Accessible Version

Meeting of the Federal Open Market Committee
December 15-16, 2009 Presentation Materials

Presentation Materials (PDF)

Pages 185 to 247 of the Transcript

Appendix 1: Materials used by Mr. Sack

Material for **FOMC Presentation:** ***Financial Market Developments and Desk Operations***
Brian Sack
December 15, 2009

Class II FOMC - Restricted (FR)

Exhibit 1

Top-left panel
(1)

Title: Implied Federal Funds Rate
Series: Federal funds rates implied by Eurodollar and federal funds futures contracts
Horizon: 11/3/09, 12/11/09
Description: Implied federal funds rate declines through 2011.

Source: Federal Reserve Bank of New York

Top-right panel
(2)

Title: Distribution of LIBOR Rate (300 Days Forward)
Series: Distribution of 3-month LIBOR rate 300 days forward
Description: LIBOR distribution 300 days forward.

Bar chart. Unit is percent. Approximate values are as follows: 0-.25: 15. .25-.50: 22. .50-.75: 15. .75-1.00: 11. 1.00-1.25: 8. 1.25-1.50: 6. 1.50-1.75: 5. 1.75-2.00: 4. 2.00-2.25: 3. 2.25-2.50: 2. 2.50-2.75: 0.

Source: Federal Reserve Bank of New York

Middle-left panel
(3)

Title: Treasury Yields
Series: Yields for the 2-year, 5-year, and 10-year Treasury note
Horizon: August 1, 2008 - December 11, 2009
Description: Treasury yields begin to increase after a short decline.

November 4: FOMC

Source: Bloomberg

Middle-right panel
(4)

Title: Historical Treasury Yields
Series: Yields for the 2-year and 10-year Treasury note
Horizon: January 1, 1977 - December 11, 2009
Description: Treasury yields near historically low levels.

Source: Bloomberg

Bottom-left panel
(5)

Title: Breakeven Inflation Rates
Series: 5-year spot and 5-year, 5-year forward breakeven inflation rates
Horizon: August 1, 2007 - December 11, 2009
Description: Breakeven inflation rates still at high levels.

Source: Federal Reserve Board of Governors

Bottom-right panel
(6)

Title: Sovereign CDS
Series: 5-year sovereign credit default swap spreads for the United States, Germany, the United Kingdom, Spain, Ireland, and Greece
Horizon: 11/3/09 and intermeeting change through 12/11/09
Description: United States CDS reflects little spillover from risk issues in Greece and Europe.

Source: Bloomberg

Exhibit 2

Top-left panel
(7)

Title: US Equity Prices (S&P 500)
Series: Standard & Poor's 500 Index
Horizon: August 1, 2008 - December 2009
Description: US equity prices continue to increase.

Source: Bloomberg

Top-right panel
(8)

Title: Equity Premium
Series: Equity premium
Horizon: December 1993 - December 2009
Description: Equity premium begins to increase.

Source: Federal Reserve Board of Governors

Middle-left panel
(9) Correlations with S&P 500

	Last 6 Months	2005 - 2006
Emerging Market Equities	0.58	0.30
CRB Commodity Index	0.61	0.04
High Yield Spread	-0.38	-0.10

Source: Federal Reserve Bank of New York

Middle-right panel
(10)

Title: Corporate Debt Spreads
Series: High yield and investment grade corporate debt spreads
Horizon: August 1, 2008 - December 11, 2009
Description: Corporate debt spreads narrow slightly.

Source: Bank of America

Bottom-left panel
(11)

Title: CMBS Spreads
Series: CMBS spreads for junior, mezzanine, and super senior tranches
Horizon: August 1, 2008 - December 11, 2009
Description: CMBS spreads widen modestly.

Source: JP Morgan Chase

Bottom-right panel
(12)

Title: US Equity Indices for Financial Firms
Series: Large and regional bank indices
Horizon: August 1, 2008 - December 11, 2009
Description: Large bank equity prices decline while regional bank equity prices increase.

Source: Bloomberg

Exhibit 3

Top-left panel
(19)

Title: Weekly Pace of Agency MBS Purchases
Series: Monthly average of agency MBS purchases and potential path of weekly agency MBS purchases
Horizon: December 2008 - March 2010
Description: Agency MBS purchases tapered.

Source: Federal Reserve Bank of New York

Top-right panel
(20)

Title: Weekly Pace of Agency Debt Purchases
Series: Monthly average of agency debt purchases and potential path of weekly agency debt purchases
Horizon: December 2008 - March 2010
Description: Agency debt purchases tapered.

Source: Federal Reserve Bank of New York

Middle-left panel
(21)

Title: MBS Spreads
Series: Fannie Mae fixed-rate current coupon option-adjusted spreads to Treasury and to swap
Horizon: August 1, 2000 - December 11, 2009
Description: MBS spreads continue to decline.

Source: Barclays Capital

Middle-right panel
(22)

Title: Agency Debt Spread
Series: Fannie Mae 5-year benchmark spread to Treasury
Horizon: August 1, 2000 - December 11, 2009
Description: Agency debt spread continues to decline.

Source: Bloomberg

Bottom-left panel
(23)

Title: Distribution of SOMA Holdings by Maturity
Series: Maturities of Federal Reserve holdings of agency debt and Treasury securities, and expected paydowns of agency MBS holdings*
Description: Largest amount of expected paydowns is after 10 years.

* BlackRock baseline forecast for paydowns Return to text

Source: Federal Reserve Bank of New York, BlackRock

Bottom-right panel
(24) Size of Fed Balance Sheet at Year-End

In Billions ($)

	2010	2011
(1) Reinvest All	2200	2200
(2) Reinvest Treasuries Only	1972	1848
Difference from (1)	*-228*	*-352*
(3) Reinvest Nothing	1878	1686
Difference from (1)	*-322*	*-514*

Source: Federal Reserve Bank of New York

Exhibit 4

Top-left panel
(25)

Title: Balance Sheet Assets by Category
Series: Federal Reserve balance sheet assets categorized by All Other, Lending to Systemically Important Institutions, Short-Term Liquidity Facilities, and Outright Asset Holdings
Horizon: August 1, 2008 - December 11, 2009
Description: Balance sheet composition shifts as securities purchases outpace decline in liquidity facilities.

Source: Federal Reserve Bank of New York

Top-right panel
(26)

Title: Excess Reserves and Short-Term Rates
Series: Amount of excess reserves, federal funds effective rate, and interest on excess reserves rate
Horizon: July 1, 2008 - December 11, 2009
Description: Excess reserves continue to rise as interest on excess reserves and the federal funds effective rate stay relatively stable.

Source: Federal Reserve Bank of New York

Middle-left panel
(27)

Title: Excess Reserves and Federal Funds Rate
Series: Excess reserves and federal funds rate
Description: As excess reserves increase the federal funds rate declines.

Source: Federal Reserve Bank of New York

Middle-right panel
(28)

Title: Dealer Forecasts for Exit Strategy
Series: Primary dealer forecasts on percent probability of exit strategy tool usage
Description: Most primary dealers expect Federal Reserve to employ balance sheet draining tools before a policy rate increase.

Source: Dealer Policy Survey

Bottom-left panel
(29)

Title: Cumulative Size of Exit Programs
Series: Primary dealer expected amounts drained from Federal Reserve balance sheet using reverse repurchase agreements, term deposits, and asset sales
Horizon: Q2 2010 - Q2 2012
Description: Primary dealers expect size of exit programs to reach its highest level in Q2 2012.

Source: Dealer Policy Survey

Bottom-right panel
(30)

Title: Level of Reserves at First Tightening
Series: Primary dealer forecasts for level of reserves at first Federal Reserve policy rate increase
Description: Forty percent of primary dealers expect reserves to be between $751 billion and $1 trillion at the first Federal Reserve policy rate increase.

Source: Dealer Policy Survey

Appendix 2: Materials used by Mr. Wascher

Page 1

Top panel
Private Housing Construction

(Thousands of units, seasonally adjusted annual rate, except where noted)

Category	2008	2009			2009			
		Q1	Q2	Q3[r]	Sept.	Oct.[p]	Oct.[r]	Nov.[p]
Total								
Starts	906	528	540	587	586	529	527	574
Permits	905	531	529	573	575	552	551	584
Single-family								
Starts	622	358	425	498	508	476	472	482
Permits	576	361	406	460	452	451	449	473
Adjusted permits[1]	583	374	418	478	476	459	458	483
Permits backlog[2]	68	60	59	56	56	56	56	54
Multifamily								
Starts	284	170	115	89	78	53	55	92
Permits	330	170	123	113	123	101	102	111
Adjusted permits[1]	328	171	123	114	123	101	102	111
Permits backlog[2]	53	46	39	36	36	43	40	40
Regional starts[3]								
Northeast	121	56	63	66	66	56	55	64
Midwest	135	83	90	107	104	93	101	104
South	453	278	261	289	298	272	268	301
West	196	110	126	124	118	108	103	105

r revised Return to table

p preliminary Return to table

1. Adjusted permits equal permit issuance plus total starts outside of permit-issuing areas. Return to table

2. Number outstanding at end of period. Seasonally adjusted by staff. Excludes permits that have been cancelled, abandoned, expired, or revoked. Not at an annual rate. Return to table

3. Sum of single-family and multifamily starts. Return to table

Source: Census Bureau.

Bottom panel
Private Housing Starts and Permits

A line chart shows three series, "Single-family starts", "Single-family adjusted permits", and "Multifamily starts", in millions of units (seasonally adjusted annual rate). Adjusted permits equal permit issuance plus total starts outside of permit-issuing areas. The single-family adjusted permits curve begins at about 1.3 in January 1999, generally decreases to about 1.2 by mid-2000, increases to about 1.8 by mid-2005, decreases to about 0.35 by the end of 2008, and increases to end at about 0.5 in November 2009. The single-family starts curve follows the same general shape as the single-family adjusted permits curve. It fluctuates more widely between about 2002 and 2006, but remains within about 0.2 of the first curve, and ends at about 0.5 in November 2009.

Multifamily starts
(Seasonally adjusted annual rate)

Period	Millions of units
January 1999	0.40
February 1999	0.35
March 1999	0.37
April 1999	0.33
May 1999	0.30
June 1999	0.29
July 1999	0.35
August 1999	0.38
September 1999	0.35
October 1999	0.30
November 1999	0.33
December 1999	0.33
January 2000	0.37
February 2000	0.48
March 2000	0.29
April 2000	0.35
May 2000	0.35
June 2000	0.36
July 2000	0.32
August 2000	0.31
September 2000	0.31
October 2000	0.31
November 2000	0.34
December 2000	0.31
January 2001	0.33
February 2001	0.35
March 2001	0.37

Period	Millions of units
April 2001	0.34
May 2001	0.32
June 2001	0.33
July 2001	0.37
August 2001	0.28
September 2001	0.31
October 2001	0.30
November 2001	0.36
December 2001	0.28
January 2002	0.36
February 2002	0.33
March 2002	0.35
April 2002	0.32
May 2002	0.35
June 2002	0.35
July 2002	0.33
August 2002	0.38
September 2002	0.36
October 2002	0.30
November 2002	0.36
December 2002	0.35
January 2003	0.32
February 2003	0.33
March 2003	0.33
April 2003	0.27
May 2003	0.36
June 2003	0.35
July 2003	0.36
August 2003	0.35
September 2003	0.38
October 2003	0.34
November 2003	0.39
December 2003	0.39
January 2004	0.35
February 2004	0.37
March 2004	0.37
April 2004	0.36
May 2004	0.33
June 2004	0.30
July 2004	0.33

Period	Millions of units
August 2004	0.33
September 2004	0.35
October 2004	0.41
November 2004	0.32
December 2004	0.33
January 2005	0.41
February 2005	0.41
March 2005	0.28
April 2005	0.40
May 2005	0.31
June 2005	0.35
July 2005	0.33
August 2005	0.36
September 2005	0.36
October 2005	0.33
November 2005	0.34
December 2005	0.37
January 2006	0.45
February 2006	0.32
March 2006	0.37
April 2006	0.31
May 2006	0.37
June 2006	0.35
July 2006	0.31
August 2006	0.28
September 2006	0.34
October 2006	0.28
November 2006	0.28
December 2006	0.40
January 2007	0.28
February 2007	0.29
March 2007	0.29
April 2007	0.29
May 2007	0.29
June 2007	0.32
July 2007	0.31
August 2007	0.37
September 2007	0.25
October 2007	0.39
November 2007	0.36

Period	Millions of units
December 2007	0.23
January 2008	0.32
February 2008	0.38
March 2008	0.28
April 2008	0.33
May 2008	0.29
June 2008	0.42
July 2008	0.30
August 2008	0.24
September 2008	0.27
October 2008	0.23
November 2008	0.20
December 2008	0.16
January 2009	0.13
February 2009	0.22
March 2009	0.16
April 2009	0.09
May 2009	0.14
June 2009	0.11
July 2009	0.09
August 2009	0.10
September 2009	0.08
October 2009	0.06
November 2009	0.09

Source: Census Bureau.

