	4.6	4.3	4.2	4.2	4.4	4.3	4.3	4.4	4.5	4.7	4.9	4.9	5.0	5.1	5.3	5.5	5.7	5.9	6.1	6.4
1984	4.6	4.3	4.1	4.2	4.4	4.3	4.3	4.4	4.5	4.7	4.8	4.9	5.0	5.1	5.2	5.4	5.6	5.8	6.0	6.3
1985	4.6	4.3	4.1	4.2	4.3	4.3	4.3	4.4	4.5	4.6	4.8	4.9	4.9	5.0	5.2	5.3	5.5	5.7	5.9	6.1
1986	4.5	4.2	4.1	4.1	4.3	4.2	4.2	4.3	4.4	4.5	4.7	4.7	4.8	4.9	5.0	5.2	5.4	5.5	5.7	5.9
1987	4.5	4.2	4.1	4.1	4.3	4.2	4.2	4.3	4.4	4.5	4.7	4.7	4.8	4.9	5.0	5.1	5.3	5.5	5.6	5.8
1988	4.5	4.2	4.1	4.1	4.3	4.2	4.2	4.3	4.4	4.5	4.7	4.7	4.8	4.9	5.0	5.1	5.3	5.4	5.6	5.8
1989	4.5	4.2	4.1	4.1	4.3	4.2	4.2	4.3	4.4	4.5	4.7	4.7	4.8	4.9	5.0	5.1	5.3	5.4	5.6	5.7
1990	4.5	4.2	4.1	4.2	4.3	4.3	4.2	4.3	4.4	4.6	4.7	4.8	4.8	4.9	5.0	5.1	5.3	5.4	5.6	5.8
1991	4.5	4.2	4.1	4.1	4.3	4.3	4.2	4.3	4.4	4.5	4.7	4.7	4.8	4.8	5.0	5.1	5.2	5.4	5.5	5.7
1992	4.5	4.2	4.1	4.1	4.3	4.2	4.2	4.3	4.4	4.5	4.6	4.7	4.7	4.8	4.9	5.0	5.1	5.3	5.4	5.6
1993	4.4	4.2	4.1	4.1	4.2	4.2	4.1	4.2	4.3	4.4	4.6	4.6	4.6	4.7	4.8	4.9	5.1	5.2	5.3	5.5
1994	4.4	4.1	4.0	4.1	4.2	4.2	4.1	4.2	4.3	4.4	4.5	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.4
1995	4.4	4.1	4.0	4.0	4.2	4.1	4.1	4.2	4.2	4.4	4.5	4.5	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.3
1996	4.3	4.1	4.0	4.0	4.1	4.1	4.1	4.1	4.2	4.3	4.4	4.5	4.5	4.5	4.6	4.7	4.8	4.9	5.0	5.2
1997	4.3	4.0	3.9	4.0	4.1	4.0	4.0	4.1	4.2	4.3	4.4	4.4	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1
1998	4.2	4.0	3.9	3.9	4.0	4.0	4.0	4.0	4.1	4.2	4.3	4.3	4.4	4.4	4.5	4.6	4.7	4.8	4.9	5.0
1999	4.2	4.0	3.9	3.9	4.0	4.0	3.9	4.0	4.1	4.2	4.3	4.3	4.3	4.4	4.5	4.5	4.6	4.7	4.8	4.9
2000	4.2	3.9	3.9	3.9	4.0	4.0	3.9	4.0	4.1	4.2	4.2	4.3	4.3	4.4	4.4	4.5	4.6	4.7	4.8	4.9
2001	4.1	3.9	3.8	3.8	3.9	3.9	3.9	3.9	4.0	4.1	4.2	4.2	4.2	4.3	4.4	4.4	4.5	4.6	4.7	4.8
2002	4.1	3.9	3.8	3.8	3.9	3.9	3.8	3.9	4.0	4.1	4.1	4.2	4.2	4.3	4.3	4.4	4.5	4.6	4.6	4.7
2003	4.1	3.8	3.8	3.8	3.9	3.8	3.8	3.9	3.9	4.0	4.1	4.1	4.1	4.2	4.3	4.3	4.4	4.5	4.5	4.7
2004	4.1	3.8	3.7	3.8	3.9	3.8	3.8	3.8	3.9	4.0	4.1	4.1	4.1	4.2	4.2	4.3	4.4	4.5	4.5	4.6
2005	4.0	3.8	3.7	3.8	3.9	3.8	3.8	3.8	3.9	4.0	4.1	4.1	4.1	4.2	4.2	4.3	4.4	4.4	4.5	4.6
2006	4.0	3.8	3.7	3.7	3.8	3.8	3.8	3.8	3.9	4.0	4.0	4.1	4.1	4.1	4.2	4.2	4.3	4.4	4.5	4.5
2007	4.0	3.8	3.7	3.7	3.8	3.8	3.8	3.8	3.9	4.0	4.0	4.1	4.1	4.1	4.2	4.2	4.3	4.4	4.5	4.5
2008	4.0	3.7	3.7	3.7	3.8	3.7	3.7	3.7	3.8	3.8	3.9	4.0	4.0	4.0	4.1	4.2	4.2	4.3	4.4	4.4
2009	3.9	3.7	3.6	3.7	3.6	3.7	3.7	3.7	3.8	3.9	3.9	4.0	4.0	4.0	4.1	4.1	4.2	4.3	4.3	4.4
2010	3.9	3.7	3.6	3.6	3.7	3.7	3.6	3.7	3.8	3.8	3.9	3.9	3.9	4.0	4.0	4.1	4.1	4.2	4.3	4.3
2011	3.9	3.7	3.6	3.6	3.7	3.7	3.6	3.7	3.7	3.8	3.9	3.9	3.9	4.0	4.0	4.0	4.1	4.2	4.2	4.3
2012	3.9	3.7	3.6	3.6	3.7	3.6	3.6	3.7	3.7	3.8	3.9	3.9	3.9	4.0	4.0	4.1	4.1	4.2	4.2	4.2
2013	3.8	3.6	3.5	3.6	3.6	3.6	3.5	3.6	3.6	3.7	3.8	3.8	3.8	3.9	3.9	4.0	4.0	4.1	4.1	4.2
2014	3.8	3.6	3.5	3.6	3.6	3.6	3.5	3.6	3.6	3.7	3.7	3.8	3.8	3.8	3.9	3.9	4.0	4.0	4.1	4.1
2015	3.7	3.5	3.5	3.6	3.6	3.5	3.5	3.5	3.6	3.6	3.7	3.7	3.7	3.8	3.8	3.8	3.9	3.9	4.0	4.0
2016	3.7	3.5	3.4	3.4	3.6	3.6	3.5	3.6	3.6	3.6	3.7	3.7	3.7	3.7	3.8	3.8	3.9	3.9	4.0	4.0
2017	3.7	3.5	3.4	3.4	3.6	3.5	3.4	3.5	3.5	3.6	3.6	3.7	3.7	3.7	3.7	3.8	3.8	3.9	3.9	4.0

Compound annual return

**Appendix C-7**

Inflation: Percent per annum total returns for all historical periods

From 1926 to 2017

End Date	Start Date	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1926																					
1927																					
1928																					
1929																					
1930																					
1931																					
1932																					
1933																					
1934																					
1935																					
1936																					
1937																					
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1954																					
1955																					
1956																					
1957																					
1958																					
1959																					
1960																					
1961																					
1962																					
1963																					
1964																					
1965																					
1966		3.4																			
1967		3.2	3.0																		
1968		3.7	3.9	4.7																	
1969		4.3	4.6	5.4	5.1																
1970		4.5	4.8	5.4	5.8	5.5															

Compound annual return

# Appendix C-7

Inflation: Percent per annum total returns for all historical periods  
From 1926 to 2017

