

TO: Board Members

THROUGH: Jeff Walker, Executive Administrator

FROM: Investment Officers

DATE: October 20, 2016

SUBJECT: Quarterly Investment Report for the period June 1 - August 31, 2016

Please find attached the quarterly investment report for the period ending August 31, 2016. This report has been prepared and submitted in accordance with the Public Funds Investment Act (PFIA) and the Texas Water Development Board (TWDB) Investment Policy and Strategies.

This report provides a snapshot of the portfolio at the end of the period, shows the diversification in security types, shows totals by investment fund type (including average yield and weighted average maturity), identifies significant changes from the beginning of the period to the end of the period in each investment fund type, and provides a year-to-date summary of each fund type. We have also included the Federal Reserve Bank's (FED) National Economic Outlook and Texas Economic Indicators for this period. Highlights from the FED report include:

Adversity in the oil and gas sectors continued this quarter with mixed performance. While rig counts continue to recover, crude oil prices are still down. In Texas, exports decreased, although exports of petroleum and coal products increased. Also, while employment grew in Texas this quarter, unemployment also grew to 4.6%. The good news is that Texas is still below the national average of 4.9% unemployment. The FED continues to watch wage pressures and other inflationary measures as they contemplate future rate policy. In the case of any FED rate change, the investment officers will closely monitor the effects to the portfolio in conjunction with the Texas Treasury Safekeeping Trust Company and make adjustments if needed.

On October 14, 2016, major changes to prime money market funds took place as mandated by the Securities and Exchange Commission (SEC). Prime money market funds in the past have strived to maintain a net asset value (NAV) of \$1.00, which is a money market fund requirement by the PFIA. The SEC changed this requirement due to the financial crisis of 2008 and now prime funds no longer have a stable NAV. In anticipation of these changes, we have moved all money market funds into government money market funds which do maintain a net asset value (NAV) of \$1.00 and are eligible investments under PFIA and the TWDB Investment Policy and Strategies.

Our Mission

To provide leadership, information, education, and support for planning, financial assistance, and outreach for the conservation and responsible development of water for Texas

Board Members

Bech Bruun, Chairman | Kathleen Jackson, Board Member | Peter Lake, Board Member
Jeff Walker, Executive Administrator

The investment portfolio for the TWDB for this period is in compliance with the Public Funds Investment Act and the TWDB Investment Policy and Strategies.