Page 2
Recent Changes in Consumer Price Indexes

(Percent change)

Item	Weights[1]	12-month change[2]		3-month change		2009			
		Nov. 2008	Nov. 2009	Aug. 2009	Nov. 2009	Aug.	Sept.	Oct.	Nov.
				Annual rate		Monthly rate			
Total CPI	**100.0**	**1.1**	**1.8**	**4.9**	**3.4**	**.4**	**.2**	**.3**	**.4**
Food	14.6	6.0	-.7	-.5	.1	.1	-.1	.1	.1
Meats, poultry, fish, and eggs	1.9	5.5	-4.0	-4.0	-3.5	.4	-1.0	-.2	.3
Fruits and vegetables	1.2	5.7	-4.9	.5	-6.8	-.7	-1.2	-.7	.1
Other	11.5	6.2	.3	.0	1.4	.1	.2	.2	.0
Energy	7.6	-13.3	7.4	57.1	27.9	4.6	.6	1.5	4.1

Item	Weights[1]	12-month change[2]		3-month change		2009			
		Nov. 2008	Nov. 2009	Aug. 2009	Nov. 2009	Aug.	Sept.	Oct.	Nov.
Motor Fuel	3.2	-28.6	21.8	160.2	42.0	8.8	1.1	1.6	6.2
Heating oil	.3	-3.4	-7.7	20.9	74.4	3.9	1.1	6.0	7.3
Natural gas	1.2	7.5	-18.6	10.8	6.4	.4	-1.7	1.9	1.5
Electricity	3.0	8.1	.1	-10.2	11.1	-.1	.6	.6	1.4
CPI excluding food and energy	**77.7**	**2.0**	**1.7**	**1.4**	**1.5**	**.1**	**.2**	**.2**	**.0**
Goods ex. food and energy	21.5	-.2	2.6	1.0	3.8	-.3	.3	.4	.2
Nondurables ex. food and energy	11.0	2.1	3.3	3.2	.1	.0	.2	-.2	.0
Apparel	3.7	.0	1.0	4.8	-2.2	-.1	.1	-.4	-.3
Tobacco	.8	6.7	30.3	13.2	9.7	.1	1.0	.3	1.0
Other nondurables	6.5	2.9	1.5	.9	.1	.0	.1	-.1	.0
Durables	10.5	-2.6	1.8	-1.2	7.8	-.6	.4	1.1	.4
New vehicles	4.5	-2.9	4.9	-.7	11.2	-1.3	.4	1.6	.6
New cars		-.7	3.5	-.8	10.8	-1.2	.1	1.6	.9
New trucks		-4.9	6.4	2.0	9.2	-1.0	.3	1.6	.3
Used cars and trucks	1.6	-7.1	5.8	11.4	31.5	1.9	1.6	3.4	2.0
Computers	.2	-11.1	-12.3	-24.8	-2.5	-2.8	-.7	.3	-.2
Audio/Video Equipment	.6	-5.8	-9.0	-8.8	-11.0	-.5	-1.4	-1.7	.3
Other Durables	3.6	1.1	-1.2	-4.3	-2.2	-.7	.3	-.2	-.6
Services excluding energy	56.3	2.9	1.4	1.6	.7	.2	.1	.1	.0
Rent of shelter	32.9	2.2	.3	-.2	-.3	.1	.1	.0	-.2
Owners' equivalent rent	24.4	2.3	.8	.4	-1.1	.1	-.1	.0	-.1
Rent of primary residence	6.0	3.6	.9	.1	-.9	.0	-.1	-.1	-.1
Lodging away from home	2.5	-2.3	-6.1	-5.0	1.2	.5	1.5	.4	-1.5
Services ex. energy and shelter	23.4	3.9	2.9	3.9	2.9	.4	.3	.2	.2
Medical services	4.8	3.1	3.5	2.9	3.6	.2	.4	.2	.4
Tuition and other school fees	2.9	5.6	4.6	5.3	2.0	.5	.0	.3	.2
Air fares	.7	4.0	.6	13.5	42.1	1.7	3.4	1.7	3.8
Other services	15.0	3.8	2.5	3.6	1.3	.3	.2	.1	.0
Memo:									
Chained CPI	100.0	.6	1.6	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
All items less food and energy	77.6	1.5	1.3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

1. Relative importance weights for December 2008, which are based on 2005-2006 expenditure weights. For the chained CPI, the 2005 -2006 expenditure weights are shown. Return to table

2. Not seasonally adjusted. Return to table

Source: Bureau of Labor Statistics.

Consumer Price Index

(Percent change at annual rate)

Top panel
All items

Percent

	3-month change	12-month change
January 2000	2.89	2.79
February 2000	3.85	3.22
March 2000	5.32	3.76
April 2000	3.83	3.01
May 2000	2.85	3.13
June 2000	2.84	3.73
July 2000	4.28	3.60
August 2000	3.55	3.35
September 2000	3.29	3.46
October 2000	2.81	3.45
November 2000	3.52	3.44
December 2000	2.32	3.44
January 2001	3.97	3.72
February 2001	4.20	3.53
March 2001	3.48	2.98
April 2001	1.83	3.22
May 2001	2.99	3.56
June 2001	3.68	3.19
July 2001	2.29	2.72
August 2001	0.23	2.72
September 2001	0.90	2.59
October 2001	0.45	2.13
November 2001	0.23	1.89
December 2001	-1.56	1.60
January 2002	0.23	1.20
February 2002	1.13	1.14
March 2002	2.50	1.36
April 2002	3.65	1.64
May 2002	3.41	1.24
June 2002	2.49	1.07
July 2002	1.57	1.47

	3-month change	12-month change
August 2002	2.25	1.75
September 2002	2.70	1.52
October 2002	2.69	2.03
November 2002	2.23	2.25
December 2002	2.23	2.48
January 2003	3.13	2.76
February 2003	4.71	3.15
March 2003	4.70	3.03
April 2003	1.32	2.18
May 2003	-1.52	1.89
June 2003	-1.73	1.95
July 2003	1.10	2.06
August 2003	3.55	2.22
September 2003	4.44	2.38
October 2003	2.64	2.04
November 2003	1.09	1.93
December 2003	0.87	2.04
January 2004	3.06	2.03
February 2004	3.73	1.69
March 2004	3.50	1.74
April 2004	2.38	2.29
May 2004	3.25	2.90
June 2004	3.90	3.17
July 2004	3.68	2.94
August 2004	2.14	2.55
September 2004	1.92	2.54
October 2004	3.64	3.19
November 2004	5.39	3.62
December 2004	4.06	3.34
January 2005	2.11	2.95
February 2005	1.47	3.05
March 2005	2.95	3.21
April 2005	4.24	3.42
May 2005	2.31	2.82
June 2005	1.04	2.49
July 2005	1.87	2.96
August 2005	5.27	3.59
September 2005	10.96	4.69
October 2005	9.57	4.40
November 2005	4.99	3.50

	3-month change	12-month change
December 2005	-0.80	3.44
January 2006	0.40	3.96
February 2006	2.24	3.69
March 2006	3.06	3.47
April 2006	2.63	3.56
May 2006	3.66	4.03
June 2006	3.86	4.18
July 2006	4.05	4.11
August 2006	4.65	3.88
September 2006	2.20	2.06
October 2006	-1.57	1.36
November 2006	-2.53	1.97
December 2006	0.99	2.52
January 2007	3.36	2.09
February 2007	4.13	2.43
March 2007	4.09	2.78
April 2007	4.69	2.60
May 2007	4.63	2.67
June 2007	3.30	2.64
July 2007	2.78	2.29
August 2007	1.63	1.93
September 2007	2.65	2.75
October 2007	3.51	3.58
November 2007	7.22	4.38
December 2007	6.60	4.15
January 2008	6.59	4.38
February 2008	3.25	4.16
March 2008	3.70	4.05
April 2008	2.86	3.92
May 2008	4.17	4.05
June 2008	6.45	4.84
July 2008	8.91	5.44
August 2008	6.73	5.33
September 2008	3.06	4.94
October 2008	-3.11	3.71
November 2008	-9.37	0.99
December 2008	-12.37	-0.08
January 2009	-8.42	-0.15
February 2009	-0.48	0.07
March 2009	2.17	-0.45

	3-month change	12-month change
April 2009	0.94	-0.62
May 2009	-0.25	-1.01
June 2009	3.32	-1.19
July 2009	3.42	-1.89
August 2009	4.88	-1.44
September 2009	2.51	-1.32
October 2009	3.62	-0.23
November 2009	3.43	1.87

Source: Bureau of Labor Statistics.

Middle panel
Excluding food and energy

Percent

	3-month change	12-month change
January 2000	2.72	2.11
February 2000	2.26	2.16
March 2000	2.94	2.45
April 2000	2.25	2.27
May 2000	2.93	2.38
June 2000	2.47	2.55
July 2000	2.69	2.48
August 2000	2.68	2.59
September 2000	2.68	2.53
October 2000	2.45	2.53
November 2000	2.67	2.63
December 2000	2.21	2.57
January 2001	2.88	2.57
February 2001	2.87	2.79
March 2001	3.09	2.61
April 2001	2.64	2.66
May 2001	1.97	2.55
June 2001	2.85	2.71
July 2001	2.84	2.70
August 2001	3.06	2.64
September 2001	2.39	2.63
October 2001	2.16	2.63
November 2001	3.03	2.73
December 2001	2.81	2.78
January 2002	2.80	2.61
February 2002	2.14	2.55

	3-month change	12-month change
March 2002	1.71	2.44
April 2002	2.14	2.49
May 2002	1.92	2.54
June 2002	2.13	2.26
July 2002	1.70	2.20
August 2002	2.34	2.36
September 2002	2.33	2.24
October 2002	2.12	2.19
November 2002	1.69	2.02
December 2002	1.68	1.96
January 2003	1.89	1.96
February 2003	1.26	1.80
March 2003	0.84	1.74
April 2003	0.21	1.48
May 2003	0.83	1.53
June 2003	1.04	1.47
July 2003	1.88	1.52
August 2003	1.46	1.31
September 2003	1.46	1.25
October 2003	1.25	1.31
November 2003	0.83	1.09
December 2003	1.04	1.09
January 2004	1.24	1.14
February 2004	1.87	1.25
March 2004	2.70	1.56
April 2004	2.70	1.77
May 2004	2.69	1.71
June 2004	2.27	1.87
July 2004	1.85	1.76
August 2004	1.43	1.70
September 2004	1.84	1.96
October 2004	2.25	2.01
November 2004	2.87	2.22
December 2004	2.25	2.27
January 2005	2.24	2.26
February 2005	2.24	2.31
March 2005	3.06	2.35
April 2005	2.64	2.25
May 2005	2.22	2.19
June 2005	1.00	2.03

	3-month change	12-month change
July 2005	1.20	2.08
August 2005	1.20	2.13
September 2005	1.40	1.92
October 2005	2.21	2.07
November 2005	2.81	2.12
December 2005	3.22	2.17
January 2006	2.40	2.11
February 2006	2.19	2.11
March 2006	2.79	2.10
April 2006	3.39	2.30
May 2006	3.58	2.44
June 2006	3.37	2.69
July 2006	2.76	2.69
August 2006	2.75	2.83
September 2006	2.35	2.93
October 2006	2.54	2.77
November 2006	1.95	2.62
December 2006	1.75	2.56
January 2007	1.92	2.65
February 2007	2.51	2.70
March 2007	2.32	2.45
April 2007	2.20	2.36
May 2007	1.89	2.27
June 2007	2.30	2.18
July 2007	2.19	2.21
August 2007	2.09	2.11
September 2007	2.10	2.12
October 2007	2.30	2.15
November 2007	2.84	2.33
December 2007	3.02	2.43
January 2008	3.14	2.46
February 2008	2.31	2.28
March 2008	2.05	2.37
April 2008	1.47	2.27
May 2008	2.06	2.32
June 2008	2.49	2.41
July 2008	3.14	2.51
August 2008	2.98	2.55
September 2008	2.26	2.46
October 2008	1.11	2.21

	3-month change	12-month change
November 2008	0.62	1.99
December 2008	0.18	1.74
January 2009	0.94	1.66
February 2009	1.49	1.78
March 2009	2.16	1.77
April 2009	2.47	1.91
May 2009	2.30	1.84
June 2009	2.41	1.75
July 2009	1.75	1.56
August 2009	1.44	1.46
September 2009	1.30	1.51
October 2009	1.67	1.70
November 2009	1.53	1.69

Source: Bureau of Labor Statistics.