End Date	Start Date	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1971	4.3	4.5	4.9	5.0	4.4	3.4																									
1972	4.2	4.3	4.6	4.6	4.1	3.4	8.4																								
1973	4.8	5.0	5.3	5.4	5.2	5.2	6.1	8.8																							
1974	5.6	5.9	6.3	6.5	6.6	6.9	8.1	10.5	12.2																						
1975	5.7	6.0	6.4	6.6	6.7	6.9	7.8	9.3	9.6	7.0																					
1976	5.6	5.9	6.2	6.4	6.4	6.6	7.2	9.2	9.0	5.9	4.8																				
1977	5.7	5.9	6.2	6.4	6.4	6.6	7.1	7.9	7.7	6.2	5.8	6.8																			
1978	6.0	6.2	6.5	6.7	6.7	6.9	7.4	8.1	7.8	6.9	6.0	7.9	9.0																		
1979	6.5	6.7	7.0	7.3	7.4	7.6	9.1	8.8	8.3	8.1	8.4	9.7	11.1	13.3																	
1980	6.9	7.1	7.4	7.7	7.8	8.1	9.6	9.2	8.3	8.8	9.2	10.3	11.6	12.9	12.4																
1981	7.0	7.2	7.6	7.8	7.9	8.1	9.5	9.2	8.3	8.5	9.2	10.1	10.9	11.5	10.7	8.9															
1982	6.8	7.0	7.3	7.5	7.6	7.8	8.2	8.7	8.7	8.2	8.4	9.0	9.5	9.6	8.3	6.4	3.9														
1983	6.6	6.8	7.1	7.2	7.3	7.5	7.8	8.2	8.2	7.7	7.8	8.2	8.5	8.4	7.2	5.5	3.8	3.8													
1984	6.5	6.7	6.9	7.0	7.1	7.2	7.5	7.9	7.8	7.3	7.4	7.7	7.8	7.6	6.5	5.1	3.9	3.9	4.0												
1985	6.4	6.6	6.7	6.8	6.9	7.0	7.2	7.5	7.4	7.0	7.0	7.3	7.3	7.1	6.1	4.8	3.8	3.8	3.9	3.8											
1986	6.1	6.2	6.4	6.5	6.5	6.6	6.8	7.1	6.9	6.5	6.5	6.6	6.6	6.3	5.3	4.2	3.3	3.2	2.9	2.4											
1987	6.0	6.2	6.3	6.4	6.4	6.5	6.7	6.9	6.8	6.3	6.3	6.4	6.4	6.1	5.2	4.2	3.5	3.4	3.3	3.1											
1988	6.0	6.1	6.2	6.3	6.3	6.4	6.5	6.7	6.5	6.2	6.1	6.3	6.2	5.9	5.1	4.3	3.6	3.6	3.5	3.4											
1989	5.9	6.0	6.2	6.2	6.2	6.3	6.4	6.6	6.5	6.1	6.0	6.1	6.1	5.8	5.1	4.3	3.7	3.7	3.7	3.7											
1990	5.9	6.0	6.1	6.2	6.2	6.3	6.4	6.6	6.5	6.1	6.0	6.1	6.1	5.8	5.2	4.5	4.0	4.0	4.1	4.1											
1991	5.8	5.9	6.0	6.1	6.1	6.1	6.2	6.4	6.3	5.9	5.9	5.9	5.9	5.6	5.0	4.4	3.9	3.9	3.9	3.9											
1992	5.7	5.8	5.9	5.9	5.9	6.0	6.1	6.2	6.1	5.7	5.7	5.7	5.7	5.4	4.8	4.2	3.8	3.8	3.8	3.8											
1993	5.6	5.7	5.8	5.8	5.8	5.8	5.9	6.0	5.9	5.6	5.5	5.5	5.5	5.2	4.7	4.1	3.7	3.7	3.7	3.7											
1994	5.5	5.6	5.7	5.7	5.7	5.7	5.8	5.9	5.8	5.4	5.4	5.4	5.3	5.1	4.6	4.0	3.5	3.5	3.6	3.6											
1995	5.4	5.5	5.5	5.6	5.6	5.6	5.6	5.7	5.6	5.3	5.2	5.2	5.2	4.9	4.4	3.9	3.6	3.5	3.6	3.6											
1996	5.3	5.4	5.5	5.5	5.6	5.6	5.6	5.6	5.5	5.2	5.1	5.1	5.1	4.8	4.4	3.9	3.5	3.5	3.5	3.5											
1997	5.2	5.3	5.3	5.4	5.3	5.3	5.4	5.5	5.3	5.1	5.0	5.0	4.9	4.7	4.2	3.8	3.4	3.4	3.4	3.3											
1998	5.1	5.1	5.2	5.2	5.2	5.2	5.3	5.3	5.2	4.9	4.8	4.8	4.7	4.5	4.1	3.6	3.3	3.3	3.3	3.2											
1999	5.0	5.1	5.1	5.1	5.1	5.1	5.2	5.2	5.1	4.8	4.7	4.7	4.6	4.4	4.0	3.6	3.3	3.3	3.2	3.2											
2000	5.0	5.0	5.1	5.1	5.1	5.0	5.1	5.2	5.0	4.7	4.7	4.7	4.6	4.4	4.0	3.6	3.3	3.3	3.2	3.2											
2001	4.9	4.9	5.0	5.0	4.9	4.9	5.0	5.0	4.9	4.6	4.6	4.5	4.5	4.3	3.9	3.5	3.2	3.2	3.1	3.1											
2002	4.8	4.8	4.9	4.9	4.9	4.8	4.9	4.9	4.8	4.6	4.5	4.5	4.4	4.2	3.8	3.4	3.2	3.1	3.1	3.1											
2003	4.7	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.7	4.5	4.4	4.4	4.3	4.1	3.7	3.4	3.1	3.1	3.0	3.0											
2004	4.7	4.7	4.8	4.8	4.7	4.7	4.8	4.8	4.7	4.4	4.3	4.3	4.2	4.1	3.7	3.4	3.1	3.1	3.0	3.0											
2005	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.8	4.6	4.4	4.3	4.3	4.2	4.0	3.7	3.4	3.1	3.1	3.1	3.0											
2006	4.6	4.6	4.7	4.7	4.6	4.6	4.7	4.7	4.6	4.3	4.3	4.2	4.1	4.0	3.6	3.3	3.1	3.1	3.0	3.0											
2007	4.6	4.6	4.7	4.7	4.6	4.6	4.6	4.7	4.6	4.3	4.2	4.2	4.1	4.0	3.7	3.4	3.1	3.1	3.1	3.0											
2008	4.5	4.5	4.6	4.5	4.5	4.5	4.5	4.5	4.4	4.2	4.1	4.1	4.0	3.8	3.5	3.2	3.0	3.0	3.0	2.9											
2009	4.4	4.5	4.5	4.5	4.5	4.4	4.5	4.5	4.4	4.2	4.1	4.1	4.0	3.8	3.6	3.2	3.0	3.0	3.0	2.9											
2010	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.3	4.1	4.0	4.0	3.9	3.7	3.4	3.2	3.0	2.9	2.9	2.9											
2011	4.3	4.4	4.4	4.4	4.4	4.3	4.4	4.3	4.3	4.1	4.0	3.9	3.9	3.7	3.4	3.2	3.0	2.9	2.9	2.9											
2012	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.2	4.0	3.9	3.9	3.8	3.7	3.4	3.1	2.9	2.9	2.9	2.8											
2013	4.2	4.3	4.3	4.3	4.2	4.2	4.2	4.2	4.1	3.9	3.8	3.8	3.7	3.6	3.3	3.1	2.9	2.8	2.8	2.7											
2014	4.2	4.2	4.2	4.2	4.1	4.1	4.1	4.2	4.0	3.8	3.8	3.7	3.7	3.6	3.3	3.0	2.8	2.8	2.7	2.7											
2015	4.1	4.1	4.1	4.1	4.1	4.0	4.1	4.1	4.0	3.8	3.7	3.7	3.6	3.4	3.2	2.9	2.8	2.7	2.7	2.6											
2016	4.1	4.1	4.1	4.1	4.0	4.0	4.0	4.0	3.9	3.7	3.7	3.6	3.5	3.4	3.1	2.9	2.7	2.7	2.7	2.6											
2017	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.9	3.7	3.6	3.6	3.5	3.4	3.1	2.9	2.7	2.7	2.7	2.6											