Rebecca Trevino, Chief Financial Officer

Amanda Lavin, Development Fund Manager

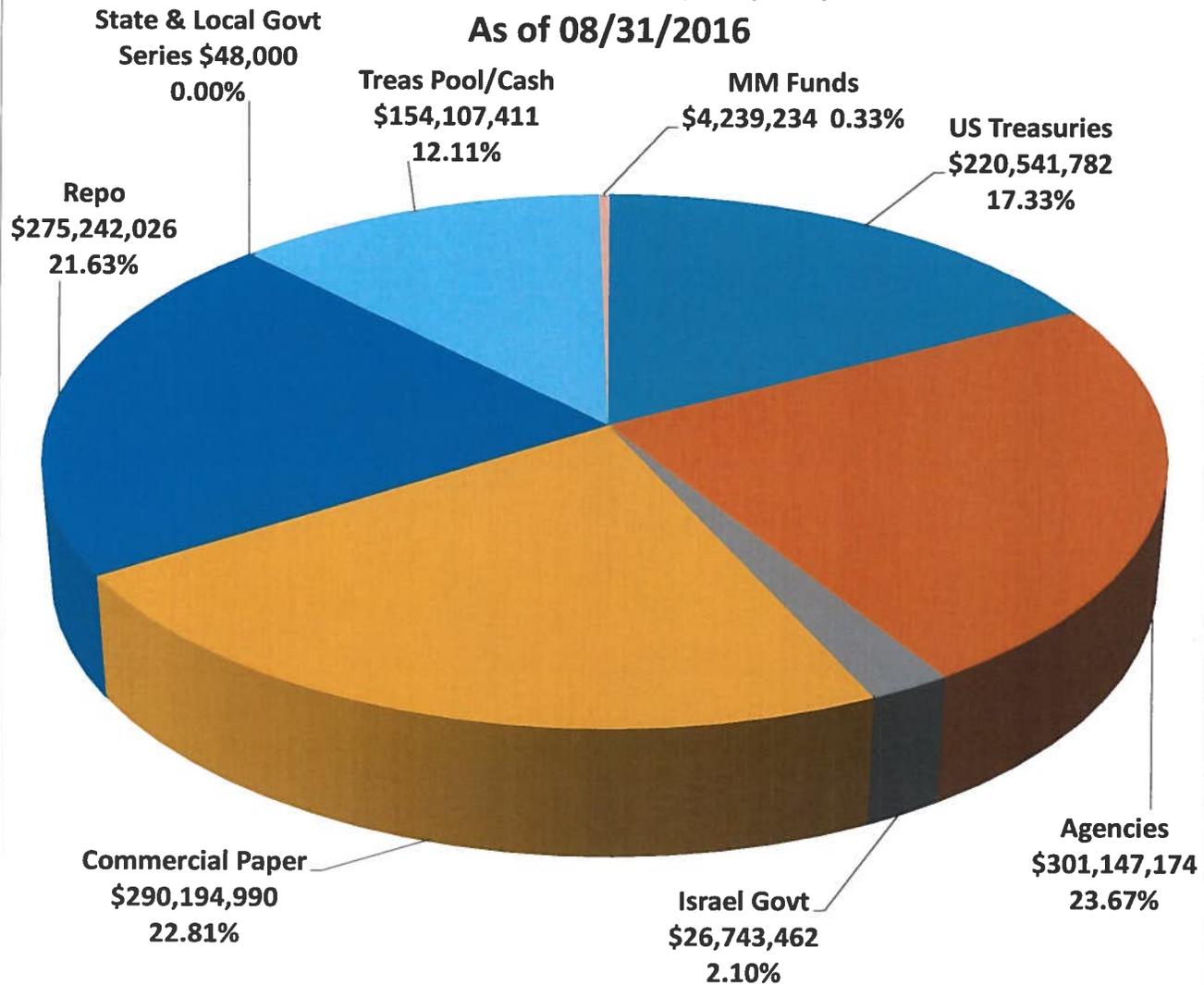
Oscar Ramirez, Director of Accounting

Elaine S. Wilson, Revenue Team Lead

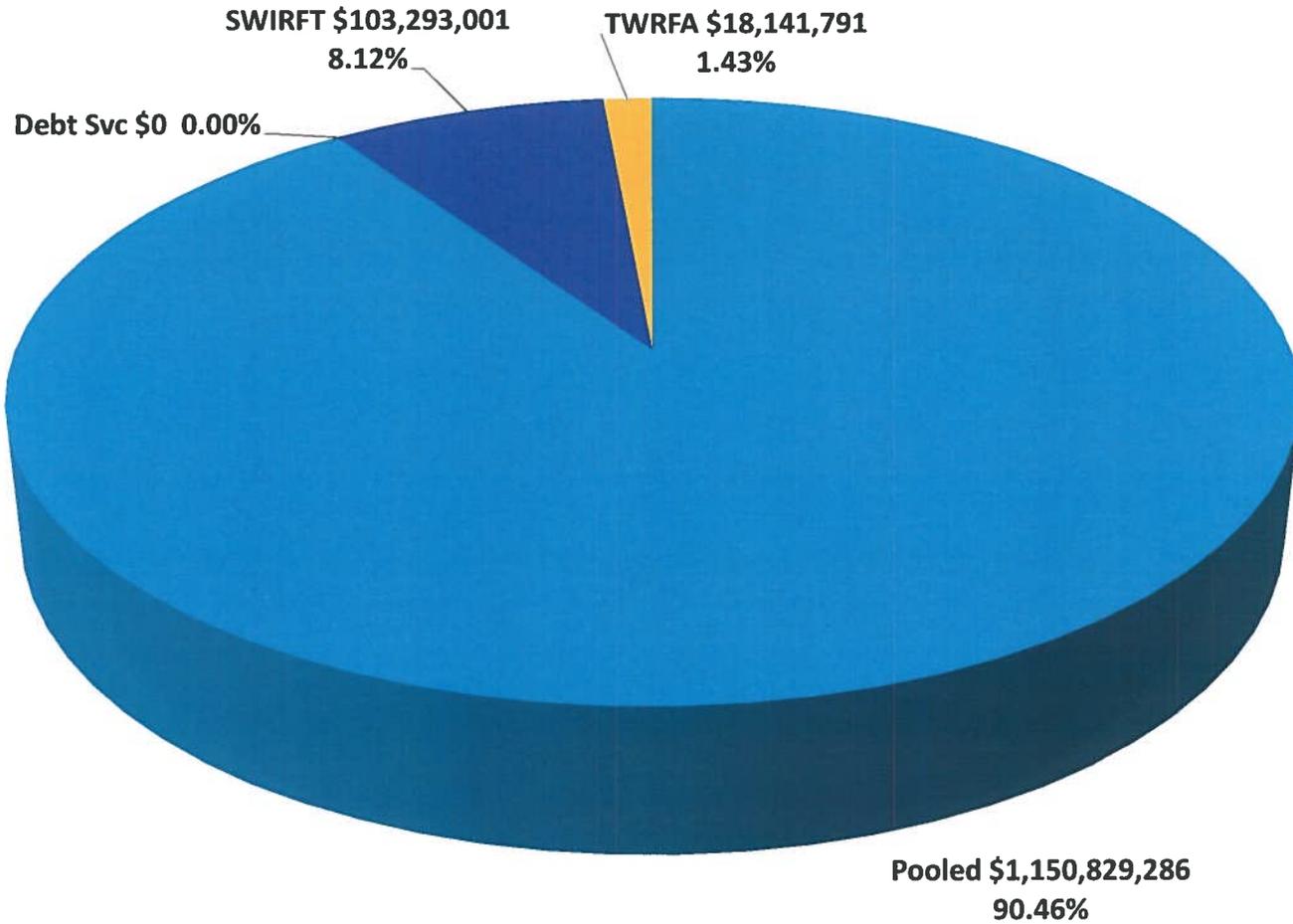
TWDB Portfolio by Security Type

Total Market Value \$1,272,264,078

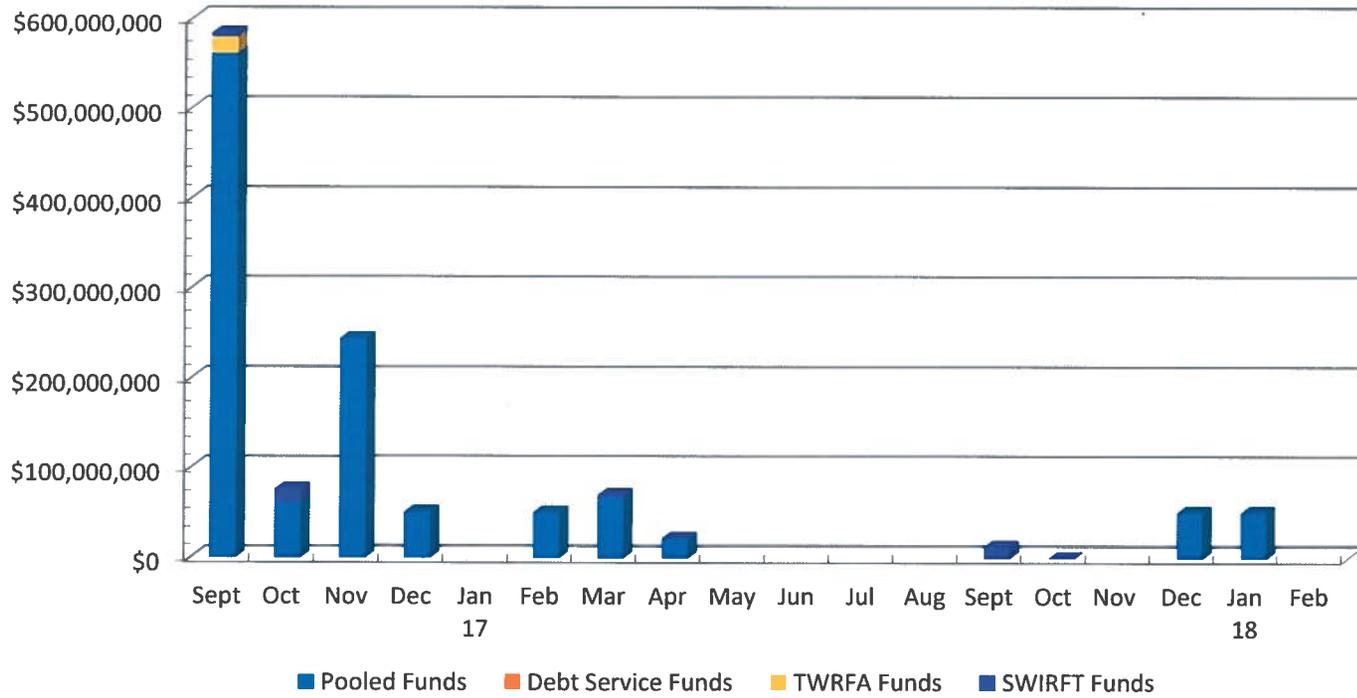
As of 08/31/2016



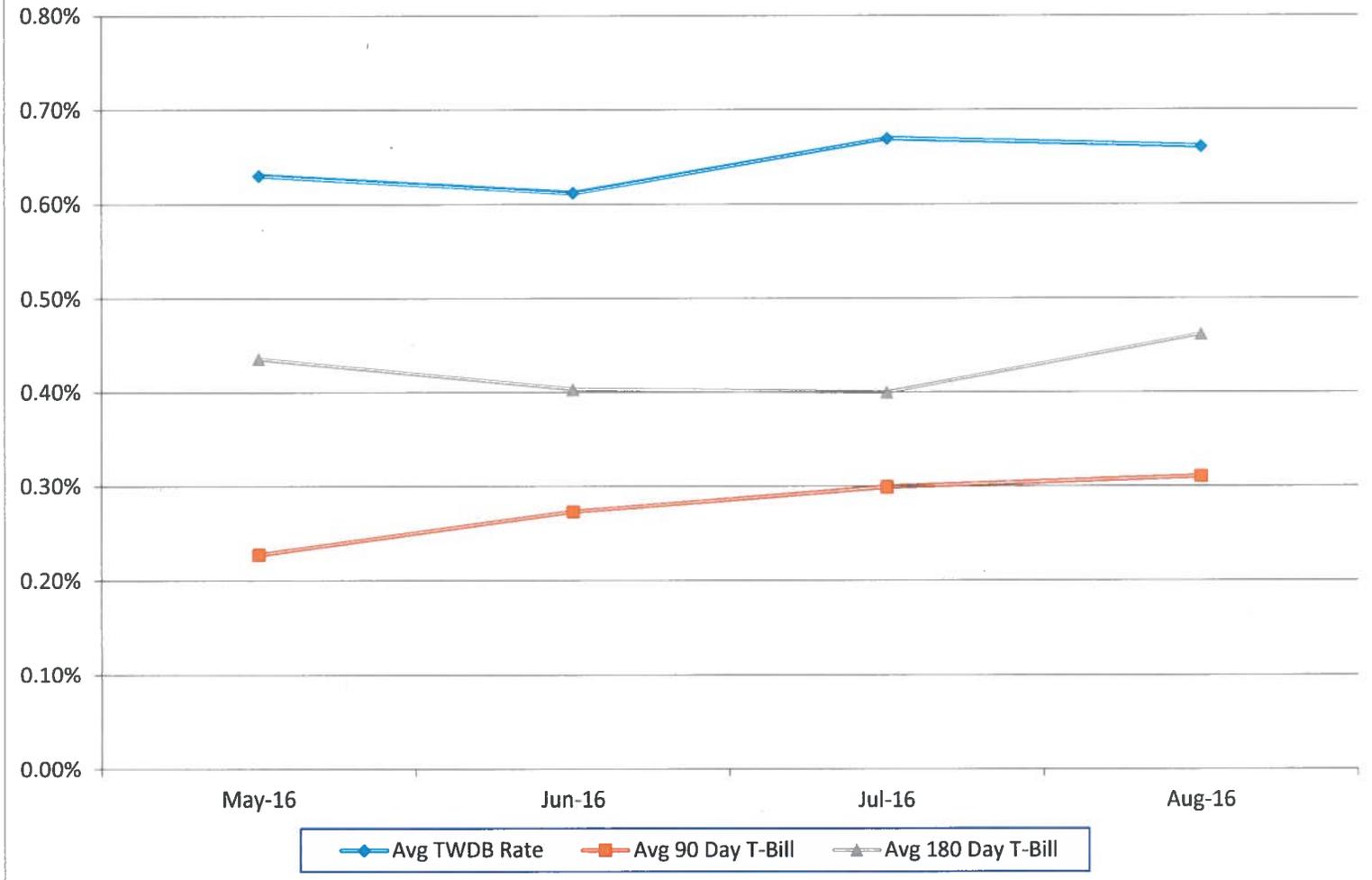
TWDB Portfolio by Fund Type
Total Market Value \$1,272,264,078
As of 08/31/2016



Texas Water Development Board Investments Maturing within 18 mos



Texas Water Development Board Average Rates - Current Quarter



Texas Water Development Board
Portfolio Summary
As of August 31, 2016



	Par Value	Book Value	Market Value	Portfolio Percentage
Treasury Pool/Cash	\$154,107,411	\$154,107,411	\$154,107,411	12.12%
Money Market Funds	\$4,239,234	\$4,239,234	\$4,239,234	0.33%
Commercial Paper	\$291,000,000	\$290,196,879	\$290,194,990	22.83%
Israel US Govt Gtd Bonds	\$25,932,000	\$26,370,115	\$26,743,462	2.07%
Repurchase Agreements	\$275,242,026	\$275,242,026	\$275,242,026	21.65%
US Treasury Bills/Notes	\$220,402,000	\$220,489,538	\$220,541,782	17.34%
US Agency Discounts/Bonds	\$302,826,000	\$300,577,738	\$301,147,174	23.64%
State and Local Govt Series (SLGS)	\$48,000	\$48,000	\$48,000	0.00%
Portfolio Totals	\$1,273,796,670	\$1,271,270,940	\$1,272,264,078	100.00%

	Par Value	Book Value	Market Value	Qtrly Avg Yield	Weighted Avg Maturity (WAM) in Days	Earnings for Period
Treasury Funds	\$154,107,411	\$154,107,411	\$154,107,411	0.821%	1.00	\$617,655
Trust Co. Funds (CWSRF/DWSRF)	\$997,449,235	\$996,559,815	\$996,721,875	0.534%	106.00	\$1,381,977
Pooled Funds	\$1,151,556,646	\$1,150,707,226	\$1,150,829,286	0.598%	106.00	\$1,999,632
Debt Service Funds	\$0	\$0	\$0	0.811%	0.00	\$6,961
SWIRFT Funds	\$104,098,234	\$102,421,924	\$103,293,001	1.248%	1,123.25	\$314,058