Bottom panel
Excluding food and energy

Percent

	Published 12-month change	Chain CPI 12-month change
January 2000	2.11	ND
February 2000	2.16	ND
March 2000	2.45	ND
April 2000	2.27	ND
May 2000	2.38	ND
June 2000	2.55	ND
July 2000	2.48	ND
August 2000	2.59	ND
September 2000	2.53	ND
October 2000	2.53	ND
November 2000	2.63	ND
December 2000	2.57	1.90
January 2001	2.57	1.89
February 2001	2.79	1.99
March 2001	2.61	1.98
April 2001	2.66	1.88
May 2001	2.55	1.88
June 2001	2.71	2.17
July 2001	2.70	2.07
August 2001	2.64	2.17
September 2001	2.63	1.96

	Published 12-month change	Chain CPI 12-month change
October 2001	2.63	1.96
November 2001	2.73	2.05
December 2001	2.78	2.16
January 2002	2.61	2.05
February 2002	2.55	2.04
March 2002	2.44	1.94
April 2002	2.49	2.03
May 2002	2.54	2.13
June 2002	2.26	1.64
July 2002	2.20	1.74
August 2002	2.36	1.73
September 2002	2.24	1.92
October 2002	2.19	1.82
November 2002	2.02	1.63
December 2002	1.96	1.63
January 2003	1.96	1.63
February 2003	1.80	1.34
March 2003	1.74	1.24
April 2003	1.48	1.14
May 2003	1.53	1.14
June 2003	1.47	1.24
July 2003	1.52	1.14
August 2003	1.31	1.04
September 2003	1.25	0.85
October 2003	1.31	0.94
November 2003	1.09	0.85
December 2003	1.09	0.76
January 2004	1.14	0.94
February 2004	1.25	1.22
March 2004	1.56	1.50
April 2004	1.77	1.69
May 2004	1.71	1.69
June 2004	1.87	1.69
July 2004	1.76	1.69
August 2004	1.70	1.59
September 2004	1.96	1.87
October 2004	2.01	1.96
November 2004	2.22	2.15
December 2004	2.27	2.25
January 2005	2.26	2.15

	Published 12-month change	Chain CPI 12-month change
February 2005	2.31	2.14
March 2005	2.35	1.94
April 2005	2.25	1.94
May 2005	2.19	1.85
June 2005	2.03	1.85
July 2005	2.08	1.75
August 2005	2.13	1.85
September 2005	1.92	1.75
October 2005	2.07	1.74
November 2005	2.12	1.74
December 2005	2.17	1.83
January 2006	2.11	1.74
February 2006	2.11	1.82
March 2006	2.10	2.00
April 2006	2.30	2.08
May 2006	2.44	2.18
June 2006	2.69	2.45
July 2006	2.69	2.54
August 2006	2.83	2.63
September 2006	2.93	2.62
October 2006	2.77	2.43
November 2006	2.62	2.25
December 2006	2.56	2.16
January 2007	2.65	2.30
February 2007	2.70	2.21
March 2007	2.45	1.98
April 2007	2.36	1.89
May 2007	2.27	1.84
June 2007	2.18	1.67
July 2007	2.21	1.67
August 2007	2.11	1.64
September 2007	2.12	1.64
October 2007	2.15	1.77
November 2007	2.33	1.94
December 2007	2.43	1.96
January 2008	2.46	2.00
February 2008	2.28	1.87
March 2008	2.37	2.02
April 2008	2.27	1.91
May 2008	2.32	1.99

	Published 12-month change	Chain CPI 12-month change
June 2008	2.41	2.09
July 2008	2.51	2.15
August 2008	2.55	2.09
September 2008	2.46	2.02
October 2008	2.21	1.78
November 2008	1.99	1.51
December 2008	1.74	1.33
January 2009	1.66	1.23
February 2009	1.78	1.33
March 2009	1.77	1.30
April 2009	1.91	1.42
May 2009	1.84	1.36
June 2009	1.75	1.31
July 2009	1.56	1.12
August 2009	1.46	1.01
September 2009	1.51	1.07
October 2009	1.70	1.28
November 2009	1.69	1.33

Source: Bureau of Labor Statistics.

Appendix 3: Materials used by Mr. Madigan

Material for Briefing on **Monetary Policy Alternatives**
Brian Madigan
December 15-16, 2009

Class I FOMC - Restricted Controlled (FR)

November FOMC Statement

Information received since the Federal Open Market Committee met in September suggests that economic activity has continued to pick up. Conditions in financial markets were roughly unchanged, on balance, over the intermeeting period. Activity in the housing sector has increased over recent months. Household spending appears to be expanding but remains constrained by ongoing job losses, sluggish income growth, lower housing wealth, and tight credit. Businesses are still cutting back on fixed investment and staffing, though at a slower pace; they continue to make progress in bringing inventory stocks into better alignment with sales. Although economic activity is likely to remain weak for a time, the Committee anticipates that policy actions to stabilize financial markets and institutions, fiscal and monetary stimulus, and market forces will support a strengthening of economic growth and a gradual return to higher levels of resource utilization in a context of price stability.

With substantial resource slack likely to continue to dampen cost pressures and with longerterm inflation expectations stable, the Committee expects that inflation will remain subdued for some time.

In these circumstances, the Federal Reserve will continue to employ a wide range of tools to promote economic recovery and to preserve price stability. The Committee will maintain the target range for the federal funds rate at 0

to ¼ percent and continues to anticipate that economic conditions, including low rates of resource utilization, subdued inflation trends, and stable inflation expectations, are likely to warrant exceptionally low levels of the federal funds rate for an extended period. To provide support to mortgage lending and housing markets and to improve overall conditions in private credit markets, the Federal Reserve will purchase a total of $1.25 trillion of agency mortgage-backed securities and about $175 billion of agency debt. The amount of agency debt purchases, while somewhat less than the previously announced maximum of $200 billion, is consistent with the recent path of purchases and reflects the limited availability of agency debt. In order to promote a smooth transition in markets, the Committee will gradually slow the pace of its purchases of both agency debt and agency mortgage-backed securities and anticipates that these transactions will be executed by the end of the first quarter of 2010. The Committee will continue to evaluate the timing and overall amounts of its purchases of securities in light of the evolving economic outlook and conditions in financial markets. The Federal Reserve is monitoring the size and composition of its balance sheet and will make adjustments to its credit and liquidity programs as warranted.

[Note: In the December FOMC Statement Alternatives, strong emphasis (bold) indicates bold underlined red text in the original document.]

December FOMC Statement--Alternative A

Information received since the Federal Open Market Committee met in **November** suggests that economic activity has continued to pick up **and that the deterioration in the labor market is abating**. The housing sector has **shown some signs of improvement** over recent months**, boosted in part by government incentives for first-time homebuyers**. Household spending appears to be expanding but remains constrained by **the weak labor market, modest** income growth, lower housing wealth, and tight credit. **Business spending is being dampened by firms' efforts to reduce inventories to bring them**into better alignment with sales **and by cutbacks in fixed investment**. **Partly reflecting these factors, the Committee anticipates that the economic recovery will be sluggish and that slack in resource utilization will diminish quite slowly absent further policy action.**

Inflation has fallen considerably over the past year. With substantial resource slack likely to continue to dampen cost pressures and with longer-term inflation expectations stable, the Committee expects that inflation will remain subdued for some time.

To promote a stronger economic recovery and higher resource utilization, the Committee will provide additional monetary stimulus by increasing its purchases of agency mortgage-backed securities to a total of $1.5 trillion, up from the previously announced amount of $1.25 trillion; the Committee anticipates that these purchases will be executed by the end of the second quarter of 2010. The Committee is also in the process of purchasing $175 billion of agency debt**; it** anticipates that these purchases will be **completed** by the end of the first quarter of 2010. The Committee will continue to evaluate the timing and overall amounts of its purchases of securities in light of the evolving economic outlook and conditions in financial markets. The Committee will maintain the target range for the federal funds rate at 0 to ¼ percent and continues to anticipate that low rates of resource utilization, subdued inflation trends, and stable inflation expectations are likely to warrant **this** exceptionally low **range for** the federal funds rate for an extended period. The Federal Reserve will continue to employ a wide range of tools to promote economic recovery and to preserve price stability. The Federal Reserve is monitoring the size and composition of its balance sheet and will make adjustments to its credit and liquidity programs as warranted.

December FOMC Statement--Alternative B

Information received since the Federal Open Market Committee met in **November** suggests that economic activity has continued to pick up **and that the deterioration in the labor market is abating**. The housing sector has **shown some signs of improvement** over recent months. Household spending appears to be expanding **at a moderate rate, though it** remains constrained by **a weak labor market, modest** income growth, lower housing wealth, and tight credit. Businesses are still cutting back on fixed investment, though at a slower pace; they continue to make progress in bringing inventory stocks into better alignment with sales. **Financial market conditions have become more supportive of economic growth.** Although economic activity is likely to remain weak for a time, the Committee anticipates that policy actions to stabilize financial markets and institutions, fiscal and monetary stimulus, and market forces will **contribute to** a strengthening of economic growth and a gradual return to higher levels of resource utilization in a context of price stability.

With substantial resource slack likely to continue to dampen cost pressures and with longerterm inflation expectations stable, the Committee expects that inflation will remain subdued for some time.

The Committee will maintain the target range for the federal funds rate at 0 to ¼ percent and continues to anticipate that economic conditions, including low rates of resource utilization, subdued inflation trends, and stable inflation expectations, are likely to warrant exceptionally low levels of the federal funds rate for an extended period. To provide support to mortgage lending and housing markets and to improve overall conditions in private credit markets, the Federal Reserve **is in the process of purchasing** $1.25 trillion of agency mortgage-backed securities and about $175 billion of agency debt. In order to promote a smooth transition in markets, the Committee **is** gradually **slowing** the pace of**these** purchases, and **it** anticipates that these transactions will be executed by the end of the first quarter of 2010. The Committee will continue to evaluate the timing and overall amounts of its purchases of securities in light of the evolving economic outlook and conditions in financial markets.

In light of ongoing improvements in the functioning of financial markets, the Committee and the Board of Governors anticipate that most of the Federal Reserve's special liquidity facilities will expire on February 1, 2010, consistent with the Federal Reserve's announcement of June 25, 2009. These facilities include the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility, the Commercial Paper Funding Facility, the Primary Dealer Credit Facility, and the Term Securities Lending Facility. The Federal Reserve will also be working with its central bank counterparties to close its temporary liquidity swap arrangements by February 1. The Federal Reserve expects that amounts provided under the Term Auction Facility will continue to be scaled back in early 2010. The anticipated expiration dates for the Term Asset-Backed Securities Loan Facility remain set at June 30, 2010, for loans backed by new-issue commercial mortgage-backed securities and March 31, 2010, for loans backed by all other types of collateral. The Federal Reserve is prepared to modify these plans if necessary to support financial stability and economic growth.

December FOMC Statement--Alternative C

Information received since the Federal Open Market Committee met in **November indicates** that **a recovery in** economic activity **is under way**. The housing sector has**shown some signs of improvement** over recent months. **The deterioration in the labor market appears to be abating and** household spending **is** expanding. Businesses **have made additional** progress in bringing inventory stocks into better alignment with sales.**Financial market conditions have become more supportive of economic growth.**Although economic activity is likely to remain weak for a time, the Committee anticipates that policy actions to stabilize financial markets and institutions, fiscal and monetary stimulus, and market forces will **contribute to** a strengthening of economic growth and a gradual return to higher levels of resource utilization in a context of price stability.

Longer term inflation expectations **have been** stable**, and** the Committee expects that**, with appropriate monetary policy adjustments,** inflation will remain **at levels consistent with price stability**.

At this meeting, the Committee **maintained** the target range for the federal funds rate at**its** exceptionally low level of 0 to ¼ percent, and **it** anticipates that economic conditions, including low rates of resource utilization, subdued inflation trends, and stable inflation expectations, are likely to warrant low levels of the federal funds rate for **some time**. **In view of continued improvements in financial market conditions and the economic outlook, the Committee decided to cap its purchases of agency mortgage-backed securities at $1.1 trillion and its purchases of agency debt at $160 billion, and it**anticipates that these transactions will be executed by the end of **January 2010**. The Committee will continue to evaluate the timing and overall amounts of its purchases of securities in light of the evolving economic outlook and conditions in financial markets.