Compound annual return

**Appendix C-7**

Inflation: Percent per annum total returns for all historical periods

From 1926 to 2017

End Date	Start Date	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1971																					
1972																					
1973																					
1974																					
1975																					
1976																					
1977																					
1978																					
1979																					
1980																					
1981																					
1982																					
1983																					
1984																					
1985																					
1986		1.1																			
1987		2.8	4.4																		
1988		3.3	4.4	4.4																	
1989		3.6	4.5	4.5	4.6																
1990		4.1	4.5	5.1	5.4	5.1															
1991		4.0	4.5	4.6	4.6	4.6	3.1														
1992		3.8	4.3	4.2	4.2	4.0	3.0	2.9													
1993		3.7	4.0	4.0	3.9	3.7	2.9	2.8	2.7												
1994		3.6	3.9	3.8	3.7	3.5	2.8	2.8	2.7	2.7	2.6										
1995		3.5	3.7	3.6	3.5	3.3	2.8	2.7	2.7	2.6	2.5										
1996		3.4	3.7	3.6	3.5	3.3	2.9	2.8	2.6	2.6	2.9	3.3									
1997		3.3	3.5	3.4	3.3	3.1	2.7	2.5	2.6	2.6	2.5	2.5	1.7								
1998		3.2	3.3	3.2	3.1	3.0	2.6	2.5	2.4	2.4	2.3	2.2	1.7	1.5							
1999		3.1	3.3	3.2	3.1	2.9	2.6	2.5	2.5	2.4	2.4	2.3	2.0	2.1	2.7						
2000		3.1	3.3	3.2	3.1	3.0	2.7	2.6	2.6	2.6	2.5	2.5	2.3	2.6	3.0	3.4					
2001		3.0	3.2	3.1	3.0	2.9	2.6	2.5	2.5	2.4	2.4	2.4	2.2	2.3	2.5	2.6	1.6				
2002		3.0	3.1	3.0	2.9	2.8	2.5	2.5	2.5	2.4	2.4	2.4	2.2	2.3	2.5	2.4	2.0	2.4			
2003		2.9	3.1	3.0	2.9	2.7	2.5	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.4	2.3	1.9	2.1	1.9		
2004		3.0	3.1	3.0	2.9	2.8	2.5	2.5	2.5	2.5	2.4	2.4	2.3	2.4	2.5	2.5	2.3	2.6	2.6	3.3	
2005		3.0	3.1	3.0	2.9	2.8	2.6	2.5	2.5	2.5	2.5	2.5	2.4	2.5	2.6	2.6	2.5	2.7	2.8	3.3	3.4
2006		3.0	3.1	3.0	2.9	2.8	2.6	2.6	2.5	2.5	2.5	2.5	2.4	2.5	2.6	2.6	2.5	2.7	2.8	3.1	3.0
2007		3.0	3.1	3.0	3.0	2.9	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.7	2.8	2.8	2.7	2.9	3.0	3.3	3.3
2008		2.9	3.0	2.9	2.8	2.7	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.5	2.6	2.4	2.5	2.5	2.7	2.5
2009		2.9	3.0	2.9	2.8	2.7	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.5	2.5	2.5	2.4	2.5	2.6	2.7	2.6
2010		2.9	2.9	2.8	2.8	2.7	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.4	2.5	2.4	2.3	2.4	2.4	2.5	2.4
2011		2.8	2.9	2.8	2.8	2.7	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.5	2.5	2.6	2.5
2012		2.8	2.9	2.8	2.7	2.6	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.3	2.4	2.4	2.5	2.4
2013		2.7	2.8	2.7	2.7	2.6	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.4	2.3
2014		2.7	2.7	2.7	2.6	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.1
2015		2.5	2.7	2.6	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.0
2016		2.6	2.6	2.6	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.0
2017		2.6	2.6	2.6	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.0

Compound annual return

# Appendix C-7

Inflation: Percent per annum total returns for all historical periods

From 1926 to 2017

End Date	Start Date	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1971												
1972												
1973												
1974												
1975												
1976												
1977												
1978												
1979												
1980												
1981												
1982												
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1996												
1997												
1998												
1999												
2000												
2001												
2002												
2003												
2004												
2005												
2006	2.5											
2007	3.3	4.1										
2008	2.2	2.1	0.1									
2009	2.3	2.3	1.4	2.7								
2010	2.2	2.1	1.4	2.1	1.5							
2011	2.3	2.3	1.8	2.4	2.2	3.0						
2012	2.2	2.2	1.8	2.2	2.1	2.3	1.7					
2013	2.1	2.1	1.7	2.1	1.9	2.1	1.6	1.5				
2014	2.0	1.9	1.6	1.9	1.7	1.7	1.3	1.1	0.8			
2015	1.9	1.8	1.5	1.7	1.5	1.5	1.2	1.0	0.7	0.7		
2016	1.9	1.8	1.6	1.7	1.6	1.6	1.4	1.3	1.2	1.4	2.1	
2017	1.9	1.8	1.6	1.8	1.7	1.7	1.5	1.4	1.4	1.6	2.1	2.1

Compound annual return

Attachment JLR-4  
Cause No. 45117  
Page 8 of 8



# SURVEY OF PROFESSIONAL FORECASTERS

Release Date: August 10, 2018

## THIRD QUARTER 2018

### *Steady Outlook for Growth with Stronger Labor Markets*

The outlook for growth in the U.S. economy over the next three years is mostly unchanged from that of three months ago, according to 38 forecasters surveyed by the Federal Reserve Bank of Philadelphia. The panel predicts real GDP will grow at an annual rate of 3.0 percent this quarter and 2.8 percent next quarter, unchanged from the estimates of three months ago. On an annual-average over annual-average basis, the forecasters expect real GDP to grow 2.8 percent in 2018 and 2019, 1.8 percent in 2020, and 1.5 percent in 2021.

The forecasters see a small improvement in the outlook for the unemployment rate. The forecasters predict the unemployment rate will average 3.9 percent in 2018, 3.6 percent in 2019, 3.7 percent in 2020, and 4.0 percent in 2021. The projections for 2019 and 2020 are slightly below those of the last survey, indicating a better outlook for unemployment.

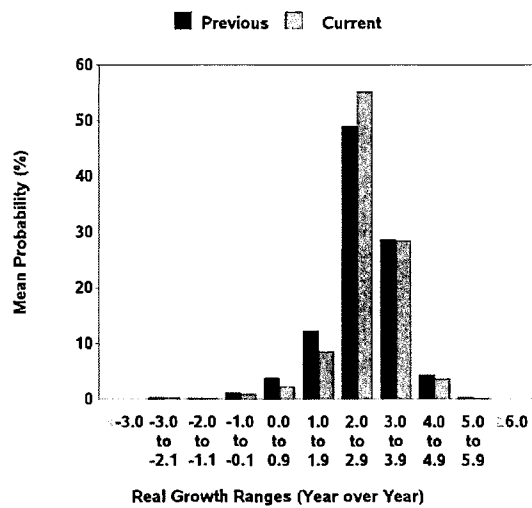
On the employment front, the forecasters have revised upward their estimates for job gains over the next two years. The projections for the annual-average level of nonfarm payroll employment suggest job gains at a monthly rate of 194,800 in 2018, up from the previous estimate of 185,900, and 167,800 in 2019, up from 160,800 estimated three months ago. (These annual-average estimates are computed as the year-to-year change in the annual-average level of nonfarm payroll employment, converted to a monthly rate.)

### *Median Forecasts for Selected Variables in the Current and Previous Surveys*

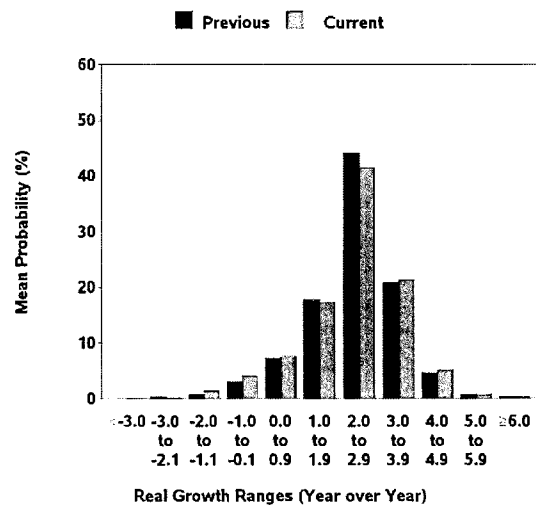
	Real GDP (%)		Unemployment Rate (%)		Payrolls (000s/month)	
	Previous	New	Previous	New	Previous	New
Quarterly data:						
2018:Q3	3.0	3.0	3.9	3.8	175.0	197.1
2018:Q4	2.8	2.8	3.8	3.7	160.4	173.3
2019:Q1	2.4	2.5	3.8	3.7	160.9	161.5
2019:Q2	2.6	2.7	3.7	3.6	151.7	162.0
2019:Q3	N.A.	2.6	N.A.	3.6	N.A.	150.1
Annual data (projections are based on annual-average levels):						
2018	2.8	2.8	3.9	3.9	185.9	194.8
2019	2.7	2.8	3.7	3.6	160.8	167.8
2020	1.9	1.8	3.9	3.7	N.A.	N.A.
2021	2.0	1.5	4.0	4.0	N.A.	N.A.

The charts below provide some insight into the degree of uncertainty the forecasters have about their projections for the rate of growth in the annual-average level of real GDP. Each chart presents the forecasters' previous and current estimates of the probability that growth will fall into each of 11 ranges. The charts show that the estimates of uncertainty about growth over the next four years are nearly the same as those in the previous survey.