TWRFA Funds	\$18,141,791	\$18,141,791	\$18,141,791	0.288%	6.06	\$14,081
Portfolio Totals	\$1,273,796,670	\$1,271,270,940	\$1,272,264,078	0.6395%	187.16	\$2,334,732

Net Interest Earnings for the Period**	\$2,334,732
Unrealized Gains/(Losses) at end of Period	\$993,138

**Interest earnings net of fees paid for Investment Services

**Texas Water Development Board
Portfolio Summary of Changes by Fund
As of August 31, 2016**



	Par Value	Book Value	Market Value
Pooled Funds			
Beginning Balance 5/31/16	\$1,311,989,854	\$1,311,685,966	\$1,311,749,881
Period Changes	(\$160,433,208)	(\$160,978,740)	(\$160,920,595)
Ending Balance 8/31/16	\$1,151,556,646	\$1,150,707,226	\$1,150,829,286
Debt Service Funds			
Beginning Balance 5/31/16	\$11,313	\$11,313	\$11,313
Period Changes	(\$11,313)	(\$11,313)	(\$11,313)
Ending Balance 8/31/16	\$0	\$0	\$0
SWIRFT Funds			
Beginning Balance 5/31/16	\$100,747,464	\$98,963,470	\$99,243,274
Period Changes	\$3,350,770	\$3,458,454	\$4,049,727
Ending Balance 8/31/16	\$104,098,234	\$102,421,924	\$103,293,001
TWRFA Funds			
Beginning Balance 5/31/16	\$21,995,947	\$21,995,947	\$21,995,947
Period Changes	(\$3,854,156)	(\$3,854,156)	(\$3,854,156)
Ending Balance 8/31/16	\$18,141,791	\$18,141,791	\$18,141,791
Totals	\$1,273,796,670	\$1,271,270,940	\$1,272,264,078

**Texas Water Development Board
Portfolio Summary of Changes by Fund
As of August 31, 2016**



Summary of Significant Changes this Period:

Pooled Funds

Loan Repayments	Qtr	\$77,625,404
Loan Prepayments	Qtr	\$72,163,000
Bond Proceeds Series 2016BCD	July	\$53,148,264
Loan Closings/Disbursements	Qtr	(\$194,174,522)
GR Draw for Debt Service	July	\$43,270,814
Debt Service Payments	July/Aug	(\$211,266,047)
	<i>Pooled</i>	<u>(\$159,233,086)</u>

SWIRFT Funds

SWIRFT Repayments	Qtr	\$3,459,179
SWIRFT Debt Service	Qtr	\$0
	<i>SWIRFT</i>	<u>\$3,459,179</u>