In light of ongoing improvements in the functioning of financial markets, the Committee and the Board of Governors anticipate that most of the Federal Reserve's special liquidity facilities will expire on February 1, 2010, consistent with the Federal Reserve's announcement of June 25, 2009. These facilities include the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility, the Commercial Paper Funding Facility, the Primary Dealer Credit Facility, and the Term Securities Lending Facility. The Federal Reserve will also be working with its central bank counterparties to close its temporary liquidity swap arrangements by February 1. The Federal Reserve expects that amounts provided under the Term Auction Facility will continue to be scaled back in early 2010. The anticipated expiration dates for the Term Asset-Backed Securities Loan Facility remain set at June 30, 2010, for loans backed by new-issue commercial mortgage-backed securities and March 31, 2010, for loans backed by all other types of

collateral. The Federal Reserve is prepared to modify these plans if necessary to support financial stability and economic growth.

Table 1: Overview of Alternative Language for the December 15-16, 2009 FOMC Announcement

	November FOMC	December Alternatives		
		A	B	C
Forward Guidance on Funds Rate Path				
	"exceptionally low levels of the federal funds rate for an extended period"	"this exceptionally low range for the federal funds rate for an extended period"	"exceptionally low levels of the federal funds rate for an extended period"	"low levels of the federal funds rate for some time"
Agency MBS Purchases				
Total Amount	"a total of" $1.25 trillion	"a total of" $1.5 trillion	$1.25 trillion	"cap" at $1.1 trillion
Pace	pace will "gradually slow"		"is gradually slowing"	
Completion	by the end of the first quarter of 2010	through the second quarter of 2010	by the end of the first quarter of 2010	by the end of January 2010
Agency Debt Purchases				
Total Amount	"about" $175 billion	$175 billion	"about" $175 billion	"cap" at $160 billion
Pace	pace will "gradually slow"		"is gradually slowing"	
Completion	by the end of the first quarter of 2010	by the first quarter of 2010	by the end of the first quarter of 2010	by the end of January 2010
Evaluation of LSAP Timing and Overall Amounts				
	timing and amounts of all LSAPs will continue to be evaluated	timing and amounts of all LSAPs will continue to be evaluated		
Liquidity Facilities				
	adjustments as warranted	adjustments as warranted	expire on February 1	

DIRECTIVES

NOVEMBER FOMC MEETING

The Federal Open Market Committee seeks monetary and financial conditions that will foster price stability and promote sustainable growth in output. To further its long-run objectives, the Committee seeks conditions in reserve markets consistent with federal funds trading in a range from 0 to 1/4 percent. The Committee directs the Desk to purchase agency debt and agency MBS during the intermeeting period with the aim of providing support to private credit markets and economic activity. The timing and pace of these purchases should depend on conditions in the markets for such securities and on a broader assessment of private credit market conditions. The Desk is expected to execute purchases of about $175 billion in housing-related agency debt and about $1.25 trillion of agency MBS by the end of the first quarter of 2010. The Desk is expected to gradually slow the pace of these purchases as they near completion. The Committee anticipates that outright purchases of securities will cause the size of the Federal Reserve's balance sheet to expand significantly in coming months. The System Open Market Account Manager and the Secretary will keep the Committee informed of ongoing developments regarding the System's balance sheet that could affect the attainment over time of the Committee's objectives of maximum employment and price stability.

DECEMBER FOMC MEETING -- ALTERNATIVE A

The Federal Open Market Committee seeks monetary and financial conditions that will foster price stability and promote sustainable growth in output. To further its long-run objectives, the Committee seeks conditions in reserve markets consistent with federal funds trading in a range from 0 to ¼ percent. The Committee directs the Desk to purchase agency debt and agency MBS during the intermeeting period with the aim of providing support to private credit markets and economic activity. The timing and pace of these purchases should depend on conditions in the markets for such securities and on a broader assessment of private credit market conditions. The Desk is expected to execute purchases of up to $175 billion in housing-related agency debt by the end of the first quarter of 2010 and about $1.5 trillion of agency MBS by the end of the second quarter of 2010. The Desk is expected to gradually slow the pace of these purchases as they near completion. The Committee anticipates that outright purchases of securities will cause the size of the Federal Reserve's balance sheet to expand significantly in coming months. The System Open Market Account Manager and the Secretary will keep the Committee informed of ongoing developments regarding the System's balance sheet that could affect the attainment over time of the Committee's objectives of maximum employment and price stability.

DECEMBER FOMC MEETING -- ALTERNATIVE B

The Federal Open Market Committee seeks monetary and financial conditions that will foster price stability and promote sustainable growth in output. To further its long-run objectives, the Committee seeks conditions in reserve markets consistent with federal funds trading in a range from 0 to ¼ percent. The Committee directs the Desk to purchase agency debt and agency MBS during the intermeeting period with the aim of providing support to private credit markets and economic activity. The timing and pace of these purchases should depend on conditions in the markets for such securities and on a broader assessment of private credit market conditions. The Desk is expected to execute purchases of about $175 billion in housing-related agency debt and about $1.25 trillion of agency MBS by the end of the first quarter of 2010. The Desk is expected to gradually slow the pace of these purchases as they near completion. The Committee anticipates that outright purchases of securities will cause the size of the Federal Reserve's balance sheet to expand significantly in coming months. The System Open Market Account Manager and the Secretary will keep the Committee informed of ongoing developments regarding the System's balance sheet that could affect the attainment over time of the Committee's objectives of maximum employment and price stability.

DECEMBER FOMC MEETING -- ALTERNATIVE C

The Federal Open Market Committee seeks monetary and financial conditions that will foster price stability and promote sustainable growth in output. To further its long-run objectives, the Committee seeks conditions in reserve markets consistent with federal funds trading in a range from 0 to ¼ percent. The Committee directs the Desk to purchase agency debt and agency MBS during the intermeeting period with the aim of providing support to private credit markets and economic activity. The timing and pace of these purchases should depend on conditions in the markets for such securities and on a broader assessment of private credit market conditions. The Desk is expected to execute purchases of about $160 billion in housing-related agency debt and about $1.1 trillion of agency MBS by the end of January 2010. The Desk is expected to slow the pace of these purchases as they near completion. The System Open Market Account Manager and the Secretary will keep the Committee informed of ongoing developments regarding the System's balance sheet that could affect the attainment over time of the Committee's objectives of maximum employment and price stability.

Appendix 4: Materials used by Mr. Dotsey

Page 1

Material for Briefing on **Inflation Persistence, Output Gaps and Monetary Policy**
Michael Dotsey
December 16, 2009

Class II FOMC - Restricted (FR)

Page 2
Overview

- Inflation Persistence and output gaps are linked through the Phillips Curve.
- Three main points.
  -- Inflation persistence is largely an outcome of monetary policy and not structural features.
  -- Statistically derived output gaps are not useful.
  -- Theoretical measures of output gaps may be useful in principle but not in practice.

Page 3
Inflation Persistence

- Reduced-form Phillips Curve.

$$ \ln{\pi_t} = \alpha \ln{\pi_{t-1}} + (1-\alpha)\ln{\pi^*_t} + \kappa mc_t + \lambda e_t $$

Π is the gross inflation rate,
π^* is the inflation trend,
mc is marginal cost,
and **e** is a mark-up shock.

- Modeling trend inflation is of key importance.
  -- If trend is stochastic our model implies structural rigidities are less important in explaining inflation persistence.

Page 4
Policy Implication

- Inflation trend is a result of past policy.
  -- Controlling inflation may not be too costly, especially if inflationary expectations are well anchored.

Page 5
Output Gaps

- Gap = output - desired output.
- Desired output can be calculated either.
  -- Statistically (deviation from a trend), or
  -- From an estimated theoretical model.
- Model-based measures are potentially a useful guide for conducting monetary policy.
- Statistical and model-based measures may differ (figure 1).

Page 6
Figure 1. Impulse Response to a Productivity Shock

percent

Quarter	GDP	Efficient	Gap
1	0.5958	0.9254	-0.3297
2	0.6437	0.9709	-0.3272
3	0.5399	0.7921	-0.2523
4	0.4147	0.5935	-0.1788
5	0.3065	0.4288	-0.1223
6	0.2223	0.3046	-0.0824
7	0.1596	0.2147	-0.0550
8	0.1141	0.1507	-0.0366
9	0.0813	0.1056	-0.0242
10	0.0579	0.0739	-0.0160
11	0.0412	0.0517	-0.0105
12	0.0293	0.0361	-0.0069
13	0.0208	0.0253	-0.0045
14	0.0148	0.0177	-0.0029
15	0.0105	0.0123	-0.0018
16	0.0075	0.0086	-0.0012
17	0.0053	0.0060	-0.0007
18	0.0038	0.0042	-0.0004
19	0.0027	0.0029	-0.0003
20	0.0019	0.0021	-0.0002
21	0.0014	0.0014	-0.0001
22	0.0010	0.0010	0.0000
23	0.0007	0.0007	0.0000
24	0.0005	0.0005	0.0000

Page 7
Theoretical Gaps

- Not quite ready for use in policy because:
  -- In complex models the output gap is no longer sufficient statistic for welfare.
  -- Models are still preliminary
  -- Different models produce very different output gaps (figure 2).

Page 8
Figure 2. Model-Based Output Gaps

percent

Quarter	Richmond	Philadelphia	EDO Natural Rate	EDO Efficient
1954:Q1	-1.26	ND	ND	ND
1954:Q2	-2.07	ND	ND	ND

Quarter	Richmond	Philadelphia	EDO Natural Rate	EDO Efficient
1954:Q3	-2.30	ND	ND	ND
1954:Q4	-2.48	0.00	ND	ND
1955:Q1	-0.10	-0.75	ND	ND
1955:Q2	1.06	-0.41	ND	ND
1955:Q3	2.33	-0.33	ND	ND
1955:Q4	2.87	0.21	ND	ND
1956:Q1	3.14	0.73	ND	ND
1956:Q2	3.26	1.11	ND	ND
1956:Q3	2.94	1.19	ND	ND
1956:Q4	2.43	1.48	ND	ND
1957:Q1	2.52	1.21	ND	ND
1957:Q2	2.04	0.95	ND	ND
1957:Q3	1.69	0.94	ND	ND
1957:Q4	1.07	0.48	ND	ND
1958:Q1	-1.22	-0.24	ND	ND
1958:Q2	-3.10	-0.81	ND	ND
1958:Q3	-3.55	-1.09	ND	ND
1958:Q4	-3.23	-1.43	ND	ND
1959:Q1	-1.66	-1.12	ND	ND
1959:Q2	0.18	-0.84	ND	ND
1959:Q3	0.91	-0.71	ND	ND
1959:Q4	1.35	-0.48	ND	ND
1960:Q1	2.07	-0.30	ND	ND
1960:Q2	1.91	-0.13	ND	ND
1960:Q3	1.31	-0.65	ND	ND
1960:Q4	0.16	-0.68	ND	ND
1961:Q1	-1.05	-0.96	ND	ND
1961:Q2	-1.40	-1.07	ND	ND
1961:Q3	-1.64	-1.54	ND	ND
1961:Q4	-0.64	-1.44	ND	ND
1962:Q1	-0.59	-1.30	ND	ND
1962:Q2	-0.41	-1.25	ND	ND
1962:Q3	-0.38	-1.41	ND	ND
1962:Q4	-1.74	-1.38	ND	ND
1963:Q1	-2.62	-1.81	ND	ND
1963:Q2	-1.75	-1.97	ND	ND
1963:Q4	-0.82	-2.06	ND	ND
1964:Q1	-0.12	-2.07	ND	ND
1964:Q2	0.23	-1.43	ND	ND
1964:Q3	-0.53	-1.14	ND	ND