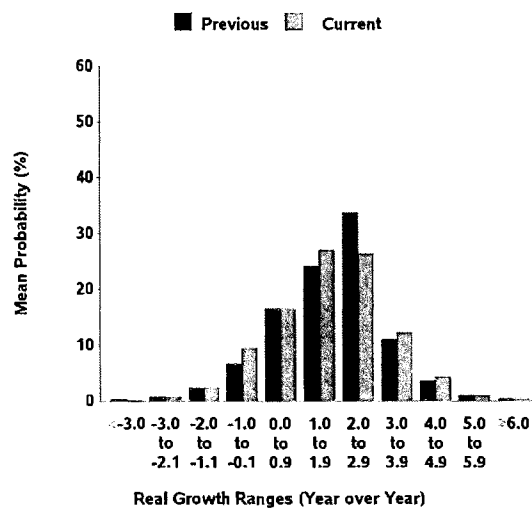
Mean Probabilities for Real GDP Growth in 2018



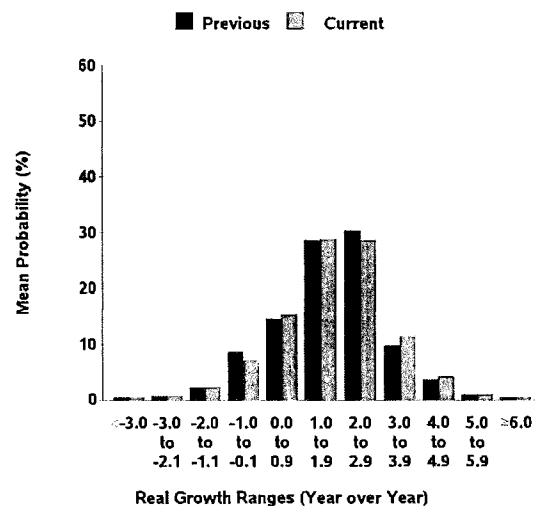
Mean Probabilities for Real GDP Growth in 2019



Mean Probabilities for Real GDP Growth in 2020

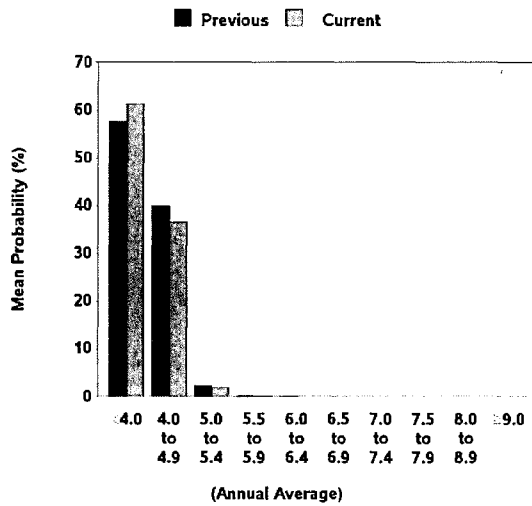


Mean Probabilities for Real GDP Growth in 2021

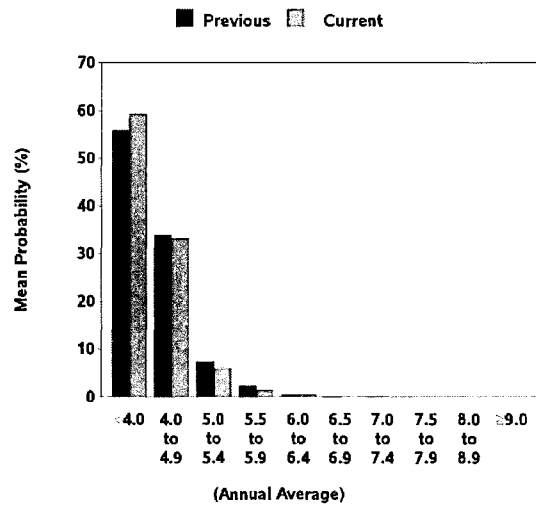


The forecasters' density projections for unemployment, shown below, shed light on uncertainty about the labor market over the next four years. Each chart presents the forecasters' current estimates of the probability that unemployment will fall into each of 10 ranges. The charts show the panelists are raising their density estimates for an unemployment rate below 4.0 percent for the next four years.

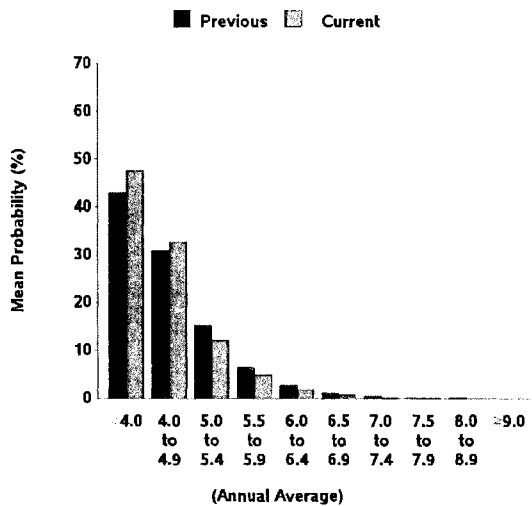
Mean Probabilities for Unemployment Rate in 2018



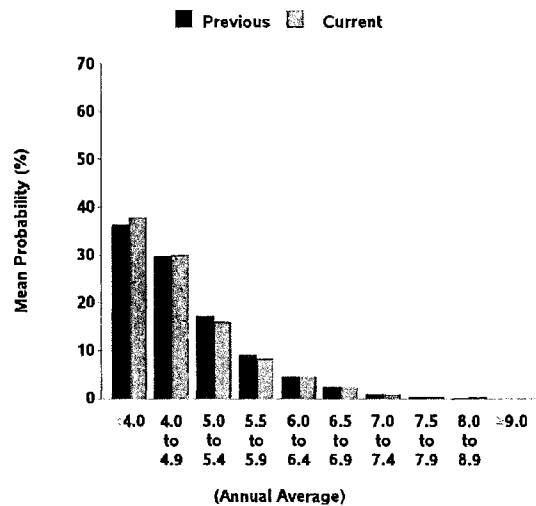
Mean Probabilities for Unemployment Rate in 2019



Mean Probabilities for Unemployment Rate in 2020



Mean Probabilities for Unemployment Rate in 2021





***Forecasters See Slightly Lower Inflation in 2018***

The forecasters expect current-year headline CPI inflation to average 2.4 percent, down slightly from 2.5 percent in the last survey. Core CPI inflation for 2018 will be 2.3 percent, down 0.2 percentage point from the previous estimate.

The forecasters predict current-year headline PCE inflation to average 2.1 percent, unchanged from the last survey. Core PCE inflation for 2018 will be 2.0 percent, down 0.2 percentage point from the previous estimate.

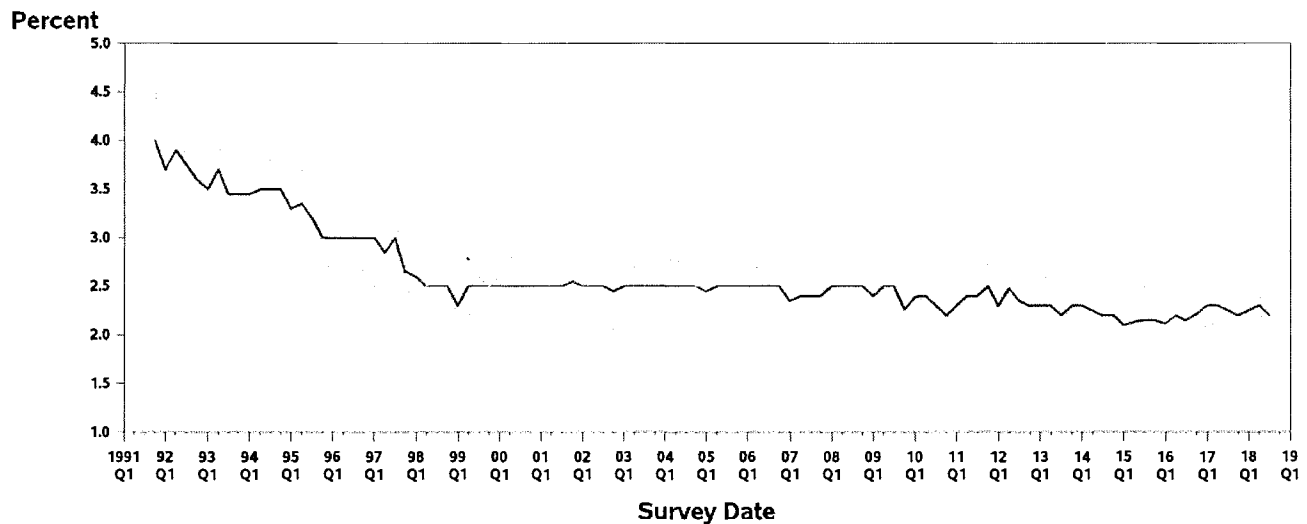
Over the next 10 years, 2018 to 2027, the forecasters expect headline CPI inflation to average 2.20 percent at an annual rate, down 0.1 percentage point from the previous estimate. The corresponding estimate for 10-year annual-average PCE inflation is 2.00 percent, unchanged from the estimate of three months ago.