TWRFA Funds

Reimbursement to GR	July	(\$4,279,844)
Loan Repayments	Qtr	\$414,714
	<i>TWRFA Funds</i>	<u>(\$3,865,130)</u>

Texas Water Development Board
Portfolio Listing by Maturity Date
As of August 31, 2016



Fund Type	Security Description	Security Type	Cusip	Maturity Date	Par Value	Total Book Value	Total Market Value
POOLED	Treas Pool/Cash	Treas Pool/Cash	Cash Pool	09/01/2016	\$154,107,411.29	\$154,107,411.29	\$154,107,411.29
DEBT SVC	Treas Pool/Cash	Treas Pool/Cash	Cash Pool	09/01/2016	\$0.00	\$0.00	\$0.00
POOLED	GREENWICH REPO	Repo	RPTWDB01	09/01/2016	\$224,000,000.00	\$224,000,000.00	\$224,000,000.00
POOLED	GREENWICH REPO	Repo	RPTWDB01	09/01/2016	\$33,148,235.00	\$33,148,235.00	\$33,148,235.00
TWRFA	GREENWICH REPO	Repo	RPTWDB01	09/01/2016	\$18,093,790.56	\$18,093,790.56	\$18,093,790.56
SWIRFT	GOLDMAN SACHS FUND	MM Funds	X9USDGLD4	09/01/2016	\$4,239,233.62	\$4,239,233.62	\$4,239,233.62
POOLED	CIESCO LLC	Commercial Paper	17178BJ1	09/01/2016	\$25,000,000.00	\$25,000,000.00	\$25,000,000.00
POOLED	FHLB DISC NOTE	Agencies	313384F8	09/14/2016	\$25,000,000.00	\$24,994,944.44	\$24,997,750.00
POOLED	US TREAS NOTE	US Treasuries	912828LP	09/30/2016	\$100,000,000.00	\$100,200,571.56	\$100,216,000.00
POOLED	CANADIAN IMPERIAL CP	Commercial Paper	13607EK7	10/07/2016	\$20,000,000.00	\$19,981,200.00	\$19,981,200.00
POOLED	FHLB DISC NOTE	Agencies	313384K6	10/14/2016	\$20,000,000.00	\$19,989,011.09	\$19,992,800.00
SWIRFT	US TREAS NOTE	US Treasuries	912828WA4	10/15/2016	\$16,007,000.00	\$16,012,529.87	\$16,013,562.87
SWIRFT	US TREAS NOTE	US Treasuries	912828WA4	10/15/2016	\$207,000.00	\$207,068.53	\$207,084.87
POOLED	BANK OF MONTREAL CP	Commercial Paper	06367JKJ	10/18/2016	\$20,000,000.00	\$19,975,716.67	\$19,975,716.67
POOLED	JP MORGAN SECURITY CP	Commercial Paper	46640PL8	11/08/2016	\$20,000,000.00	\$19,968,644.44	\$19,966,755.55
POOLED	JP MORGAN SECURITY CP	Commercial Paper	46640PL8	11/08/2016	\$4,000,000.00	\$3,993,351.11	\$3,993,351.11
POOLED	FHLB DISC NOTE	Agencies	313384N8	11/09/2016	\$24,000,000.00	\$23,980,910.00	\$23,985,840.00
POOLED	FHLB DISC NOTE	Agencies	313384P5	11/14/2016	\$50,000,000.00	\$49,954,263.80	\$49,968,000.00
POOLED	CHEVRON CORP	Commercial Paper	16677JLF	11/15/2016	\$24,000,000.00	\$23,961,500.00	\$23,961,500.00
POOLED	CHEVRON CORP	Commercial Paper	16677JLG	11/16/2016	\$24,000,000.00	\$23,960,986.67	\$23,960,986.67
POOLED	TOYOTA MOTOR CREDIT	Commercial Paper	89233GLH	11/17/2016	\$24,000,000.00	\$23,955,853.33	\$23,955,853.33
POOLED	TOYOTA MOTOR CREDIT	Commercial Paper	89233GLJ	11/18/2016	\$24,000,000.00	\$23,955,280.00	\$23,955,280.00
POOLED	US TREAS NOTE	US Treasuries	912828G4	11/30/2016	\$50,000,000.00	\$49,985,834.48	\$50,021,000.00
POOLED	JP MORGAN SECURITY CP	Commercial Paper	46640PM9	12/09/2016	\$20,000,000.00	\$19,946,100.00	\$19,946,100.00
POOLED	FHLB DISC NOTE	Agencies	313384ZC	12/30/2016	\$30,301,000.00	\$30,257,568.57	\$30,266,759.87
POOLED	US TREAS BILL	US Treasuries	912796KJ	2/23/2017	\$50,000,000.00	\$49,891,597.21	\$49,889,000.00
SWIRFT	ISRAEL ST U S GOVT NOTE	Israel Govt	465139DD2	03/15/2017	\$3,426,000.00	\$3,415,022.32	\$3,415,516.44
POOLED	BEDFORD ROW FUNDING	Commercial Paper	07644AQP	03/23/2017	\$20,000,000.00	\$19,884,966.67	\$19,884,966.67
POOLED	TORONTO DOMINION	Commercial Paper	89116EQQ	03/24/2017	\$25,000,000.00	\$24,861,166.67	\$24,861,166.67
POOLED	BEDFORD ROW FUNDING	Commercial Paper	07644AQX	03/31/2017	\$21,000,000.00	\$20,873,224.17	\$20,873,224.17

Texas Water Development Board
Portfolio Listing by Maturity Date
As of August 31, 2016