Quarter	Richmond	Philadelphia	EDO Natural Rate	EDO Efficient
1964:Q4	-0.47	-1.08	ND	ND
1965:Q1	0.58	-1.30	ND	ND
1965:Q2	0.44	-0.90	ND	ND
1965:Q3	0.36	-0.45	ND	ND
1965:Q4	0.03	0.15	ND	ND
1966:Q1	1.03	0.20	ND	ND
1966:Q2	2.06	0.66	ND	ND
1966:Q3	2.30	1.07	ND	ND
1966:Q4	2.10	1.08	ND	ND
1967:Q1	1.58	0.91	ND	ND
1967:Q2	0.44	0.89	ND	ND
1967:Q3	-0.13	0.78	ND	ND
1967:Q4	-0.56	0.73	ND	ND
1968:Q1	-0.48	1.16	ND	ND
1968:Q2	-0.10	1.00	ND	ND
1968:Q3	0.45	1.32	ND	ND
1968:Q4	0.47	1.25	ND	ND
1969:Q1	1.31	1.14	ND	ND
1969:Q2	1.65	1.43	ND	ND
1969:Q3	1.96	1.88	ND	ND
1969:Q4	1.38	2.24	ND	ND
1970:Q1	1.50	2.28	ND	ND
1970:Q2	0.25	1.70	ND	ND
1970:Q3	-0.39	1.25	ND	ND
1970:Q4	-1.10	0.62	ND	ND
1971:Q1	-1.18	0.09	ND	ND
1971:Q2	-1.85	-0.29	ND	ND
1971:Q3	-2.15	-0.64	ND	ND
1971:Q4	-1.75	-0.68	ND	ND
1972:Q1	-1.04	-0.41	ND	ND
1972:Q2	-0.79	-0.44	ND	ND
1972:Q3	-0.34	-0.47	ND	ND
1972:Q4	0.27	0.00	ND	ND
1973:Q1	1.65	0.12	ND	ND
1973:Q2	2.48	-0.12	ND	ND
1973:Q3	2.67	0.09	ND	ND
1973:Q4	2.76	0.26	ND	ND
1974:Q2	2.33	0.51	ND	ND
1974:Q3	1.89	0.45	ND	ND
1974:Q4	0.17	-0.16	ND	ND

Quarter	Richmond	Philadelphia	EDO Natural Rate	EDO Efficient
1975:Q1	-2.46	-0.69	ND	ND
1975:Q2	-4.04	-1.62	ND	ND
1975:Q3	-4.08	-2.48	ND	ND
1975:Q4	-3.92	-2.80	ND	ND
1976:Q1	-1.85	-2.51	ND	ND
1976:Q2	-2.13	-2.36	ND	ND
1976:Q3	-2.28	-2.20	ND	ND
1976:Q4	-2.50	-2.09	ND	ND
1977:Q1	-1.96	-2.14	ND	ND
1977:Q2	-0.66	-2.13	ND	ND
1977:Q3	-0.38	-1.89	ND	ND
1977:Q4	0.16	-1.33	ND	ND
1978:Q1	0.51	-0.70	ND	ND
1978:Q2	1.55	-0.86	ND	ND
1978:Q3	1.49	-0.56	ND	ND
1978:Q4	2.38	-0.35	ND	ND
1979:Q1	2.21	0.21	ND	ND
1979:Q2	2.48	0.24	ND	ND
1979:Q3	2.43	0.48	ND	ND
1979:Q4	2.49	0.79	ND	ND
1980:Q1	1.89	0.85	ND	ND
1980:Q2	1.02	0.65	ND	ND
1980:Q3	0.48	0.48	ND	ND
1980:Q4	0.76	0.21	ND	ND
1981:Q1	1.32	-0.37	ND	ND
1981:Q2	0.88	-0.64	ND	ND
1981:Q3	0.46	-1.15	ND	ND
1981:Q4	0.03	-1.18	ND	ND
1982:Q1	-1.13	-0.91	ND	ND
1982:Q2	-1.28	-1.76	ND	ND
1982:Q3	-2.06	-1.60	ND	ND
1982:Q4	-3.67	-1.61	ND	ND
1983:Q1	-4.06	-2.03	ND	ND
1983:Q2	-2.65	-2.21	ND	ND
1983:Q3	-2.25	-2.23	ND	ND
1983:Q4	-1.24	-1.95	ND	ND
1984:Q1	-0.46	-1.54	ND	ND
1984:Q2	0.26	-1.09	ND	ND
1984:Q4	0.52	-0.42	ND	ND
1985:Q1	0.60	-0.01	-0.15	-0.48

Quarter	Richmond	Philadelphia	EDO Natural Rate	EDO Efficient
1985:Q2	0.02	0.20	-0.48	-0.52
1985:Q3	0.24	0.47	-0.56	-0.43
1985:Q4	0.77	0.73	-0.55	-0.06
1986:Q1	0.55	0.65	-0.82	0.01
1986:Q2	-0.98	0.30	-1.27	-0.23
1986:Q3	-0.96	0.18	-1.69	-0.31
1986:Q4	-1.54	0.51	-1.29	-0.03
1987:Q1	-1.57	0.81	-0.48	0.67
1987:Q2	-0.86	1.10	-0.03	1.11
1987:Q3	-0.70	1.31	-0.04	1.33
1987:Q4	-0.15	1.63	0.22	1.95
1988:Q1	0.17	2.11	0.61	1.84
1988:Q2	1.20	2.19	1.23	2.40
1988:Q3	1.38	2.54	1.97	2.69
1988:Q4	1.92	2.57	2.54	3.20
1989:Q1	2.45	2.46	2.83	3.69
1989:Q2	2.65	2.43	2.57	3.52
1989:Q3	2.44	2.53	2.71	3.39
1989:Q4	2.23	3.06	3.20	3.27
1990:Q1	2.28	2.98	2.79	3.14
1990:Q2	1.87	3.23	2.92	2.63
1990:Q3	1.45	3.19	2.66	1.90
1990:Q4	0.67	2.63	1.36	0.64
1991:Q1	-0.32	2.20	0.56	-0.31
1991:Q2	-1.22	2.02	0.20	-0.85
1991:Q3	-1.51	1.57	-0.70	-1.17
1991:Q4	-1.93	1.35	-1.66	-1.59
1992:Q1	-2.47	1.85	-1.74	-2.18
1992:Q2	-2.41	1.41	-2.25	-2.23
1992:Q3	-2.52	1.26	-2.46	-2.44
1992:Q4	-2.07	0.97	-2.29	-2.29
1993:Q1	-2.02	0.75	-2.43	-2.06
1993:Q2	-1.29	0.87	-2.15	-1.62
1993:Q3	-1.29	1.28	-1.63	-1.40
1993:Q4	-0.87	1.20	-1.50	-0.89
1994:Q1	-0.94	1.65	-1.28	-0.45
1994:Q2	-0.39	1.46	-0.97	0.29
1994:Q3	0.18	1.66	-0.70	0.47
1994:Q4	0.23	1.97	-0.55	0.88
1995:Q1	0.40	2.39	-0.62	0.86

Quarter	Richmond	Philadelphia	EDO Natural Rate	EDO Efficient
1995:Q2	0.01	2.73	-0.51	0.60
1995:Q3	0.00	2.70	-0.55	0.59
1995:Q4	-0.59	2.85	-0.74	0.57
1996:Q1	-1.16	3.00	-0.85	0.33
1996:Q2	-0.88	3.05	-0.91	0.51
1996:Q3	-0.77	3.03	-1.03	0.69
1996:Q4	-0.37	3.08	-1.00	0.80
1997:Q1	0.30	3.35	-0.76	1.18
1997:Q2	0.49	3.54	-0.90	1.36
1997:Q3	0.56	3.98	-0.50	1.57
1997:Q4	0.59	4.52	-0.40	1.61
1998:Q1	0.36	4.97	-0.14	1.84
1998:Q2	0.38	5.31	0.12	1.79
1998:Q3	0.22	5.46	0.31	1.83
1998:Q4	1.04	5.24	0.39	2.18
1999:Q1	1.07	5.74	0.70	2.27
1999:Q2	1.40	5.64	1.02	2.33
1999:Q3	1.53	5.75	1.44	2.55
1999:Q4	1.83	6.36	2.17	2.76
2000:Q1	1.86	6.91	2.37	2.73
2000:Q2	1.80	6.19	3.01	2.93
2000:Q3	1.96	6.45	3.03	2.63
2000:Q4	1.76	6.07	3.04	2.26
2001:Q1	1.66	6.30	2.31	1.44
2001:Q2	1.33	5.49	1.69	0.73
2001:Q3	0.29	4.81	0.89	-0.18
2001:Q4	-0.59	4.32	0.22	-1.21
2002:Q1	-1.53	4.03	-0.16	-1.80
2002:Q2	-1.38	3.64	-0.51	-2.13
2002:Q3	-1.54	3.11	-1.01	-2.61
2002:Q4	-1.66	2.88	-1.18	-3.03
2003:Q1	-1.89	2.91	-1.44	-3.53
2003:Q2	-2.29	2.73	-1.75	-3.89
2003:Q3	-2.19	2.38	-1.51	-3.82
2003:Q4	-1.75	1.94	-1.46	-3.64
2004:Q1	-1.62	1.63	-0.94	-3.44
2004:Q2	-1.56	1.68	-0.85	-3.25
2004:Q3	-1.17	1.78	-0.63	-3.07
2004:Q4	-0.52	1.71	0.05	-2.62
2005:Q1	-1.08	1.50	0.28	-2.46

Quarter	Richmond	Philadelphia	EDO Natural Rate	EDO Efficient
2005:Q2	-0.26	1.43	0.28	-2.60
2005:Q3	-0.49	1.70	0.42	-2.53
2005:Q4	-0.03	1.46	0.93	-2.06
2006:Q1	0.51	1.56	1.37	-1.61
2006:Q2	0.87	1.49	1.79	-1.61
2006:Q3	1.00	1.41	2.24	-1.60
2006:Q4	1.58	1.93	3.08	-1.58
2007:Q1	1.89	2.09	3.87	-1.58
2007:Q2	2.07	1.69	4.00	-1.65
2007:Q3	1.95	1.42	4.05	-1.91
2007:Q4	1.80	1.54	3.93	-2.31
2008:Q1	1.55	1.48	3.69	-2.94
2008:Q2	1.58	1.15	3.37	-3.53
2008:Q3	1.34	0.82	2.17	-4.42
2008:Q4	-0.19	0.11	1.03	-5.80
2009:Q1	-1.90	-1.10	ND	ND
2009:Q2	-3.80	-2.07	ND	ND

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Models are Useful

- Models can inform of us about shocks.
- Need to look at a number of models, because they produce different results.
- Models can place discipline on policy discussions.

Appendix 5: Materials used by Mr. Wynne

Page 1

Material for Briefing on **The Global Slack Hypothesis**
Mark A. Wynne
December 16, 2009

Class II FOMC - Restricted (FR)

Page 2
Figure 1: US imports as a share of GDP

Series: Ratio of U.S. imports of goods and services to U.S. GDP
Horizon: 1950 to 2009
Description: Imports of goods and services as a share of U.S. GDP increased from just over 4 percent in the 1950s and early 1960s to just over 18 percent at the most recent peak. The increase happened steadily from the

mid-1960s, with some setbacks along the way. After peaking at just over 18 percent of GDP in the third quarter of 2008, imports as a share of GDP fell to about 13 percent.

Page 3
Global slack hypothesis

- Does globalization matter for U.S. inflation dynamics?
- Important as a *real* phenomenon
- Implications for monetary policy?

  -- Yes: Global slack rather than domestic slack

  -- No: Flexible exchange rates insulate domestic price developments from foreign influences

Page 4
Globalization does matter…

- …for inflation over the long term

  -- Impact on "inflation bias" under discretionary monetary policy making

- …for short term inflation dynamics

  -- Open economy Phillips Curve differs from that of a closed economy

Page 5
Open economy pricing

$$\underbrace{\hat{\pi}_t}_{Rate\ of\ CPI\ inflation} = \underbrace{\xi \hat{\pi}^H_t + (1-\xi)\hat{\pi}^F_t}_{Weighted\ average\ of\ the\ rate\ of\ increase\ of\ the\ prices\ of\ Home\ and\ Foreign\ goods} \\ \underbrace{\hat{\pi}^H_t}_{Rate\ of\ increase\ of\ the\ prices\ of\ Home\ goods} = \beta \underbrace{E_t \hat{\pi}^H_{t+1}}_{Expected\ rate\ of\ increase\ of\ the\ prices\ of\ Home\ goods\ next\ quarter} + \lambda\underbrace{(\widehat{mc}_t - \hat{p}^H_t)}_{Real\ marginal\ cost\ of\ producing\ Home\ goods} \\ \underbrace{\hat{\pi}^F_t}_{Rate\ of\ increase\ of\ the\ prices\ of\ Foreign\ goods} = \beta \underbrace{E_t \hat{\pi}^F_{t+1}}_{Expected\ rate\ of\ increase\ of\ the\ prices\ of\ Foreign\ goods\ next\ quarter} + \lambda\underbrace{(\widehat{mc}^*_t - \hat{p}^F_t + \hat{s}_t)}_{Real\ marginal\ cost\ of\ producing\ Foreign\ goods}$$

Page 6
The open economy Phillips Curve

$$\underbrace{\hat{\pi}_t}_{CPI\ inflation\ this\ quarter} = \underbrace{\beta E_t \hat{\pi}_{t+1}}_{Expected\ CPI\ inflation\ next\ quarter} + \lambda[\underbrace{\Psi_{\pi,x}x_t}_{Domestic\ output\ gap} + \underbrace{\Psi_{\pi,x^*}x^*_t}_{Foreign\ output\ gap} + \underbrace{\varepsilon\Psi_{\pi,rp}(\xi-\xi^*)\widehat{tot}_t}_{Terms\ of\ trade} - \underbrace{\varepsilon\Psi_{\pi,rp}\widehat{rs}_t}_{Real\ exchange\ rate}]$$

Domestic output gap term *declines in importance* as share of foreign goods in consumption basket increases

Foreign output gap term *grows in importance* as share of foreign goods in consumption basket increases

Terms of trade and real exchange rate terms only appear if some fraction ϵ of foreign firms engage in local currency pricing

Page 7
Is the Global Slack Hypothesis consistent with the data?