*Median Short-Run and Long-Run Projections for Inflation (Annualized Percentage Points)*

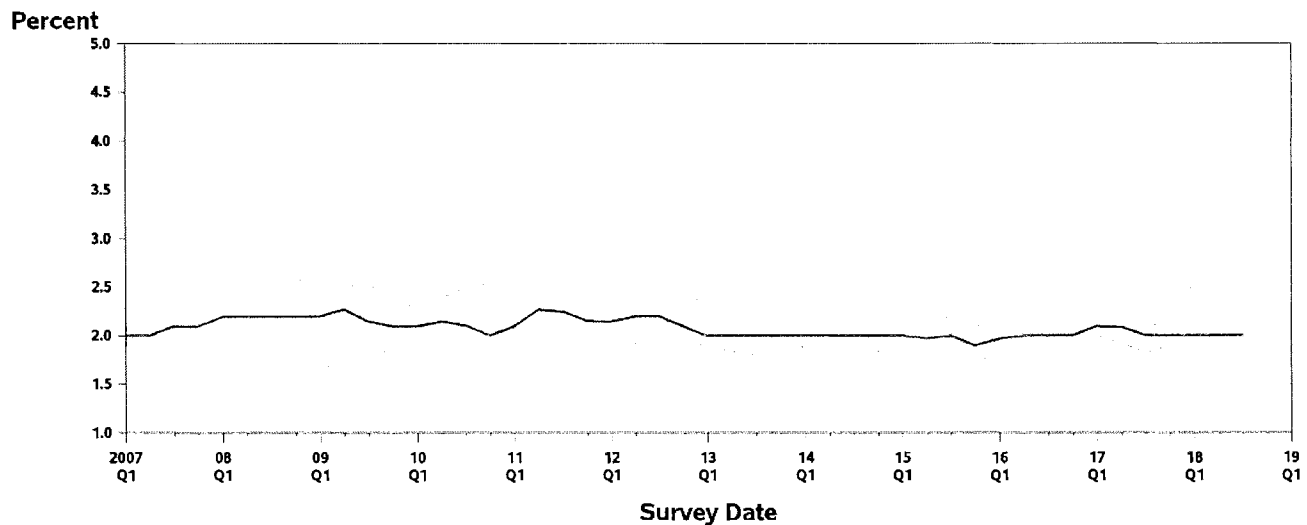
	Headline CPI		Core CPI		Headline PCE		Core PCE	
	Previous	Current	Previous	Current	Previous	Current	Previous	Current
Quarterly								
2018:Q3	2.2	2.3	2.3	2.3	2.0	2.0	2.1	2.0
2018:Q4	2.3	2.3	2.3	2.3	2.0	2.1	2.1	2.0
2019:Q1	2.3	2.4	2.4	2.4	2.1	2.1	2.1	2.1
2019:Q2	2.2	2.1	2.4	2.4	2.0	2.0	2.0	2.1
2019:Q3	N.A.	2.3	N.A.	2.4	N.A.	2.1	N.A.	2.1
Q4/Q4 Annual Averages								
2018	2.5	2.4	2.5	2.3	2.1	2.1	2.2	2.0
2019	2.2	2.3	2.4	2.4	2.1	2.1	2.1	2.1
2020	2.3	2.3	2.4	2.4	2.1	2.1	2.1	2.1
Long-Term Annual Averages								
2018-2022	2.20	2.22	N.A.	N.A.	2.00	2.04	N.A.	N.A.
2018-2027	2.30	2.20	N.A.	N.A.	2.00	2.00	N.A.	N.A.

The charts below show the median projections (the red line) and the associated interquartile ranges (gray areas around the red line) for the projections for 10-year annual-average CPI and PCE inflation. The charts highlight a slightly lower level of the long-term projection for CPI inflation and an unchanged long-term projection for PCE inflation.

### Projections for the 10-Year Annual-Average Rate of CPI Inflation (Median and Interquartile Range)

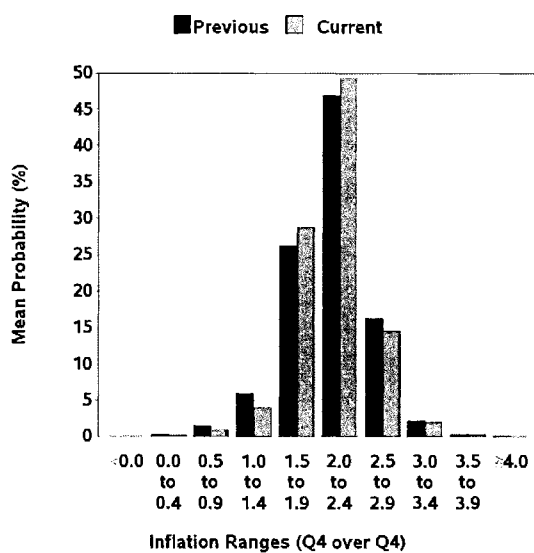


### Projections for the 10-Year Annual-Average Rate of PCE Inflation (Median and Interquartile Range)

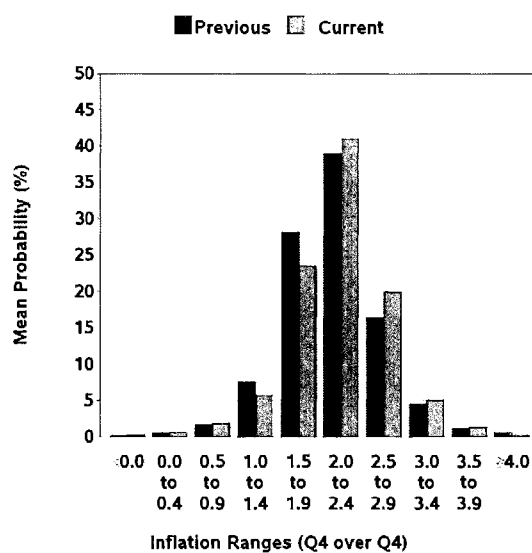


The figures below show the probabilities that the forecasters are assigning to the possibility that fourth-quarter over fourth-quarter core PCE inflation in 2018 and 2019 will fall into each of 10 ranges. For both years, the estimates are nearly the same as those of the previous survey, suggesting that the forecasters' assessment of the uncertainty about future inflation is holding steady.

Mean Probabilities for Core PCE Inflation in 2018



Mean Probabilities for Core PCE Inflation in 2019



### Forecasters See Little Change to the Risk of a Negative Quarter

The forecasters have marginally revised downward the chance of a contraction in real GDP in any of the next three quarters. For the current quarter, the forecasters predict a 6.6 percent chance of negative growth, down from 8.6 percent in the survey of three months ago. The forecasters have also made downward revisions to their forecasts for the following two quarters. For the second quarter in 2019, the forecasters predict a 16.4 percent chance of negative growth, up from 15.6 percent in the previous survey.

### Risk of a Negative Quarter (%) Survey Means

Quarterly data:	Previous	New
2018:Q3	8.6	6.6
2018:Q4	11.1	10.5
2019:Q1	14.4	13.2
2019:Q2	15.6	16.4
2019:Q3	N.A.	19.6

***Natural Rate of Unemployment Estimated at 4.3 Percent***

In third-quarter surveys, we ask the forecasters to provide their estimates of the natural rate of unemployment — the rate of unemployment that occurs when the economy reaches equilibrium. The forecasters peg this rate at 4.30 percent. The table below shows, for each third-quarter survey since 1996, the percentage of respondents who use the natural rate in their forecasts and, for those who use it, the median estimate and the lowest and highest estimates. Thirty-four percent of the 32 forecasters who answered the question report that they use the natural rate in their forecasts. The lowest estimate is 3.80 percent, and the highest estimate is 4.60 percent.