Fund Type	Security Description	Security Type	Cusip	Maturity Date	Par Value	Total Book Value	Total Market Value
POOLED	CIESCO LLC	Commercial Paper	17177LR7	04/07/2017	\$20,000,000.00	\$19,878,888.89	\$19,878,888.89
SWIRFT	US TREAS NOTE	US Treasuries	912828C73	04/15/2017	\$999,000.00	\$1,001,214.58	\$1,000,988.01
SWIRFT	US TREAS NOTE	US Treasuries	912828C73	04/15/2017	\$217,000.00	\$217,457.17	\$217,431.83
SWIRFT	FHLMC NOTE	Agencies	3137EADL0	09/29/2017	\$11,558,000.00	\$11,599,975.70	\$11,591,171.46
SWIRFT	US TREAS NOTE	US Treasuries	912828F54	10/15/2017	\$27,000.00	\$27,060.27	\$27,049.68
POOLED	FHLB NOTE	Agencies	3130A8JA	12/15/2017	\$50,000,000.00	\$50,000,000.00	\$50,021,000.00
POOLED	FHLB NOTE	Agencies	3130A8PJ	01/08/2018	\$50,000,000.00	\$50,000,000.00	\$50,020,500.00
SWIRFT	US TREAS NOTE	US Treasuries	912828K25	04/15/2018	\$2,378,000.00	\$2,376,029.43	\$2,376,882.34
SWIRFT	US TREAS NOTE	US Treasuries	912828K25	04/15/2018	\$198,000.00	\$197,773.88	\$197,906.94
SWIRFT	US TREAS NOTE	US Treasuries	912828RH5	09/30/2018	\$27,000.00	\$27,241.81	\$27,308.07
SWIRFT	FHLB NOTE	Agencies	313382U35	10/15/2018	\$11,270,000.00	\$11,270,000.00	\$11,316,883.20
SWIRFT	ISRAEL ST U S GOVT DISC	Israel Govt	465139DH3	03/15/2019	\$1,846,000.00	\$1,792,450.77	\$1,793,185.94
SWIRFT	US TREAS NOTE	US Treasuries	912828C65	03/31/2019	\$161,000.00	\$163,387.93	\$164,068.66
SWIRFT	US TREAS NOTE	US Treasuries	912828F39	09/30/2019	\$6,000.00	\$6,095.26	\$6,145.80
SWIRFT	RESOLUTION FDG CORP	Agencies	76116FAA5	10/15/2019	\$10,287,000.00	\$9,818,075.56	\$9,929,423.88
SWIRFT	FHLMC NOTE	Agencies	3134A1MY3	02/01/2020	\$485,000.00	\$460,839.75	\$459,159.20
SWIRFT	US TREAS NOTE	US Treasuries	912828J84	03/31/2020	\$163,000.00	\$163,397.52	\$164,936.44
SWIRFT	FNMA NOTE	Agencies	3136G0N49	04/15/2020	\$1,294,000.00	\$1,296,305.99	\$1,305,089.58
SWIRFT	US TREAS NOTE	US Treasuries	912828VZ0	09/30/2020	\$12,000.00	\$12,278.76	\$12,416.28
SWIRFT	RESOLUTION FDG CORP	Agencies	76116FAE7	10/15/2020	\$9,819,000.00	\$9,126,847.55	\$9,305,859.06
SWIRFT	FHLMC NOTE	Agencies	3134A4MW1	01/15/2021	\$125,000.00	\$115,498.46	\$115,903.75
SWIRFT	RESOLUTION FDG CORP	Agencies	76116EFX3	01/15/2021	\$198,000.00	\$182,874.59	\$186,585.30
SWIRFT	RESOLUTION FDG CORP	Agencies	76116FAG2	01/15/2021	\$1,185,000.00	\$1,095,653.37	\$1,115,322.00
SWIRFT	RESOLUTION FDG CORP	Agencies	76116EGV6	04/15/2021	\$160,000.00	\$151,905.45	\$150,174.40
TWRFA	STATE & LOCAL GOVT SERIES	State & Local Govt Series	SL001067	07/10/2021	\$22,000.00	\$22,000.00	\$22,000.00
SWIRFT	ISRAEL ST U S GOVT NOTE	Israel Govt	465139DNO	09/15/2021	\$9,008,000.00	\$8,230,153.86	\$8,276,730.56
SWIRFT	ISRAEL ST U S GOVT NOTE	Israel Govt	465139MQ3	02/15/2022	\$658,000.00	\$592,522.46	\$597,207.38
SWIRFT	ISRAEL ST U S GOVT NOTE	Israel Govt	465139RC9	02/15/2022	\$412,000.00	\$371,840.88	\$373,733.44
SWIRFT	ISRAEL ST U S GOVT NOTE	Israel Govt	465139BT9	03/15/2022	\$145,000.00	\$130,367.32	\$131,639.70
SWIRFT	RESOLUTION FDG CORP	Agencies	76116EGX2	04/15/2022	\$150,000.00	\$139,918.88	\$136,812.00
TWRFA	STATE & LOCAL GOVT SERIES	State & Local Govt Series	SL001065	07/10/2022	\$26,000.00	\$26,000.00	\$26,000.00
SWIRFT	ISRAEL ST U S GOVT NOTE	Israel Govt	465139BU6	09/15/2022	\$2,433,000.00	\$2,154,015.96	\$2,173,179.93
SWIRFT	RESOLUTION FDG CORP	Agencies	76116EGY0	10/15/2022	\$5,869,000.00	\$5,178,085.40	\$5,296,948.57

Texas Water Development Board
 Portfolio Listing by Maturity Date
 As of August 31, 2016



Fund Type	Security Description	Security Type	Cusip	Maturity Date	Par Value	Total Book Value	Total Market Value
SWIRFT	FHLMC NOTE	Agencies	3134A32C9	03/15/2023	\$441,000.00	\$381,149.15	\$387,625.77
SWIRFT	FHLMC NOTE	Agencies	3134A48X1	03/15/2023	\$379,000.00	\$327,563.55	\$333,383.56
SWIRFT	RESOLUTION FDG CORP FED	Agencies	76116EGZ7	04/15/2023	\$128,000.00	\$113,029.64	\$113,958.40
SWIRFT	ISRAEL ST U S GOVT NOTE	Israel Govt	46513EFF4	09/18/2023	\$8,004,000.00	\$9,683,741.48	\$9,982,268.64
SWIRFT	RESOLUTION FDG CORP FED	Agencies	76116EHB9	04/15/2024	\$96,000.00	\$79,425.52	\$83,577.60
SWIRFT	FNMA NOTE	Agencies	31364DKF2	04/08/2025	\$69,000.00	\$55,148.09	\$57,498.39
SWIRFT	FNMA NOTE	Agencies	31364DPG5	03/23/2026	\$2,000.00	\$1,527.75	\$1,582.26
SWIRFT	FNMA NOTE	Agencies	31364DPJ9	03/23/2027	\$5,000.00	\$3,643.41	\$3,797.15
SWIRFT	RESOLUTION FDG CORP	Agencies	76116EHK9	04/15/2028	\$5,000.00	\$3,572.15	\$3,768.40
Total Investments					\$1,273,796,670.47	\$1,271,270,940.26	\$1,272,264,077.82

FY 2016

Fund Types	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Debt Service Funds									
Securities	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cash/Money Market Funds	\$9,992	\$40,534,666	\$10,600	\$10,600	\$11,262	\$11,313	\$11,321	\$39,319	\$0
Total	\$9,992	\$40,534,666	\$10,600	\$10,600	\$11,262	\$11,313	\$11,321	\$39,319	\$0
Pooled Funds									
Securities	\$888,161,310	\$819,578,701	\$860,079,270	\$911,126,288	\$937,128,608	\$1,072,323,674	\$1,085,970,224	\$988,468,474	\$996,599,815
Cash/Money Market Funds	\$166,968,425	\$167,356,095	\$158,228,734	\$168,159,645	\$226,476,855	\$239,362,292	\$200,512,462	\$153,826,112	\$154,107,411
Total	\$1,055,129,736	\$986,934,796	\$1,018,308,004	\$1,079,285,933	\$1,163,605,463	\$1,311,685,966	\$1,286,482,686	\$1,142,294,586	\$1,150,707,227
TWRFA Funds									
Securities	\$48,000	\$48,000	\$48,000	\$48,000	\$48,000	\$48,000	\$48,000	\$48,000	\$48,000
Cash/Money Market Funds	\$21,836,023	\$21,924,347	\$21,930,247	\$21,935,156	\$21,941,437	\$21,947,947	\$21,950,697	\$18,080,118	\$18,093,791
Total	\$21,884,023	\$21,972,347	\$21,978,247	\$21,983,156	\$21,989,437	\$21,995,947	\$21,998,697	\$18,128,118	\$18,141,791
SWIRFT Funds									
Securities	\$106,575,219	\$107,988,977	\$106,326,212	\$98,566,207	\$98,449,294	\$98,085,006	\$98,120,121	\$98,156,406	\$98,182,690
Cash/Money Market Funds	\$534,024	\$342,128	\$3,308,595	\$16,657,042	\$521,837	\$878,464	\$2,410,479	\$2,423,304	\$4,239,234
Total	\$107,109,244	\$108,331,105	\$109,634,807	\$115,223,249	\$98,971,131	\$98,963,470	\$100,530,600	\$100,579,710	\$102,421,924
PORTFOLIO TOTALS	\$1,184,132,994	\$1,157,772,914	\$1,151,188,596	\$1,216,603,495	\$1,284,577,293	\$1,432,656,696	\$1,409,023,303	\$1,261,041,733	\$1,271,270,941