- Early studies

-- Orr (1994), Garner (1994), Tootell (1998)

-- No role for foreign slack

-- Focus on G7

- Revived debate

-- Borio and Filardo (2007): foreign slack matters

-- Ihrig, et al. (2007): no it doesn't

Page 8
Our approach

- Focus on cyclical components of inflation etc.
- Start with G7 group of countries

-- Measures of foreign slack (unemployment, capacity utilization in mfg., output gaps) seem to matter

- Changing trade patterns

-- Look at broader group of countries

Page 9
Figure 2: Declining importance of G7

Series: The first series shown in blue is imports from other G7 countries as a share of US imports. The second series shown in red is the share of G7 GDP in world GDP.
Horizon: 1960 to 2009 for the import series; 1970 to 2009 for the GDP series.
Description: The chart shows imports into the US from the other G7 countries rising as a share of total US imports from 1960 to 1970, then falling until 1980, rising again until 1986 (but not to the previous peak), and then falling steadily through 2009. The chart also shows the G7 share of global GDP hovering between 60 and 65 percent from 1970 until the late 1990s, but then falling steadily to about 55 percent.

Page 10
Foreign slack appears to matter…

(1) $\hat{\pi}_{t} = \mathop{\rm -0.217}_{\rm (0.190)}\hat{\pi}_{t-1} + \mathop{\rm 0.124}_{\rm (0.228)}\hat{y}^{US}_{t} + \mathop{\rm 1.236}_{\rm (0.591)^{**}}\hat{y}^{G26}_{t}$

(2) $\hat{\pi}^{Core}_{t} = \mathop{\rm -0.225}_{\rm (0.108)^{**}}\hat{\pi}^{Core}_{t-1} + \mathop{\rm 0.020}_{\rm (0.082)}\hat{y}^{US}_{t} + \mathop{\rm 0.347}_{\rm (0.121)^{***}}\hat{y}^{G26}_{t}$

(3) $\hat{\pi}_{t} = \mathop{\rm -0.430}_{\rm (0.178)^{***}}\hat{\pi}_{t-1} + \mathop{\rm 0.090}_{\rm (0.261)^{***}}\hat{y}^{US}_{t} + \mathop{\rm 0.782}_{\rm (0.620)}\hat{y}^{G26}_{t} - \mathop{\rm 0.260}_{\rm (0.114)}\widehat{tot}_{t} - \mathop{\rm 0.143}_{\rm (0.067)^{**}}\widehat{rer}_{t}$

(4) $\hat{\pi}^{Core}_{t} = \mathop{\rm -0.223}_{\rm (0.122)^{*}}\hat{\pi}^{Core}_{t-1} + \mathop{\rm 0.005}_{\rm (0.084)}\hat{y}^{US}_{t} + \mathop{\rm 0.286}_{\rm (0.133)^{***}}\hat{y}^{G26}_{t} - \mathop{\rm 0.009}_{\rm (0.036)}\widehat{tot}_{t} - \mathop{\rm 0.030}_{\rm (0.017)^{**}}\widehat{rer}_{t}$

Page 11
The open economy Phillips Curve…

Under producer currency pricing:

\[\underbrace{\hat{\pi}_t}_{CPI\ inflation\ this\ quarter} = \underbrace{\beta E_t \hat{\pi}_{t+1}}_{Expected\ CPI\ inflation\ next\ quarter} + \lambda[\underbrace{(\varphi + \gamma)x_t}_{Domestic\ output\ gap\ term} - \underbrace{\Psi_{\pi,x^*}\Gamma(\widehat{tot}_t) - \widehat{\overline{tot}}_t)}_{Terms\ of\ trade\ gap\ term}] \]

Slope of the Phillips Curve with respect to domestic output gap does not change as the share of foreign goods in the consumption basket increases if we rely on the terms of trade gap to capture the effects of the foreign output gap

Page 12
Key points

- The global slack hypothesis, the idea that foreign slack plays a role commensurate with domestic slack in short-term inflation dynamics, has analytical content
- The data are also consistent with the global slack hypothesis
- Accurate measurement of slack, both domestic and foreign, remains a challenge
  - -- Data availability & quality
  - -- Conceptual problems
- The terms of trade (in gap form) may adequately capture foreign influences

Appendix 6: Materials used by Mr. Fuhrer

Page 1

Material for Briefing on **The Role of Expectations and Output in the Inflation Process**
Jeff Fuhrer
December 16, 2009

Class II FOMC - Restricted (FR)

Page 2
Overview

- Two key determinants of inflation in current economic thinking
  - -- Marginal cost or output gap
  - -- Expectations (of inflation and, implicitly, of costs and monetary policy)
- Both are the subject of considerable discussion
  - -- Can we measure gaps well? How reliable are gaps as forecasters of inflation?
  - -- Are expectations well-anchored? What do we mean by that? If so, will they offset downward pressure from costs or output? How are they connected to monetary policy?
- Goals of presentation
  - -- Add some economic structure to the discussion
  - -- Examine some empirical evidence on the role of gaps and expectations in determining inflation

Page 3
Inflation, expectations, and monetary policy

Top-left panel
1. A standard inflation framework

A diagram, consisting of one blue textbox on the left and three green textboxes on the right, with arrows connecting the green textboxes to the blue textbox. The blue textbox reads, "Inflation, this quarter (t)", and the green textboxes read as follows:

Expected inflation, next quarter (t+1)

Output *or* marginal cost, this quarter (t)

Lagged inflation (t-1)--"inertia"

Top-right panel
2. This relationship also holds in "t+1"

A diagram, consisting of one blue textbox on the left and three green textboxes on the right, with arrows connecting the green textboxes to the blue textbox. The blue textbox reads, "Inflation, next quarter (t+1)", and the green textboxes read as follows:

Expected inflation, two quarters hence (t+2)

Output *or* marginal cost, next quarter (t+1)

Inflation, this quarter (t)

Bottom-left panel
3. Implications for expectations, I

- Inflation depends on current and expected costs/output
- These depend (in part) on monetary policy
- Monetary policy depends (in part) on the inflation goal, which may vary over time
- Expectations of policy actions and the inflation goal matter

Bottom-right panel
4. Implications for expectations, II

- In practical terms, the expectations that should matter are:
  - Short-run inflation expectations
  - Long-run inflation expectations, as a proxy for the Fed's long-run inflation goal
  - Longer-run cost or output expectations

Page 4
"Anchored" expectations in this framework

- People know the Fed's inflation goal, whether it's subject to change, and how vigorously the Fed will pursue its inflation goal
- People expect the goal to remain reasonably stable

-- Note: Historically, some of the longer-term movements in inflation may well have been caused by fluctuations in the Fed's inflation goal

-- For that reason, and because the goal *could* (in principle) change over time, we allow for this effect of the Fed's goal on inflation in our framework

-- We expect (and empirical evidence confirms) that this source of variation is smaller today than it was several decades ago

Page 5
"Anchored" expectations and the Fed's long-run inflation goal

- Clark and Davig estimate a reduced-form model which shows that long-term expectations (the 10-year SPF forecast) are an excellent proxy for "trend inflation"
- Trend inflation may be thought of as an indicator of the public's perception of the Federal Reserve's inflation goal

A line chart shows long-term forecasts of CPI inflation from the Blue Chip Consensus (1982-1991) and the Survey of Professional Forecasters (1992-2008) and econometric estimates of trend inflation. The period covered is from the third quarter of 1982 through the second quarter of 2008, and the data are in percent. One line shows the path of long-term forecasts over the period. The second, represented with dots, shows the path of the econometric estimate of trend inflation. These estimates were obtained from a model in which inflation depends on past CPI inflation, an unobserved inflation trend, and monetary policy. The chart shows long-term forecasts declining from roughly 5.5 percent at the beginning of the sample to 2.5 percent in 1998 and remaining essentially unchanged at that level for the rest of the sample. The econometric estimate of trend inflation follows a very similar path. As a result, long-term forecasts of inflation from surveys of professional forecasters are excellent proxies for trend inflation.

- Long-run expectations/perception of the Fed's goal "well-anchored" of late

Page 6
How much could anchored expectations offset downward cost and output pressures?

- Answer: depends on how "forward-looking" price-setters are
- Consider two options:

1. Purely forward-looking/model-consistent
2. Combination of above and backward-looking

1. Purely forward-looking/model-consistent

Percent

Year:Quarter	Inflation goal	Inflation	Policy rate	Real marginal cost
-2:Q1	2.000	2.000	4.000	0.000
-2:Q2	2.000	2.000	4.000	0.000
-2:Q3	2.000	2.000	4.000	0.000
-2:Q4	2.000	2.000	4.000	0.000
-1:Q1	2.000	2.000	4.000	0.000
-1:Q2	2.000	2.000	4.000	0.000
-1:Q3	2.000	2.000	4.000	-7.000
-1:Q4	2.000	2.000	4.000	-7.000

Year:Quarter	Inflation goal	Inflation	Policy rate	Real marginal cost
0:Q1	2.000	0.656	2.702	-6.610
0:Q2	2.000	0.807	2.075	-5.972
0:Q3	2.000	0.948	1.882	-5.327
0:Q4	2.000	1.076	1.950	-4.709
1:Q1	2.000	1.190	2.156	-4.138
1:Q2	2.000	1.290	2.421	-3.623
1:Q3	2.000	1.378	2.693	-3.166
1:Q4	2.000	1.455	2.944	-2.766
2:Q1	2.000	1.521	3.161	-2.418
2:Q2	2.000	1.579	3.340	-2.117
2:Q3	2.000	1.629	3.483	-1.856
2:Q4	2.000	1.673	3.593	-1.631
3:Q1	2.000	1.711	3.677	-1.436
3:Q2	2.000	1.745	3.740	-1.266
3:Q3	2.000	1.774	3.787	-1.118
3:Q4	2.000	1.800	3.821	-0.989
4:Q1	2.000	1.823	3.847	-0.875
4:Q2	2.000	1.843	3.867	-0.775
4:Q3	2.000	1.861	3.883	-0.687
4:Q4	2.000	1.877	3.896	-0.609
5:Q1	2.000	1.891	3.907	-0.540
5:Q2	2.000	1.903	3.916	-0.479
5:Q3	2.000	1.914	3.925	-0.424
5:Q4	2.000	1.924	3.932	-0.376
6:Q1	2.000	1.932	3.939	-0.333
6:Q2	2.000	1.940	3.946	-0.295
6:Q3	2.000	1.947	3.951	-0.262
6:Q4	2.000	1.953	3.957	-0.232
7:Q1	2.000	1.958	3.961	-0.206
7:Q2	2.000	1.963	3.966	-0.182
7:Q3	2.000	1.967	3.969	-0.161
7:Q4	2.000	1.971	3.973	-0.143
8:Q1	2.000	1.974	3.976	-0.127
8:Q2	2.000	1.977	3.979	-0.112
8:Q3	2.000	1.980	3.981	-0.099
8:Q4	2.000	1.982	3.983	-0.088
9:Q1	2.000	1.984	3.985	-0.078
9:Q2	2.000	1.986	3.987	-0.069
9:Q3	2.000	1.988	3.988	-0.061
9:Q4	2.000	1.989	3.990	-0.054

Purely forward-looking: relatively small and short-lived decline in inflation

Page 7
Anchored expectations versus declining marginal cost: an intermediate case