*Median Estimates of the Natural Rate of Unemployment*

Survey Date	Percentage Who Use the Natural Rate	Median Estimate (%)	Low (%)	High (%)
1996:Q3	62	5.65	5.00	6.00
1997:Q3	59	5.25	4.50	5.88
1998:Q3	45	5.30	4.50	5.80
1999:Q3	43	5.00	4.13	5.60
2000:Q3	48	4.50	4.00	5.00
2001:Q3	34	4.88	3.50	5.50
2002:Q3	50	5.10	3.80	5.50
2003:Q3	41	5.00	4.31	5.40
2004:Q3	46	5.00	4.00	5.50
2005:Q3	50	5.00	4.25	5.50
2006:Q3	53	4.95	4.00	5.50
2007:Q3	52	4.65	4.20	5.50
2008:Q3	48	5.00	4.00	5.50
2009:Q3	45	5.00	4.00	6.00
2010:Q3	50	5.78	4.50	6.80
2011:Q3	42	6.00	4.75	7.00
2012:Q3	49	6.00	4.75	7.00
2013:Q3	63	6.00	4.75	7.00
2014:Q3	65	5.50	4.50	6.70
2015:Q3	62	5.00	4.25	5.80
2016:Q3	56	4.80	4.50	5.50
2017:Q3	44	4.50	3.50	5.00
2018:Q3	34	4.30	3.80	4.60

**Technical Notes**

**Moody's Aaa and Baa Historical Rates**

The historical values of Moody's Aaa and Baa rates are proprietary and, therefore, not available in the data files on the Bank's website or on the tables that accompany the survey's complete write-up in the PDF.

The Federal Reserve Bank of Philadelphia thanks the following forecasters for their participation in recent surveys:

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This is a partial list of participants. We also thank those who wish to remain anonymous.

SUMMARY TABLE  
SURVEY OF PROFESSIONAL FORECASTERS  
MAJOR MACROECONOMIC INDICATORS

	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2018	2019 (YEAR-OVER-YEAR)	2020	2021
PERCENT GROWTH AT ANNUAL RATES									
1. REAL GDP (BILLIONS, CHAIN WEIGHTED)	3.0	2.8	2.5	2.7	2.6	2.8	2.8	1.8	1.5
2. GDP PRICE INDEX (PERCENT CHANGE)	2.3	2.3	2.2	2.2	2.2	2.3	2.3	N.A.	N.A.
3. NOMINAL GDP (\$ BILLIONS)	5.1	5.3	5.1	4.6	4.7	5.2	5.1	N.A.	N.A.
4. NONFARM PAYROLL EMPLOYMENT (PERCENT CHANGE)	1.6	1.4	1.3	1.3	1.2	1.6	1.4	N.A.	N.A.
(AVG MONTHLY CHANGE)	197.1	173.3	161.5	162.0	150.1	194.8	167.8	N.A.	N.A.
VARIABLES IN LEVELS									
5. UNEMPLOYMENT RATE (PERCENT)	3.8	3.7	3.7	3.6	3.6	3.9	3.6	3.7	4.0
6. 3-MONTH TREASURY BILL (PERCENT)	2.1	2.3	2.5	2.7	2.8	1.9	2.7	3.1	3.1
7. 10-YEAR TREASURY BOND (PERCENT)	3.0	3.1	3.3	3.3	3.4	3.0	3.4	3.6	3.7
	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2018	2019 (Q4-OVER-Q4)	2020	
INFLATION INDICATORS									
8. CPI (ANNUAL RATE)	2.3	2.3	2.4	2.1	2.3	2.4	2.3	2.3	
9. CORE CPI (ANNUAL RATE)	2.3	2.3	2.4	2.4	2.4	2.3	2.4	2.4	
10. PCE (ANNUAL RATE)	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.1	
11. CORE PCE (ANNUAL RATE)	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.1	

Note: The figures on each line are medians of 38 forecasters.

Source: Research Department, Federal Reserve Bank of Philadelphia.  
Survey of Professional Forecasters, Third Quarter 2018.

## **SURVEY OF PROFESSIONAL FORECASTERS**

**Third Quarter 2018**

### **Tables**

Note: Data in these tables listed as "actual" are the data that were available to the forecasters when they were sent the survey questionnaire on July 27, 2018; the tables do not reflect subsequent revisions to the data. All forecasts were received on or before August 7, 2018.

TABLE ONE  
MAJOR MACROECONOMIC INDICATORS  
MEDIAN OF FORECASTER PREDICTIONS

	NUMBER OF FORECASTERS	ACTUAL	FORECAST						ACTUAL	FORECAST			
		2018 Q2	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2017 ANNUAL	2018 ANNUAL	2019 ANNUAL	2020 ANNUAL	2021 ANNUAL	
1. GROSS DOMESTIC PRODUCT (GDP) (\$ BILLIONS)	35	20403	20658	20925	21188	21427	21673	19485	20502	21546	N.A.	N.A.	
2. GDP PRICE INDEX (2012=100)	37	110.17	110.80	111.43	112.03	112.65	113.26	107.93	110.41	112.91	N.A.	N.A.	
3. CORPORATE PROFITS AFTER TAXES (\$ BILLIONS)	20	N.A.	2012.7	2036.8	2065.0	2085.0	2110.0	1748.6	1995.2	2090.0	N.A.	N.A.	
4. UNEMPLOYMENT RATE (PERCENT)	36	3.9	3.8	3.7	3.7	3.6	3.6	4.4	3.9	3.6	3.7	4.0	
5. NONFARM PAYROLL EMPLOYMENT (THOUSANDS)	31	148689	149280	149800	150284	150771	151221	146624	148961	150975	N.A.	N.A.	
6. INDUSTRIAL PRODUCTION (2012=100)	31	107.5	108.2	108.9	109.7	110.3	110.8	103.7	107.6	110.5	N.A.	N.A.	
7. NEW PRIVATE HOUSING STARTS (ANNUAL RATE, MILLIONS)	34	1.26	1.28	1.30	1.31	1.32	1.33	1.21	1.29	1.33	N.A.	N.A.	
8. 3-MONTH TREASURY BILL RATE (PERCENT)	36	1.84	2.06	2.25	2.49	2.67	2.80	0.93	1.93	2.71	3.12	3.11	
9. MOODY'S AAA CORP BOND YIELD * (PERCENT)	24	N.A.	4.06	4.19	4.34	4.49	4.64	N.A.	3.99	4.55	N.A.	N.A.	
10. MOODY'S BAA CORP BOND YIELD * (PERCENT)	23	N.A.	4.93	5.05	5.23	5.34	5.50	N.A.	4.80	5.40	N.A.	N.A.	
11. 10-YEAR TREASURY BOND YIELD (PERCENT)	37	2.92	3.00	3.12	3.28	3.33	3.43	2.33	2.95	3.40	3.60	3.67	
12. REAL GDP (BILLIONS, CHAIN WEIGHTED)	36	18507	18647	18775	18891	19018	19141	18051	18563	19076	19415	19708	
13. TOTAL CONSUMPTION EXPENDITURE (BILLIONS, CHAIN WEIGHTED)	35	12847.8	12930.5	13012.3	13087.9	13163.2	13234.8	12558.7	12878.4	13194.8	N.A.	N.A.	
14. NONRESIDENTIAL FIXED INVESTMENT (BILLIONS, CHAIN WEIGHTED)	33	2701.5	2739.1	2772.7	2806.8	2836.7	2873.1	2538.1	2717.7	2856.5	N.A.	N.A.	
15. RESIDENTIAL FIXED INVESTMENT (BILLIONS, CHAIN WEIGHTED)	33	613.7	615.2	619.6	622.8	626.0	631.2	611.1	616.0	629.7	N.A.	N.A.	
16. FEDERAL GOVERNMENT C & I (BILLIONS, CHAIN WEIGHTED)	32	1223.4	1232.7	1240.1	1248.8	1256.7	1262.3	1196.4	1228.1	1260.5	N.A.	N.A.	
17. STATE AND LOCAL GOVT C & I (BILLIONS, CHAIN WEIGHTED)	33	1944.3	1950.1	1956.4	1962.7	1970.1	1974.6	1932.3	1947.0	1972.1	N.A.	N.A.	
18. CHANGE IN PRIVATE INVENTORIES (BILLIONS, CHAIN WEIGHTED)	29	-27.9	19.9	29.0	30.0	32.0	34.0	22.5	12.4	31.1	N.A.	N.A.	
19. NET EXPORTS (BILLIONS, CHAIN WEIGHTED)	31	-849.9	-871.5	-887.8	-896.1	-905.0	-917.5	-858.7	-879.0	-911.6	N.A.	N.A.	

\* The historical values of Moody's Aaa and Baa rates are proprietary and therefore not available to the general public.

Source: Research Department, Federal Reserve Bank of Philadelphia. Survey of Professional Forecasters, Third Quarter 2018.