**Texas Water Development Board
Investment Officer Training Report
Annual Report as of August 31, 2016**



Name	Title	Last Training Date	# of Hours Completed	Next Training Due Date	Compliant with PFIA
Jeff Walker	Executive Administrator	9/12/2016	5	9/12/2018	Yes
Amanda Lavin	Assistant Executive Administrator & Development Fund Manager	9/12/2016	5	9/12/2018	Yes
Rebecca Trevino	Chief Financial Officer	8/12/2016	5	8/12/2018	Yes
Oscar Ramirez	Director of Accounting	2/12/2016	5	2/11/2018	Yes
Elaine Wilson	Revenue Team Lead	2/12/2016	5	2/11/2018	Yes

National

Economic Gains Enough to Further Tighten Labor Market

August 1, 2016

Indicators released over the past two months suggest a modest upturn in U.S. economic activity in the second quarter. Job growth has slowed but remains at a rate consistent with further declines in unemployment. Wage inflation has accelerated recently, and increasing tightness in the labor market signals more increases to come. Trimmed mean inflation looks to remain fairly steady over the coming four quarters.

Output Growth Strengthens Slightly, but Trend Slows

Initial data from the Bureau of Economic Analysis (BEA) showed that the economy shook off some of the weakness observed in the first quarter (*Chart 1*), with personal consumption expenditures (PCE) and net exports the only major contributors with 2.8 and 0.2 percentage points added to growth, respectively.

While the second quarter marked a slight improvement from the first quarter, it was significantly lower than the 2.2 average growth over the recovery. Moreover, the four-quarter rate—a measure of recent trend—slipped from 3.0 percent a year ago to 1.2 percent today. This is the largest year-to-year drop in the trend since 2011. However, slow trend doesn't necessarily mean slow growth ahead: In 2013, growth accelerated to more than 3.5 percent, annualized, in the second half following a four-quarter rate that was even lower at 1.0 percent.

Hiring Wanes

Nonfarm payroll employment only increased an average 147,000 per month from April through June, down from 196,000 from January through March, the lowest quarterly average rate since 2012.

Meanwhile, the unemployment rate bounced up to 4.9 percent in June, after falling to 4.7 percent in May, leaving the second-quarter average unchanged at 4.9 percent. If 150,000 jobs per month becomes the new normal over the coming year, will the unemployment rate resume its decline?

Movements in the unemployment rate occur due to changes in participation, hiring and population. The participation rate has mostly increased since October 2015. However, looking over a longer history going back to late 2008, it has fallen on net and has done so in large part because of aging (*Chart 2*). In other words, it has fallen because of factors independent of labor-market decisions. Consequently, unless firms incentivize higher rates of participation, for example, through much higher wage rates, it's likely that participation will continue falling over the medium term.

Assuming that the participation rate remains constant in the second half of 2016, the economy would need to add only 110,000 to 130,000 jobs per month to keep the unemployment rate steady. (Even fewer jobs would be needed assuming the participation rate falls.)¹ Hence, a continuation of second-quarter job growth should easily further drive down the unemployment rate.

Chart 1
Real GDP Growth Up from First Quarter, but Trend Down from a Year Ago

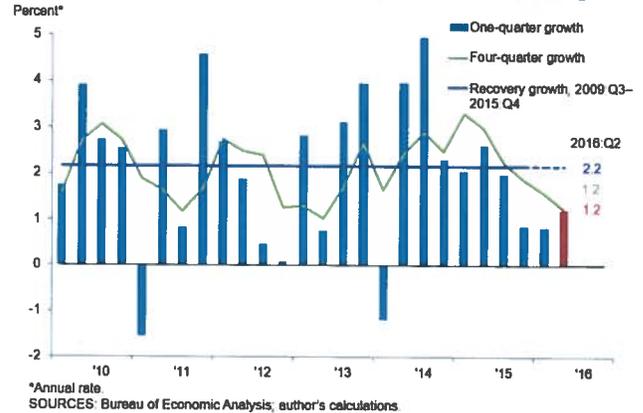
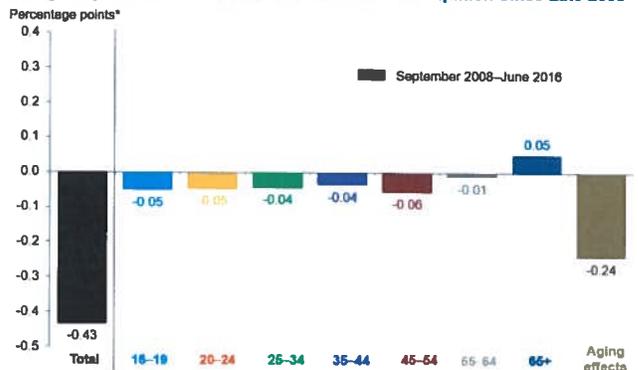


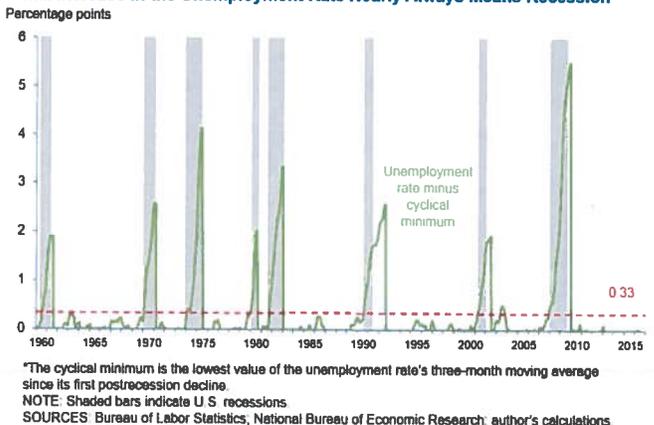
Chart 2
Aging Responsible for Over Half the Decline in Participation Since Late 2008



*Contribution to changes in labor force participation, seasonally adjusted, average per year

SOURCES: Bureau of Labor Statistics; author's calculations.

Chart 3
Small Increase in the Unemployment Rate Nearly Always Means Recession



A Recession Rule of Thumb

Unemployment is close to most estimates of the longer-run sustainable rate², i.e., the rate consistent with full employment and price stability, and further job gains may bring unemployment below what's sustainable, setting the stage for it to increase later on.

Historical experience indicates that unemployment rate increases can be problematic. Over the past 50 years, with one exception, whenever the unemployment rate's three-month moving average has risen more than a few tenths of a percentage point, more increases follow and the economy enters recession (Chart 3).³ Consequently, if unemployment falls much below the longer-run sustainable rate, it will be difficult for it to reverse course upward without triggering a recession.