2. Mixed model-consistent/backward-looking (50-50)

Percent

Year:Quarter	Inflation goal	Inflation	Policy rate
-2:Q1	2.000	2.000	4.000
-2:Q2	2.000	2.000	4.000
-2:Q3	2.000	2.000	4.000
-2:Q4	2.000	2.000	4.000
-1:Q1	2.000	2.000	4.000
-1:Q2	2.000	2.000	4.000
-1:Q3	2.000	2.000	4.000
-1:Q4	2.000	2.000	4.000
0:Q1	2.000	0.215	2.346
0:Q2	2.000	-0.927	0.592
0:Q3	2.000	-1.574	0.000
0:Q4	2.000	-1.849	0.000
1:Q1	2.000	-1.849	0.000
1:Q2	2.000	-1.651	0.000
1:Q3	2.000	-1.319	0.000
1:Q4	2.000	-0.904	0.000
2:Q1	2.000	-0.451	0.204
2:Q2	2.000	0.005	0.686
2:Q3	2.000	0.437	1.309
2:Q4	2.000	0.828	1.969
3:Q1	2.000	1.165	2.595
3:Q2	2.000	1.444	3.144
3:Q3	2.000	1.666	3.594
3:Q4	2.000	1.835	3.938
4:Q1	2.000	1.956	4.182
4:Q2	2.000	2.037	4.337
4:Q3	2.000	2.086	4.420
4:Q4	2.000	2.110	4.445
5:Q1	2.000	2.117	4.429
5:Q2	2.000	2.111	4.387
5:Q3	2.000	2.098	4.329
5:Q4	2.000	2.081	4.266

Year:Quarter	Inflation goal	Inflation	Policy rate
6:Q1	2.000	2.063	4.203
6:Q2	2.000	2.046	4.146
6:Q3	2.000	2.030	4.096
6:Q4	2.000	2.018	4.055
7:Q1	2.000	2.008	4.024
7:Q2	2.000	2.000	4.001
7:Q3	2.000	1.996	3.986
7:Q4	2.000	1.993	3.977
8:Q1	2.000	1.991	3.973
8:Q2	2.000	1.991	3.972
8:Q3	2.000	1.991	3.974
8:Q4	2.000	1.993	3.977
9:Q1	2.000	1.994	3.981
9:Q2	2.000	1.995	3.985
9:Q3	2.000	1.996	3.989
9:Q4	2.000	1.998	3.993

Mixed model: Very different results. Significant disinflation, with a period during which funds rate is stuck at zero lower bound

Page 8
So which model is more realistic?

- A somewhat structural approach: modified New Keynesian Phillips Curve, in which expectations may be any combination of
  - -- "Model-consistent" or "rational" expectations
  - -- Backward-looking behavior (average of past four quarters)
  - -- Survey-based inflation expectations
  - -- SPF one-year-ahead (median of forecasts)
  - -- SPF 10-year average (median of forecasts)

$$ \pi_t = \mu_1 \pi^{avg}_{t-1} + \mu_2 E_{t-1} \pi_{t+1} + \mu_3 \pi^{S1}_t + (1 - \mu_1 - \mu_2 - \mu_3)\pi^{S10}_t + \gamma\tilde{y}_t + d\Delta\frac{p^o_{t-1}}{p_{t-1}} + \epsilon_t $$

- See how these have changed over time, and what is important today

Page 9
Results

Which expectations proxies best explain inflation?

Proxy	Weight in model over past 30 years	Past 10 years: larger or smaller influence?
Model-consistent expectations	Small to moderate	Smaller
Lagged inflation	Moderate	Smaller

Proxy	Weight in model over past 30 years	Past 10 years: larger or smaller influence?
1-year SPF survey	Small to moderate in some cases	Mixed
10-year SPF survey	Small to moderate in some cases	Larger in some cases

- **Bottom line:**

  -- Model-consistent expectations matter relatively little

  -- The extreme model with purely forward-looking expectations is not well-supported in the data

  -- Modest role for inertial survey expectations in explaining short-run fluctuations in inflation

Page 10
What if expectations are not fully anchored?

How would a change in long-term inflation expectations affect inflation?

- The inflation scenarios just presented treat long-term expectations as anchored at the Fed's inflation goal
- But expectations have moved historically, perhaps because the Fed's inflation goal has changed significantly over time

  -- From the early 1980s to the early 2000s, long-run expectations dropped from just below 6% to 2.5%

- The models used in the scenarios imply that inflation eventually moves one-for-one with a sustained change in expectations
- An empirical model that does not impose the one-for-one pass-through of expectations into actual inflation validates this assumption

Page 11
Estimate of the effect on inflation of a change in long-term inflation expectations

Top panel

- Model: vector autoregression including the SPF-10 year expectation, core PCE inflation, economic activity, and the federal funds rate (estimated 1983-2009)
- Consider response to a 50 basis point one-time shock to the SPF 10-year expectation
  - The shock results in a persistent increase in the SPF expectation
  - The shock also generates a persistent rise in inflation, which roughly matches the rise in expectations
- Change in long-run expectations--inflation goal?--reflected one-for-one in inflation

Bottom panels

Two line charts, "SPF-10Y Response to 0.5% SPF-10Y Shock" and "Core PCE Inflation Response to 0.5% SPF-10Y Shock". Impulse response estimates (point estimates and 70 percent confidence bands) of the effects of a shock to long-term inflation expectations. Data plotted with lines representing point estimates, and with shading representing confidence bands. The responses are reported for 16 quarters. The data represent the responses of long-term inflation expectations and core PCE inflation to a 50 basis point shock (an increase) to long-term inflation expectations, estimated from a vector autoregression. The model variables include long-term inflation expectations from the Survey of Professional Forecasters (merged with data from the Blue Chip Consensus as described for Slide 5), core PCE inflation, an indicator of economic activity, and the federal funds rate. The model was estimated with data for 1983-2009. The chart on the left side of the slide provides the estimated response of

long-term inflation expectations; the chart on the right side slide provides the estimated response of core inflation. The estimates show that the 50 basis point shock to long-term inflation expectations results in a persistent rise in expectations. Following the shock, expectations decline very gradually; 15 periods after the shock, expectations remain 28 basis points above their pre-shock level. The shock to expectations also causes a persistent rise in core PCE inflation, with a hump shape. At the time of the shock, core inflation rises only 11 basis points. In the next few periods, though, core inflation rises (relative to baseline) more than 50 basis points. Over time, the effect on core inflation gradually dissipates, reaching 26 basis points after 15 quarters. Overall, the change in long-run inflation expectations is reflected about one-for-one in core inflation.

Page 12
What factors could un-anchor inflation expectations?

Top panel

- Vector autoregressive models indicate survey-based expectations generally respond more to price variables than to economic activity or monetary policy
- The scenario: a -1%, one period shock to core PCE inflation
  - The shock results in a sustained reduction in core inflation of about -0.25%
  - The federal funds rate (not shown) falls in response
- Long-run expectations gradually decline, but by a small amount--about 0.08%
- Expectations should remain anchored as long as policy responds appropriately to inflation developments

Bottom panels

Two line charts, "Core PCE Inflation Response to -1.0% Core Shock" and "SPF-10Y Response to -1.0% Core Shock". Impulse response estimates (point estimates and 70 percent confidence bands) of the effects of a shock to core PCE inflation. Data plotted with lines representing point estimates and shading representing confidence bands. The responses are reported for 16 quarters. The data represent the responses of long-term inflation expectations and core PCE inflation to a one percentage point shock (a decrease) to long-term inflation expectations, estimated from a vector autoregression. The model variables include long-term inflation expectations from the Survey of Professional Forecasters (merged with data from the Blue Chip Consensus as described for Slide 5), core PCE inflation, an indicator of economic activity, and the federal funds rate. The model was estimated with data for 1983-2009. The chart on the left side of the slide provides the estimated response of core PCE inflation; the chart on the right side slide provides the estimated response of long-term inflation expectations. The estimates show that the one percentage point decline in core inflation results in a persistent fall in core inflation. After the initial decline in inflation, inflation remains about 20-30 percentage points below baseline for several quarters. Over time, inflation gradually moves back toward baseline. 15 periods after the shock, core inflation is estimated to be 11 basis points below baseline. The shock to core inflation also causes a persistent, small reduction in long-term inflation expectations. In the few quarters following the shock, inflation expectations gradually decline (relative to baseline), by about 8 basis points after four quarters. Long-run expectations remain about 8 basis points below baseline for the next 11 quarters. Overall, the estimates show that an unexpected change in core inflation would lead to a corresponding movement in long-run inflation expectations.

Page 13
Survey Results: Government Debt and Inflation Expectations

Top panel
Exhibit 13a: Perceptions of Consumers and Financial Experts

Consider the following scenario: over the next 12 months, the government debt ends up growing substantially more than the administration has predicted BECAUSE tax revenues are lower than expected while the level of government spending remains on target. Under this scenario, how would this change your forecast for the rate of inflation over the next 12 months?

Now consider this alternative scenario: over the next 12 months, the government debt ends up growing substantially more than the administration has predicted BECAUSE the level of government spending is much higher than expected while tax revenues remain on target. Under this alternative scenario, how would this change your forecast for the rate of inflation over the next 12 months?

Number (percentage) responding:

	Question A		Question B	
	Consumers	Experts	Consumers	Experts
I would expect much lower inflation	8 (2%)	1	12 (3%)	0
I would expect somewhat lower inflation	41 (10%)	5	37 (9%)	0
I don't believe that it would have an effect on inflation	74 (18%)	4	94 (23%)	1
I would expect somewhat higher inflation	245 (60%)	1	196 (48%)	10
I would expect much higher inflation	37 (9%)	0	69 (17%)	0
Total responses	409	11	408	11

Bottom panel
Exhibit 13b: Consumer Expectations

In percentage terms, by how much do you expect the level of government debt to be [higher/lower] twelve months from now?

Quartiles of distribution of expected percentage change in government debt	All	College	Less than College
25th percentile	+5%	+5%	+5%
Median	+10%	+10%	+12%
75th percentile	+20%	+20%	+25%
Total responses	1,198	615	583

Page 14
An unanchored expectations scenario

- Public believes inflation target has risen to 3% (deficit fears?)
- Other economic conditions the same as previous simulations

Mixed model-consistent/backward-looking (50-50)

Percent

Year:Quarter	Inflation goal	Inflation	Policy rate	Public's perceived goal
-2:Q1	2.000	2.000	4.000	2.000
-2:Q2	2.000	2.000	4.000	2.000
-2:Q3	2.000	2.000	4.000	2.000
-2:Q4	2.000	2.000	4.000	2.000
-1:Q1	2.000	2.000	4.000	2.000
-1:Q2	2.000	2.000	4.000	2.000
-1:Q3	2.000	2.000	4.000	2.000
-1:Q4	2.000	2.000	4.000	3.000

Year:Quarter	Inflation goal	Inflation	Policy rate	Public's perceived goal
0:Q1	2.000	0.447	2.557	2.966
0:Q2	2.000	-0.472	1.149	2.927
0:Q3	2.000	-0.918	0.081	2.882
0:Q4	2.000	-1.021	0.000	2.830
1:Q1	2.000	-0.888	0.000	2.773
1:Q2	2.000	-0.605	0.000	2.712
1:Q3	2.000	-0.239	0.291	2.646
1:Q4	2.000	0.158	0.800	2.578
2:Q1	2.000	0.547	1.417	2.508
2:Q2	2.000	0.901	2.054	2.437
2:Q3	2.000	1.203	2.647	2.367
2:Q4	2.000	1.443	3.153	2.297
3:Q1	2.000	1.624	3.553	2.233
3:Q2	2.000	1.750	3.844	2.176
3:Q3	2.000	1.833	4.035	2.127
3:Q4	2.000	1.881	4.141	2.087
4:Q1	2.000	1.906	4.183	2.056
4:Q2	2.000	1.915	4.179	2.031
4:Q3	2.000	1.915	4.148	2.013
4:Q4	2.000	1.912	4.103	2.000
5:Q1	2.000	1.909	4.055	1.990
5:Q2	2.000	1.907	4.011	1.984
5:Q3	2.000	1.908	3.975	1.979
5:Q4	2.000	1.912	3.950	1.975
6:Q1	2.000	1.918	3.934	1.973
6:Q2	2.000	1.925	3.927	1.971
6:Q3	2.000	1.933	3.926	1.969
6:Q4	2.000	1.942	3.931	1.967
7:Q1	2.000	1.950	3.938	1.966
7:Q2	2.000	1.957	3.947	1.965
7:Q3	2.000	1.964	3.956	1.963
7:Q4	2.000	1.969	3.964	1.962
8:Q1	2.000	1.974	3.971	1.962
8:Q2	2.000	1.977	3.976	1.961
8:Q3	2.000	1.979	3.980	1.961
8:Q4	2.000	1.981	3.983	1.961
9:Q1	2.000	1.983	3.985	1.961
9:Q2	2.000	1.984	3.986	1.961
9:Q3	2.000	1.985	3.986	1.961

Year:Quarter	Inflation goal	Inflation	Policy rate	Public's perceived goal
9:Q4	2.000	1.985	3.986	1.961

- Still implies a significant drop in inflation and policy rate

Page 15
Do output gaps matter?