TABLE TWO  
MAJOR MACROECONOMIC INDICATORS  
PERCENTAGE CHANGES AT ANNUAL RATES

	NUMBER OF FORECASTERS	Q2 2018 TO Q3 2018	Q3 2018 TO Q4 2018	Q4 2018 TO Q1 2019	Q1 2019 TO Q2 2019	Q2 2019 TO Q3 2019	2017 TO 2018	2018 TO 2019	2019 TO 2020	2020 TO 2021
1. GROSS DOMESTIC PRODUCT (GDP) (\$ BILLIONS)	35	5.1	5.3	5.1	4.6	4.7	5.2	5.1	N.A.	N.A.
2. GDP PRICE INDEX (2012=100)	37	2.3	2.3	2.2	2.2	2.2	2.3	2.3	N.A.	N.A.
3. CORPORATE PROFITS AFTER TAXES (\$ BILLIONS)	20	5.9	4.9	5.7	3.9	4.9	14.1	4.8	N.A.	N.A.
4. UNEMPLOYMENT RATE (PERCENT)	36	-0.1	-0.1	-0.0	-0.1	-0.0	-0.5	-0.3	0.1	0.3
5. NONFARM PAYROLL EMPLOYMENT (PERCENT CHANGE) (AVG MONTHLY CHANGE)	31 31	1.6 197.1	1.4 173.3	1.3 161.5	1.3 162.0	1.2 150.1	1.6 194.8	1.4 167.8	N.A. N.A.	N.A. N.A.
6. INDUSTRIAL PRODUCTION (2012=100)	31	2.7	2.7	2.7	2.3	1.9	3.8	2.7	N.A.	N.A.
7. NEW PRIVATE HOUSING STARTS (ANNUAL RATE, MILLIONS)	34	7.3	4.4	2.2	5.9	3.0	6.8	3.0	N.A.	N.A.
8. 3-MONTH TREASURY BILL RATE (PERCENT)	36	0.22	0.19	0.24	0.18	0.13	1.00	0.79	0.41	-0.01
9. MOODY'S AAA CORP BOND YIELD * (PERCENT)	24	N.A.	0.13	0.15	0.15	0.14	N.A.	0.56	N.A.	N.A.
10. MOODY'S BAA CORP BOND YIELD * (PERCENT)	23	N.A.	0.12	0.18	0.12	0.16	N.A.	0.60	N.A.	N.A.
11. 10-YEAR TREASURY BOND YIELD (PERCENT)	37	0.08	0.12	0.16	0.05	0.10	0.62	0.45	0.20	0.07
12. REAL GDP (BILLIONS, CHAIN WEIGHTED)	36	3.0	2.8	2.5	2.7	2.6	2.8	2.8	1.8	1.5
13. TOTAL CONSUMPTION EXPENDITURE (BILLIONS, CHAIN WEIGHTED)	35	2.6	2.6	2.3	2.3	2.2	2.5	2.5	N.A.	N.A.
14. NONRESIDENTIAL FIXED INVESTMENT (BILLIONS, CHAIN WEIGHTED)	33	5.7	5.0	5.0	4.3	5.2	7.1	5.1	N.A.	N.A.
15. RESIDENTIAL FIXED INVESTMENT (BILLIONS, CHAIN WEIGHTED)	33	1.0	2.9	2.1	2.0	3.4	0.8	2.2	N.A.	N.A.
16. FEDERAL GOVERNMENT C & I (BILLIONS, CHAIN WEIGHTED)	32	3.1	2.4	2.9	2.6	1.8	2.7	2.6	N.A.	N.A.
17. STATE AND LOCAL GOVT C & I (BILLIONS, CHAIN WEIGHTED)	33	1.2	1.3	1.3	1.5	0.9	0.8	1.3	N.A.	N.A.
18. CHANGE IN PRIVATE INVENTORIES (BILLIONS, CHAIN WEIGHTED)	29	47.8	9.1	1.0	2.0	2.0	-10.1	18.7	N.A.	N.A.
19. NET EXPORTS (BILLIONS, CHAIN WEIGHTED)	31	-21.6	-16.3	-8.3	-8.9	-12.5	-20.3	-32.6	N.A.	N.A.

\* The historical values of Moody's Aaa and Baa rates are proprietary and therefore not available to the general public.

Note: Figures for unemployment rate, 3-month Treasury bill rate, Moody's Aaa corporate bond yield, Moody's Baa corporate bond yield, and 10-year Treasury bond yield are changes in these rates, in percentage points. Figures for change in private inventories and net exports are changes in billions of chain-weighted dollars. All others are percentage changes at annual rates.

Source: Research Department, Federal Reserve Bank of Philadelphia. Survey of Professional Forecasters, Third Quarter 2018.

TABLE THREE  
MAJOR PRICE INDICATORS  
MEDIAN OF FORECASTER PREDICTIONS

	NUMBER OF FORECASTERS	ACTUAL	FORECAST (Q/Q)					ACTUAL	FORECAST (Q4/Q4)		
		2018 Q2	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2017 ANNUAL	2018 ANNUAL	2019 ANNUAL	2020 ANNUAL
1. CONSUMER PRICE INDEX (ANNUAL RATE)	37	1.7	2.3	2.3	2.4	2.1	2.3	2.1	2.4	2.3	2.3
2. CORE CONSUMER PRICE INDEX (ANNUAL RATE)	34	1.8	2.3	2.3	2.4	2.4	2.4	1.7	2.3	2.4	2.4
3. PCE PRICE INDEX (ANNUAL RATE)	34	1.8	2.0	2.1	2.1	2.0	2.1	1.8	2.1	2.1	2.1
4. CORE PCE PRICE INDEX (ANNUAL RATE)	33	2.0	2.0	2.0	2.1	2.1	2.1	1.6	2.0	2.1	2.1

Source: Research Department, Federal Reserve Bank of Philadelphia. Survey of Professional Forecasters, Third Quarter 2018.

TABLE FOUR  
YIELD SPREADS  
MEDIAN OF FORECASTER PREDICTIONS

	NUMBER OF FORECASTERS	ACTUAL	FORECAST					ACTUAL	FORECAST			
		2018 Q2	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2017 ANNUAL	2018 ANNUAL	2019 ANNUAL	2020 ANNUAL	2021 ANNUAL
1. TBOND MINUS TBILL (PERCENTAGE POINTS)	36	1.08	0.96	0.85	0.80	0.66	0.60	1.40	1.01	0.62	0.67	0.77
2. AAA MINUS TBOND (PERCENTAGE POINTS)	24	N.A.	1.01	1.05	1.10	1.12	1.12	N.A.	1.01	1.12	N.A.	N.A.
3. BAA MINUS TBOND (PERCENTAGE POINTS)	23	N.A.	1.90	1.90	1.90	1.95	2.00	N.A.	1.85	1.95	N.A.	N.A.
4. BAA MINUS AAA (PERCENTAGE POINTS)	22	N.A.	0.89	0.90	0.90	0.90	0.90	N.A.	0.83	0.90	N.A.	N.A.

Notes:

TBOND is the rate on 10-year Treasury bonds.  
TBILL is the rate on 3-month Treasury bills.  
AAA is the rate on Moody's Aaa corporate bonds.  
BAA is the rate on Moody's Baa corporate bonds.

The historical values for interest rate spreads for Moody's Aaa and Baa rates are proprietary and therefore not available to the general public.

Each interest rate spread is computed as the median value of the forecasters' spreads. These median values may differ from those computed as the difference between the median values of each interest rate in the spread.

Source: Research Department, Federal Reserve Bank of Philadelphia. Survey of Professional Forecasters, Third Quarter 2018.

TABLE FIVE  
ESTIMATED PROBABILITY OF DECLINE IN REAL GDP

ESTIMATED PROBABILITY (CHANCES IN 100)	Q2 2018 TO Q3 2018	Q3 2018 TO Q4 2018	Q4 2018 TO Q1 2019	Q1 2019 TO Q2 2019	Q2 2019 TO Q3 2019
NUMBER OF FORECASTERS					
10 OR LESS	24	19	13	8	5
11 TO 20	6	11	16	17	15
21 TO 30	0	1	3	7	10
31 TO 40	0	0	0	0	1
41 TO 50	0	0	0	0	0
51 TO 60	0	0	0	0	0
61 TO 70	0	0	0	0	0
71 TO 80	0	0	0	0	0
81 TO 90	0	0	0	0	0
91 AND OVER	0	0	0	0	0
NOT REPORTING	8	7	6	6	7
MEAN AND MEDIAN					
MEDIAN PROBABILITY	5.00	10.00	14.32	15.00	20.00
MEAN PROBABILITY	6.55	10.53	13.23	16.41	19.63

Note: Total number of forecasters reporting is 30.