Wage Inflation Will Rise and Price Pressures to Remain Stable

How much further the unemployment rate can fall before wage and price pressures kick in is also of keen interest to many. For Federal Reserve policymakers, the Fed's dual mandate of full employment and price stability makes it especially important to understand the relationship between the unemployment rate and wage and price pressures.

The question of what wage measure to consider is a key one. Choosing a measure that is not robust to shifts in the composition of occupations or the exit and entry of low- and high-skilled workers can be misleading.

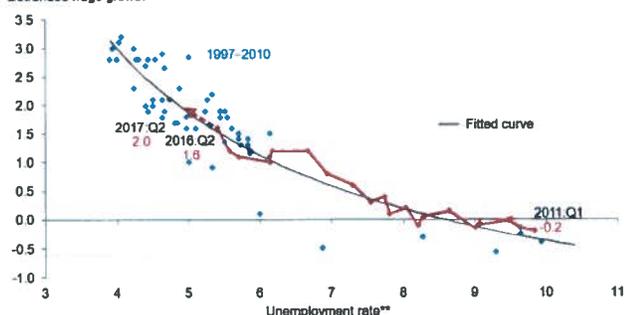
One measure highly resilient against such shifts is the Atlanta Fed Wage Growth Tracker (WGT). It measures the median 12-month wage growth of individuals continuously employed over the last 12 months. To forecast how wages will change over the coming year, the relationship between WGT (less lagged inflation expectations) and lagged values of the unemployment rate was estimated (Chart 4).⁴ There's strong intuition (validated by empirical studies) for this relationship, with one narrative among others stating that as the supply of available labor lessens, firms subsequently must bid up wages to attract the remaining job candidates. Assuming consistency with historical movements and 2 percent inflation expectations, the forecast calls for wage inflation to rise from its current four-quarter rate of 3.6 percent to 4.0 percent in second quarter 2017.

Turning to price inflation, the Dallas Fed's preferred measure of inflation is the Trimmed Mean PCE price index, which excludes the greatest individual price movements (high or low) from a basket of items during a given month and consequently better captures the underlying trend. This gives Trimmed Mean PCE a tight association with labor-market slack. On a 12-month basis, Trimmed Mean PCE inflation was 1.78 percent in May—roughly unchanged from its levels so far this year but up from a year ago.

Just as was the case with wage inflation, one can anticipate future trimmed mean inflation using lagged values of the unemployment rate (Chart 5).⁵ Doing so suggests trimmed mean inflation will hold fairly steady, at about 1.8 percent, over the four quarters ending second quarter 2017.

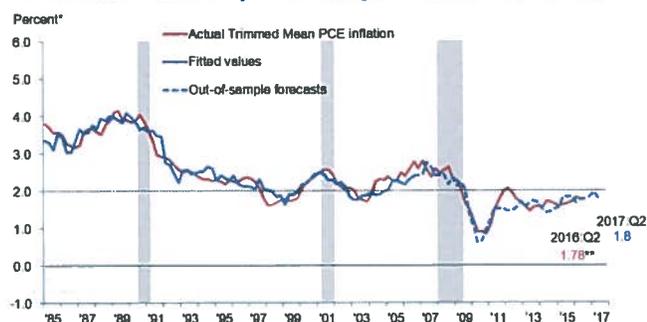
—Alan Armen

Chart 4
Labor-Market Tightness Implies Acceleration In Wage Growth Over Next Year
Detrended wage growth*



*Atlanta Fed Wage Growth Tracker, minus Survey of Professional Forecasters four-quarter lagged 10-year personal consumption expenditures inflation expectations, four-quarter percent change.
**Lagged four quarters, seasonally adjusted.
SOURCES: Bureau of Labor Statistics, Federal Reserve Bank of Atlanta, Federal Reserve Bank of Philadelphia, author's calculations.

Chart 5
Trimmed Mean Inflation Likely to Hold Steady at 1.8 Percent Over Next Year
Percent*



*Four-quarter percent change
**2018 Q2 figure is an estimate based on incomplete data covering February through May
NOTE: Shaded bars indicate U.S. recessions
SOURCES: Bureau of Economic Analysis, Federal Reserve Bank of Dallas, National Bureau of Economic Research, author's calculations.

Notes

1. Assuming a constant participation rate and between 0.9 and 1.1 percent population growth (approximately the low and high, respectively, over the recovery) in those aged 16 years and over.
2. The June 2016 Federal Reserve Board Summary of Economic Projections and the Congressional Budget Office both currently estimate the long-run sustainable unemployment rate to be around 4.8 percent.
3. For a more in-depth elaboration of this observed rule of thumb, see "Is Rising Unemployment an Early Warning of State-Level Recession?" by Alan Armen and Tyler Atkinson, *Economic Letter*, vol. 11, no. 8, 2016.
4. Specifically, the curve shows results from a regression of four-quarter wage growth detrended using four-quarter lagged 10-year inflation expectations on the four-quarter lagged unemployment rate, the inverse of the four-quarter-lagged unemployment rate and a constant. In this regression, the coefficient on the inverse unemployment rate is large, positive and highly statistically significant, indicating that the relationship between it and wage inflation is strongly nonlinear.
5. For a more detailed explanation of the model, see "Inflation, Slack and Fed Credibility," by Evan F. Koenig and Tyler Atkinson, Federal Reserve Bank of Dallas Staff Paper, no. 16, 2012.

About the Author

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Texas Economic Indicators

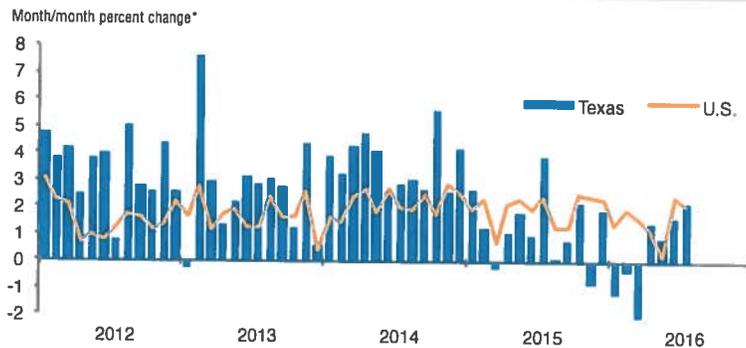
DALLAS FED

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Summary

The Texas economy's performance was mixed in July. Employment expanded but unemployment rose. Existing-home sales fell in July, while housing prices and inventories increased. Exports broadly declined in the second quarter. While the price of natural gas increased and the rig count continued to recover in July, oil prices decreased, indicating continued adversity for oil production. The Texas Leading Index estimate ticked up in July, and the Texas Business-Cycle Index points to a pickup in the Texas economy after a slow start to the year.

Employment



*Seasonally adjusted, annualized rate.

SOURCES: Bureau of Labor Statistics; Texas Workforce Commission; adjustments by the Dallas Fed.