- Much appropriate discussion about difficulty of measurement, small coefficients in estimated equations, etc.
- We allow for a "nonlinearity"--*viz* that output or unemployment gaps matter when they're large, not much when they're smaller
- How large is large?

  -- Stock and Watson (2009) and Fuhrer and Olivei (2009) find threshold for output gap at approximately 3 percentage points (1.5 percentage points away from estimated NAIRU for unemployment)

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Gaps matter when they're large

Improvement in forecast error from including gap variables

A scatterplot. Units are percentage points. The figure shows the difference between the forecast error from a conventional Phillips curve and the forecast error from a random walk forecast of inflation (the horizontal axis) against the absolute value of the deviation of unemployment from its non-accelerating inflation rate (or NAIRU), the vertical axis. The figure shows that for relatively small values of the unemployment deviation--below 1.5 percentage points--the difference between the forecast errors of the two models is not significantly positive or negative. There is a small cluster of plotted points labeled "Late 1960s" to the right of the vertical axis, at values of the unemployment deviation between about 2.5 and 3 percentage points. However, as the magnitude of the unemployment deviations rises above 1.5 percentage points, the size of the error made by the conventional Phillips curve is very often smaller than the error made by the random walk forecast, so the scatterplot depicts many points to the left of the vertical axis.

Difference Between Phillips Curve Inflation Forecast Error and Random Walk Inflation Forecast Error	Absolute Value of the Unemployment Rate Gap, %
0.33432	0.73527
0.32582	0.92988
0.14803	0.72408
0.39764	0.11788
-0.08623	0.48874
0.02185	0.59579
0.24447	0.50327
-0.28787	0.61119
-0.43589	0.31956
-0.35737	0.42837
-0.20111	0.63762
0.22601	0.54731
0.26861	0.65739

Difference Between Phillips Curve Inflation Forecast Error and Random Walk Inflation Forecast Error	Absolute Value of the Unemployment Rate Gap, %
0.16344	0.96786
0.17193	1.17866
0.36171	1.18978
-0.05104	1.30116
-0.29344	1.51276
-0.76439	1.82455
-0.61864	2.13647
-0.83527	2.34848
-0.40876	2.46056
-0.29977	2.47267
0.86773	2.58480
0.06853	2.49696
-0.28506	2.50915
-0.43028	2.52138
-0.66491	2.43367
-0.35379	2.64604
-0.25062	2.75851
-0.17148	2.87108
0.18632	2.98379
0.31432	2.99663
0.54334	3.00960
1.05725	2.82271
0.85804	2.83594
-0.02435	2.24929
-0.05991	1.66272
0.18847	1.27623
0.56979	0.68976
0.15049	0.60330
-0.16694	0.61680
0.14369	0.53022
0.68646	0.64352
1.03398	0.75664
0.47405	0.86955
-0.87307	0.98218
-0.89014	1.19450
-3.06963	1.70647
-2.77226	1.71801
-1.95929	1.82909
-1.93658	1.83965

Difference Between Phillips Curve Inflation Forecast Error and Random Walk Inflation Forecast Error	Absolute Value of the Unemployment Rate Gap, %
-3.11758	1.54962
-0.32274	1.45895
0.18083	1.06757
-1.89994	0.07543
-2.81598	1.61753
-2.92700	2.21136
-1.43565	1.80610
-0.72273	1.60178
-0.16559	0.99843
0.18217	0.89608
0.54814	0.99475
-0.29034	1.09446
0.13354	0.79521
0.11600	0.39704
0.04417	0.19995
-0.29733	0.00394
0.13471	0.39100
-0.33777	0.68487
-0.16947	0.67768
-0.38404	0.76946
-0.18395	0.76024
-0.63442	0.95004
-1.68455	0.73892
-1.86305	0.62691
-0.15836	0.31407
-0.08341	0.69953
-0.34198	1.11385
-1.54035	0.82882
-1.37305	0.84436
-1.99287	0.86042
-1.79123	0.87691
-1.03573	1.69376
-1.10572	2.31085
-0.18312	2.92811
-0.65726	3.44545
-1.04098	4.26278
-1.35471	3.98004
-0.00065	3.69715
-0.49937	3.01406

Difference Between Phillips Curve Inflation Forecast Error and Random Walk Inflation Forecast Error	Absolute Value of the Unemployment Rate Gap, %
-0.42644	2.13074
-0.04861	1.54715
-0.68035	1.06329
0.00269	1.07914
0.44288	0.99472
-0.02705	0.91000
-0.00716	1.02501
-0.01781	0.93974
0.07852	0.75419
0.00099	0.78088
0.20576	1.00729
0.30131	0.83345
0.08907	0.65936
-0.16135	0.48503
0.11129	0.21048
-0.20522	0.06428
-0.28659	0.23921
-0.13586	0.31431
0.23741	0.48956
0.01498	0.46495
-0.10978	0.64047
-0.11121	0.71613
-0.06024	0.69194
-0.06422	0.66793
-0.23898	0.44411
-0.43448	0.52053
0.20425	0.49724
-0.27105	0.07429
-0.40427	0.34824
-0.38829	0.87027
-0.16931	1.09172
-0.17306	1.21251
-0.38712	1.43258
-0.40025	1.75188
-0.54964	1.97038
-0.54539	1.98805
-0.60637	1.80490
-0.18187	1.52093
-0.31649	1.53619

Difference Between Phillips Curve Inflation Forecast Error and Random Walk Inflation Forecast Error	Absolute Value of the Unemployment Rate Gap, %
0.35083	1.25071
0.25165	1.06454
0.22597	1.07774
-0.12285	0.69038
-0.08168	0.50250
-0.14665	0.11418
0.01102	0.02548
-0.09515	0.23644
-0.17180	0.24711
-0.13818	0.15755
0.21787	0.06781
0.11423	0.07793
0.04634	0.11201
-0.00252	0.10196
-0.10498	0.19184
0.01932	0.38159
-0.03126	0.47114
0.13274	0.66041
0.29304	0.74934
0.12240	0.93785
0.27632	0.82588
0.32988	0.91339
-0.07211	1.00033
-0.01048	0.98665
-0.18564	1.07236
-0.25315	1.15742
0.25958	1.24185
-0.15032	1.32564
0.24879	1.20882
0.40294	1.29142
0.26620	0.98597
-0.18206	0.78004
0.17439	0.37367
0.00214	0.33306
-0.18336	0.54011
-0.00085	0.64741
-0.30947	0.55492
-0.05185	0.76259
0.35994	0.77037

Difference Between Phillips Curve Inflation Forecast Error and Random Walk Inflation Forecast Error	Absolute Value of the Unemployment Rate Gap, %
0.01149	0.97824
0.06430	0.98618
-0.00870	0.69419
0.15212	0.60228
0.17324	0.51050
0.06810	0.31889
0.26389	0.32747
0.01191	0.23630
0.00074	0.04543
0.06501	0.04508
0.10378	0.13518
-0.19478	0.32481
0.18086	0.31394
-0.13744	0.40254
-0.10744	0.59060
0.10435	0.47813
-0.23408	0.46513
-0.29676	0.25165
0.31084	0.13773
0.53371	0.02342
-0.25261	0.49120
-1.17274	1.20606

What does this model imply for the current outlook?

Out-of-sample fit of threshold model

Percent

Period	Core PCE Inflation, 4-quarter	Predicted Core PCE Inflation from Threshold Equation
2005:Q4	2.34	2.19
2006:Q1	2.11	2.16
2006:Q2	2.30	2.14
2006:Q3	2.45	2.14
2006:Q4	2.30	2.11
2007:Q1	2.50	2.13
2007:Q2	2.22	2.14
2007:Q3	2.22	2.17
2007:Q4	2.48	2.26
2008:Q1	2.38	2.42

Period	Core PCE Inflation, 4-quarter	Predicted Core PCE Inflation from Threshold Equation
2008:Q2	2.55	2.66
2008:Q3	2.62	2.83
2008:Q4	2.04	2.71
2009:Q1	1.73	2.32
2009:Q2	1.63	1.77
2009:Q3	1.32	1.27

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Money and Inflation

We had to say something, or Milton Friedman would have been very angry

Three scatterplots, each with "Money (M2) growth (percent)" on the horizontal axis against CPI inflation rate (percent) on the vertical axis.

Left panel
One-year averages

The chart plots annual average growth rates in M2 against CPI inflation from 1960 to 2008. Observed at the annual frequency, the chart suggests relatively little correlation between growth in M2 and CPI inflation.

Percent

Date	M2 growth (annualized)	CPI growth (annualized)
31 December 1960	4.90	1.36
31 December 1961	7.39	0.67
31 December 1962	8.11	1.23
31 December 1963	8.41	1.65
31 December 1964	8.01	1.20
31 December 1965	8.12	1.92
31 December 1966	4.57	3.36
31 December 1967	9.29	3.28
31 December 1968	8.00	4.71
31 December 1969	3.72	5.90
31 December 1970	6.57	5.57
31 December 1971	13.38	3.27
31 December 1972	12.95	3.41
31 December 1973	6.63	8.94
31 December 1974	5.45	12.10
31 December 1975	12.65	7.13
31 December 1976	13.36	5.04
31 December 1977	10.27	6.68
31 December 1978	7.53	8.99
31 December 1979	7.88	13.25
31 December 1980	8.56	12.35

Date	M2 growth (annualized)	CPI growth (annualized)
31 December 1981	9.73	8.91
31 December 1982	8.76	3.83
31 December 1983	11.33	3.79
31 December 1984	8.61	4.04
31 December 1985	8.05	3.79
31 December 1986	9.49	1.19
31 December 1987	3.64	4.33
31 December 1988	5.76	4.41
31 December 1989	5.49	4.64
31 December 1990	3.75	6.25
31 December 1991	3.06	2.98
31 December 1992	1.58	2.97
31 December 1993	1.48	2.81
31 December 1994	0.45	2.60
31 December 1995	4.12	2.53
31 December 1996	4.92	3.38
31 December 1997	5.58	1.70
31 December 1998	8.52	1.61
31 December 1999	5.79	2.68
31 December 2000	6.03	3.44
31 December 2001	10.32	1.60
31 December 2002	6.41	2.48
31 December 2003	5.05	2.04
31 December 2004	5.68	3.34
31 December 2005	4.07	3.44
31 December 2006	5.41	2.52
31 December 2007	5.64	4.15
1 August 2008	5.33	5.33

Center panel
Five-year averages

The chart begins with the scatterplot from the left chart, and overlays a scatterplot of five-year average growth rates in M2 against five-year average CPI inflation, in five-year intervals beginning in 1969. This panel suggests a stronger positive correlation between money growth and CPI inflation.

Percent

Date	M2 growth	CPI growth
31 December 1969	6.72	3.82
31 December 1974	8.94	6.60
31 December 1979	10.31	8.18
31 December 1984	9.39	6.53

Date	M2 growth	CPI growth
31 December 1989	6.47	3.66
31 December 1994	2.06	3.51
31 December 1999	5.78	2.38
31 December 2004	6.68	2.58
1 August 2008	4.76	3.45

Right panel
Ten-year averages

The chart begins with the scatterplot from the center chart, and overlays a scatterplot of ten-year average M2 growth against ten-year average CPI inflation, for the same intervals as the center panel. This panel suggests a moderately strong correlation between M2 growth and CPI inflation. The fit of a regression line for the ordinary least squares regression of 10-year average CPI inflation on 10-year average M2 growth, including an intercept, is displayed as a dashed line rising from the lower left of each panel to the upper right, indicating the positive correlation between 10-year averages of M2 growth and CPI inflation.

Percent

Date	M2 growth	CPI growth
31 December 1969	7.04	2.51
31 December 1974	7.82	5.20
31 December 1979	9.63	7.39
31 December 1984	9.85	7.35
31 December 1989	7.92	5.09
31 December 1994	4.24	3.59
31 December 1999	3.90	2.94
31 December 2004	6.23	2.48
1 August 2008	6.15	2.95

- The correlation improves as the horizon lengthens
- Correlation does not imply causality

  -- But many would expect a money-to-inflation causality, in the long run

- Contemporaneous correlations: Prediction not implied

  -- High money growth now does not necessarily imply high inflation later

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