Source: Research Department, Federal Reserve Bank of Philadelphia.  
Survey of Professional Forecasters, Third Quarter 2018.

TABLE SIX  
MEAN PROBABILITIES

MEAN PROBABILITY ATTACHED TO POSSIBLE  
CIVILIAN UNEMPLOYMENT RATES:  
(ANNUAL AVERAGE)

	2018	2019	2020	2021
9.0 PERCENT OR MORE	0.00	0.00	0.01	0.04
8.0 TO 8.9 PERCENT	0.00	0.00	0.02	0.18
7.5 TO 7.9 PERCENT	0.00	0.00	0.06	0.22
7.0 TO 7.4 PERCENT	0.00	0.00	0.12	0.78
6.5 TO 6.9 PERCENT	0.00	0.01	0.66	2.20
6.0 TO 6.4 PERCENT	0.03	0.39	1.79	4.54
5.5 TO 5.9 PERCENT	0.14	1.34	4.85	8.40
5.0 TO 5.4 PERCENT	1.90	5.99	12.13	15.89
4.0 TO 4.9 PERCENT	36.58	33.05	32.74	30.02
LESS THAN 4.0 PERCENT	61.36	59.22	47.64	37.72

MEAN PROBABILITY ATTACHED TO POSSIBLE  
PERCENT CHANGES IN REAL GDP:  
(ANNUAL-AVERAGE OVER ANNUAL-AVERAGE)

	2017-2018	2018-2019	2019-2020	2020-2021
6.0 PERCENT OR MORE	0.01	0.29	0.35	0.43
5.0 TO 5.9 PERCENT	0.13	0.85	0.82	0.92
4.0 TO 4.9 PERCENT	3.72	5.16	4.34	4.12
3.0 TO 3.9 PERCENT	28.57	21.42	12.09	11.45
2.0 TO 2.9 PERCENT	55.20	41.58	26.26	28.66
1.0 TO 1.9 PERCENT	8.53	17.41	27.10	28.80
0.0 TO 0.9 PERCENT	2.44	7.50	16.48	15.18
-1.0 TO -0.1 PERCENT	0.97	4.18	9.43	7.08
-2.0 TO -1.1 PERCENT	0.19	1.36	2.37	2.29
-3.0 TO -2.1 PERCENT	0.24	0.20	0.65	0.70
LESS THAN -3.0 PERCENT	0.00	0.04	0.12	0.39

MEAN PROBABILITY ATTACHED TO POSSIBLE  
PERCENT CHANGES IN GDP PRICE INDEX:  
(ANNUAL-AVERAGE OVER ANNUAL-AVERAGE)

	2017-2018	2018-2019
4.0 PERCENT OR MORE	0.02	0.69
3.5 TO 3.9 PERCENT	0.45	1.80
3.0 TO 3.4 PERCENT	4.05	7.92
2.5 TO 2.9 PERCENT	21.70	23.02
2.0 TO 2.4 PERCENT	49.95	38.27
1.5 TO 1.9 PERCENT	18.43	19.57
1.0 TO 1.4 PERCENT	4.26	6.39
0.5 TO 0.9 PERCENT	0.95	1.89
0.0 TO 0.4 PERCENT	0.16	0.31
LESS THAN 0.0 PERCENT	0.03	0.16

Source: Research Department, Federal Reserve Bank of Philadelphia.  
Survey of Professional Forecasters, Third Quarter 2018.

TABLE SEVEN  
MEAN PROBABILITY OF CORE CPI AND CORE PCE INFLATION (Q4/Q4)

MEAN PROBABILITY ATTACHED TO CORE CPI INFLATION:

	17Q4 TO 18Q4	18Q4 TO 19Q4
4.0 PERCENT OR MORE	0.05	0.89
3.5 TO 3.9 PERCENT	0.34	2.35
3.0 TO 3.4 PERCENT	3.73	7.83
2.5 TO 2.9 PERCENT	28.12	30.10
2.0 TO 2.4 PERCENT	50.88	38.34
1.5 TO 1.9 PERCENT	14.28	15.87
1.0 TO 1.4 PERCENT	2.24	3.44
0.5 TO 0.9 PERCENT	0.27	0.82
0.0 TO 0.4 PERCENT	0.06	0.24
LESS THAN 0.0 PERCENT	0.02	0.11

MEAN PROBABILITY ATTACHED TO CORE PCE INFLATION:

	17Q4 TO 18Q4	18Q4 TO 19Q4
4.0 PERCENT OR MORE	0.06	0.33
3.5 TO 3.9 PERCENT	0.23	1.40
3.0 TO 3.4 PERCENT	2.00	5.07
2.5 TO 2.9 PERCENT	14.52	19.95
2.0 TO 2.4 PERCENT	49.22	41.00
1.5 TO 1.9 PERCENT	28.77	23.61
1.0 TO 1.4 PERCENT	4.04	5.83
0.5 TO 0.9 PERCENT	0.90	1.92
0.0 TO 0.4 PERCENT	0.20	0.64
LESS THAN 0.0 PERCENT	0.05	0.24

Source: Research Department, Federal Reserve Bank of Philadelphia.  
Survey of Professional Forecasters, Third Quarter 2018.

TABLE EIGHT  
LONG-TERM (5-YEAR AND 10-YEAR) INFLATION FORECASTS

ANNUAL AVERAGE OVER THE NEXT 5 YEARS: 2018-2022  
=====

CPI INFLATION RATE		PCE INFLATION RATE	
-----		-----	
MINIMUM	1.93	MINIMUM	1.80
LOWER QUARTILE	2.10	LOWER QUARTILE	1.90
MEDIAN	2.22	MEDIAN	2.04
UPPER QUARTILE	2.46	UPPER QUARTILE	2.20
MAXIMUM	3.10	MAXIMUM	2.80
MEAN	2.31	MEAN	2.10
STD. DEVIATION	0.27	STD. DEVIATION	0.23
N	31	N	30
MISSING	7	MISSING	8

ANNUAL AVERAGE OVER THE FOLLOWING 5 YEARS: 2023-2027  
=====

CPI INFLATION RATE		PCE INFLATION RATE	
-----		-----	
MINIMUM	1.70	MINIMUM	1.70
LOWER QUARTILE	2.05	LOWER QUARTILE	2.00
MEDIAN	2.20	MEDIAN	2.07
UPPER QUARTILE	2.40	UPPER QUARTILE	2.20
MAXIMUM	3.70	MAXIMUM	3.00
MEAN	2.24	MEAN	2.09
STD. DEVIATION	0.35	STD. DEVIATION	0.25
N	30	N	29
MISSING	8	MISSING	9

ANNUAL AVERAGE OVER THE NEXT 10 YEARS: 2018-2027  
=====

CPI INFLATION RATE		PCE INFLATION RATE	
-----		-----	
MINIMUM	1.88	MINIMUM	1.80
LOWER QUARTILE	2.10	LOWER QUARTILE	2.00
MEDIAN	2.20	MEDIAN	2.00
UPPER QUARTILE	2.30	UPPER QUARTILE	2.11
MAXIMUM	3.40	MAXIMUM	2.80
MEAN	2.27	MEAN	2.09
STD. DEVIATION	0.28	STD. DEVIATION	0.21
N	30	N	29
MISSING	8	MISSING	9

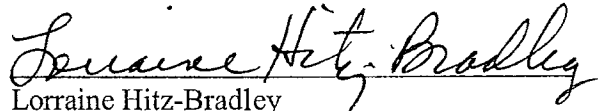
Note: The summary statistics for each forecast horizon are computed on a sample of panelists that may differ from one horizon to the next. The usual identity linking the 10-year horizon to the two underlying five-year horizons may not hold in the results.

Source: Research Department, Federal Reserve Bank of Philadelphia.  
Survey of Professional Forecasters, Third Quarter 2018.

**CERTIFICATE OF SERVICE**

This is to certify that a copy of the foregoing *Indiana Office of Utility Consumer Counselor Public's Exhibit No. 6 Testimony of OUCC Witness Jennifer L. Reed* has been served upon the following counsel of record in the captioned proceeding by electronic service on November 2, 2018.

L. Parvin Price  
**BARNES & THORNBURG LLP**  
[parvin.price@btlaw.com](mailto:parvin.price@btlaw.com)

  
Lorraine Hitz-Bradley  
Deputy Consumer Counselor

**INDIANA OFFICE OF UTILITY CONSUMER COUNSELOR**  
115 West Washington Street  
Suite 1500 South  
Indianapolis, IN 46204  
[infomgt@oucc.in.gov](mailto:infomgt@oucc.in.gov)  
317/232-2494 – Phone  
317/232-5923 – Facsimile