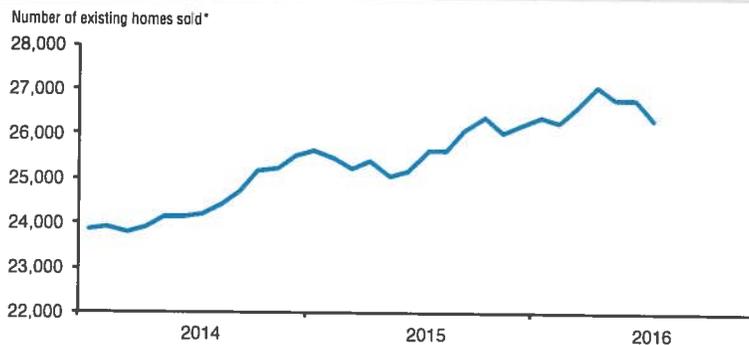
► Texas employment grew at a 2.2 percent annualized pace in July, outperforming the nation's 2.1 percent increase. Texas gained over 21,000 jobs in July after adding more than 16,000 in June.

► Employment in oil and gas extraction—which represents 1.8 percent of Texas employment—decreased the most at 13.7 percent year to date, while employment in education and health services—13.8 percent of the Texas total—grew the fastest at 3.4 percent.

► The Texas unemployment rate rose again to 4.6 percent in July. The U.S. unemployment rate, in contrast, remained steady at 4.9 percent.

► The Dallas Fed's [Texas Employment Forecast](#) estimates growth of 0.8 percent for 2016 (December over December), which would generate 96,200 jobs this year.

Home Sales



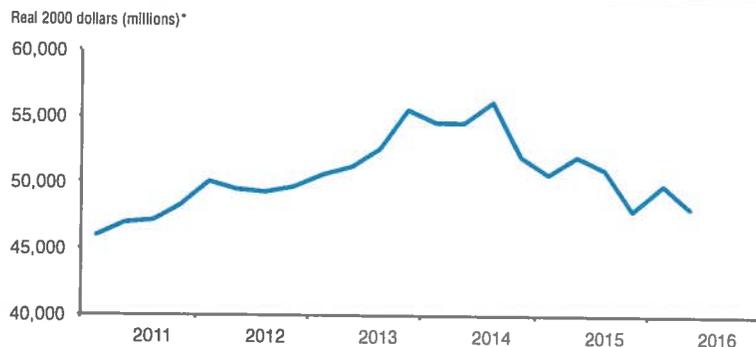
*Five-month moving average, seasonally adjusted.

SOURCE: Multiple Listing Service.

► Texas existing-home sales fell 5.8 percent in July and were 7.9 percent below year-earlier levels. The real median sales price edged up from June to July by 0.1 percent to \$207,714. Existing-home inventory also ticked up, to 3.7 months of supply, but remains well below the six-month equilibrium level.

► Housing starts declined 5.9 percent in June after growing 12.1 percent in May. Starts were down 8.8 percent year over year in June.

Exports



*Seasonally adjusted, quarterly.

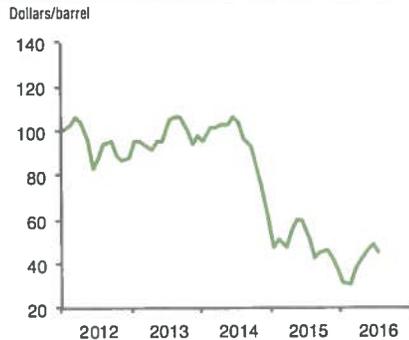
SOURCES: Census Bureau; WISERTrade; adjustments by the Dallas Fed.

► Texas exports declined 3.4 percent in the second quarter and were 7.6 percent lower than in second quarter 2015.

► Exports to Mexico, Canada and China and the rest of Asia decreased during the quarter, while exports to the European Union increased.

► Whereas exports of petroleum and coal products and nonelectrical machinery increased in the second quarter, other categories of exports, such as chemicals and agriculture, decreased.

Crude Oil Prices



SOURCE: Wall Street Journal.

► The price of West Texas Intermediate crude oil stood at \$44.69 per barrel in July, down 8.4 percent from June and 12.2 percent year over year.

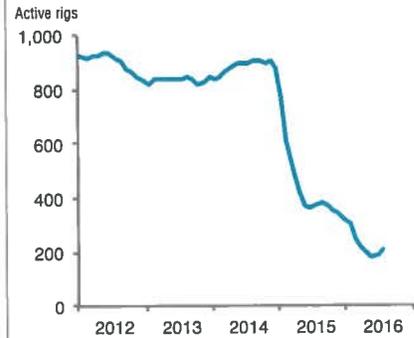
Natural Gas Prices



SOURCE: Wall Street Journal.

► The price of natural gas, in contrast, increased 8.6 percent in July to \$2.79 per million Btu.

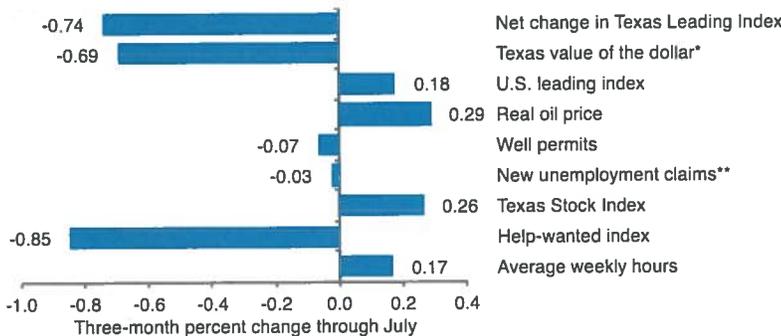
Texas Rig Count



SOURCE: Baker Hughes.

► The rig count continued to recover for the second straight month, increasing by 22 rigs in July after rising by six in June. However, there were still 162 fewer active rigs this July than last.

Texas Leading Index with Components



*Estimated July value.

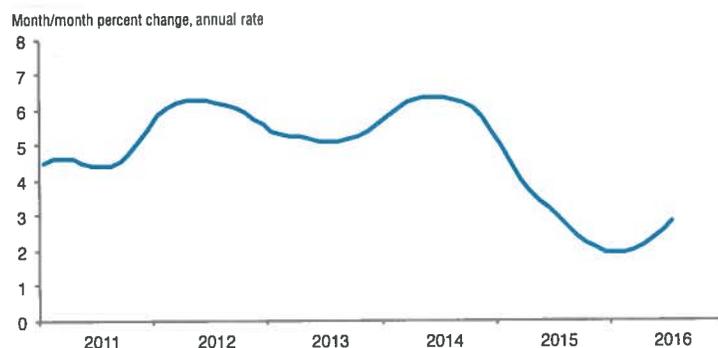
**Estimated using weekly unemployment claims series.

NOTE: Data are seasonally adjusted.

SOURCE: Dallas Fed.

► The Texas Leading Index, which uses key economic indicators to forecast employment growth, increased 0.39 percent in July. However, the three-month net change (May to July) was -0.7 percent. A rise in the Texas value of the dollar (shown as a negative value) and a decline in the help-wanted index depressed the leading index over the three-month period, while increases in the U.S. leading index, real oil prices, the Texas Stock Index and average weekly hours contributed positively to the estimate.

Texas Business-Cycle Index



SOURCE: Dallas Fed.

► The Texas Business-Cycle Index points to expansion in the state's economy. The index grew at a 2.8 percent annualized rate in July and is 2.2 percent higher than a year ago.

NOTE: Data may not match previously published numbers due to revisions.

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