[] Dendrochronology Program Library Run CAGL Program COF 10:40 Fri 04 Sep 2020 Page 1

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

File of DATED series: SCBI\_cagl.rwl

CONTENTS:

Part 1: Title page, options selected, summary, absent rings by series

Part 2: Histogram of time spans

Part 3: Master series with sample depth and absent rings by year

Part 4: Bar plot of Master Dating Series

Part 5: Correlation by segment of each series with Master

Part 6: Potential problems: low correlation, divergent year-to-year changes, absent rings, outliers

Part 7: Descriptive statistics

RUN CONTROL OPTIONS SELECTED VALUE

1 Cubic smoothing spline 50% wavelength cutoff for filtering

32 years

2 Segments examined are 50 years lagged successively by 25 years

3 Autoregressive model applied A Residuals are used in master dating series and testing

4 Series transformed to logarithms Y Each series log-transformed for master dating series and testing

5 CORRELATION is Pearson (parametric, quantitative)

Critical correlation, 99% confidence level .3281

6 Master dating series saved N

7 Ring measurements listed N

8 Parts printed 1234567

9 Absent rings are omitted from master series and segment correlations (Y)

Time span of Master dating series is 1868 to 2016 149 years

Continuous time span is 1868 to 2016 149 years

Portion with two or more series is 1871 to 2015 145 years

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*C\* Number of dated series 39 \*C\*

\*O\* Master series 1868 2016 149 yrs \*O\*

\*F\* Total rings in all series 3654 \*F\*

\*E\* Total dated rings checked 3650 \*E\*

\*C\* Series intercorrelation .399 \*C\*

\*H\* Average mean sensitivity .281 \*H\*

\*A\* Segments, possible problems 39 \*A\*

\*\*\* Mean length of series 93.7 \*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ABSENT RINGS listed by SERIES: (See Master Dating Series for absent rings listed by year)

60252 4 absent rings: 1947 1948 1952 1966

131032 3 absent rings: 1914 1919 1947

80301 1 absent rings: 1920

60386 2 absent rings: 1947 1948

10 absent rings .274%

PART 2: TIME PLOT OF TREE-RING SERIES: 10:40 Fri 04 Sep 2020 Page 2

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1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050 Ident Seq Time-span Yrs

: : : : : : : : : : : : : : : : : : : : : -------- --- ---- ---- ----

. . . . . . . . . . . . . . . . .<============>. . 90542 1 1868 1992 125

. . . . . . . . . . . . . . . . . <============> . 101159 2 1871 2002 132

. . . . . . . . . . . . . . . . . <============> . 60252 3 1878 2008 131

. . . . . . . . . . . . . . . . . <===========> . 60172 4 1880 2007 128

. . . . . . . . . . . . . . . . . <===========> . 131032 5 1880 2009 130

. . . . . . . . . . . . . . . . . <==========>. . 91321 6 1881 1996 116

. . . . . . . . . . . . . . . . . <==========> . 70269 7 1890 2009 120

. . . . . . . . . . . . . . . . . <=========>. . 80301 8 1890 1997 108

. . . . . . . . . . . . . . . . . <==========> . 70332 9 1891 2009 119

. . . . . . . . . . . . . . . . . <=========> . 91391 10 1900 2001 102

. . . . . . . . . . . . . . . . . <=========> . 50246 11 1901 2004 104

. . . . . . . . . . . . . . . . . <=========> . 80625 12 1901 2008 108

. . . . . . . . . . . . . . . . . <=========> . 60059 13 1902 2009 108

. . . . . . . . . . . . . . . . . <=========> . 60386 14 1902 2009 108

. . . . . . . . . . . . . . . . . <=========> . 121088 15 1902 2009 108

. . . . . . . . . . . . . . . . . <=========> . 90522 16 1905 2002 98

. . . . . . . . . . . . . . . . . <=========> . 80288 17 1906 2006 101

. . . . . . . . . . . . . . . . . <=========> . 121105 18 1906 2009 104

. . . . . . . . . . . . . . . . . <=========> . 131113 19 1907 2009 103

. . . . . . . . . . . . . . . . . <=========> . 172218 20 1907 2009 103

. . . . . . . . . . . . . . . . . .<========> . 70152 21 1916 2008 93

. . . . . . . . . . . . . . . . . .<========> . 91487 22 1917 2004 88

. . . . . . . . . . . . . . . . . . <=======> . 50244 23 1921 2008 88

. . . . . . . . . . . . . . . . . . <========> . 152053 24 1923 2015 93

. . . . . . . . . . . . . . . . . . <=======> . 70065 25 1929 2009 81

. . . . . . . . . . . . . . . . . . <=======> . 40522 26 1930 2010 81

. . . . . . . . . . . . . . . . . . <======> . 70626A 27 1930 2006 77

. . . . . . . . . . . . . . . . . . <======> . 100680 28 1931 2007 77

. . . . . . . . . . . . . . . . . . <======> . 111094 29 1931 2009 79

. . . . . . . . . . . . . . . . . . <=======> . 30567A 30 1932 2013 82

. . . . . . . . . . . . . . . . . . <======> . 91327 31 1935 2009 75

. . . . . . . . . . . . . . . . . . <======> . 100974 32 1936 2005 70

. . . . . . . . . . . . . . . . . . <=======> . 172210 33 1938 2014 77

. . . . . . . . . . . . . . . . . . <=====> . 92183A 34 1952 2016 65

. . . . . . . . . . . . . . . . . . <====> . 111212 35 1952 2009 58

. . . . . . . . . . . . . . . . . . <=====> . 33337A 36 1954 2014 61

. . . . . . . . . . . . . . . . . . <=====> . 112256 37 1955 2015 61

. . . . . . . . . . . . . . . . . . <====> . 70256 38 1956 2008 53

. . . . . . . . . . . . . . . . . . .<===> . 100961 39 1969 2007 39

: : : : : : : : : : : : : : : : : : : : :

1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050

PART 3: Master Dating Series: 10:40 Fri 04 Sep 2020 Page 3

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Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab

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1900 .366 10 1950 -.679 33 2000 -.753 36

1901 .441 12 1951 -.279 33 2001 .095 36

1902 .287 15 1952 -1.234 35 1 2002 -.169 35

1903 .732 15 1953 -.507 35 2003 .771 33

1904 .671 15 1954 .313 36 2004 -.167 33

1905 .909 16 1955 .778 37 2005 .255 31

1906 .813 18 1956 1.224 38 2006 .318 30

1907 -.268 20 1957 1.368 38 2007 .422 28

1908 -.381 20 1958 1.906 38 2008 .780 25

1909 -.601 20 1959 .174 38 2009 .747 20

1910 -.471 20 1960 1.191 38 2010 .365 7

1911 -2.579 20 1961 .729 38 2011 -1.443 6

1912 -.937 20 1962 -.376 38 2012 -1.142 6

1913 -1.391 20 1963 -.056 38 2013 .328 6

1914 -1.741 20 1 1964 -1.208 38 2014 .973 5

1915 -.373 20 1965 -.389 38 2015 2.057 3

1916 .687 21 1966 -2.210 38 1 2016 1.645 1

1917 .076 22 1967 -.234 38

1868 -.654 1 1918 -1.156 22 1968 .854 38

1869 2.862 1 1919 -1.069 22 1 1969 .519 39

1870 -.825 1 1920 -1.280 22 1 1970 .490 39

1871 -2.985 2 1921 .012 23 1971 -.426 39

1872 .301 2 1922 .352 23 1972 -.191 39

1873 1.280 2 1923 -.125 24 1973 .512 39

1874 -1.561 2 1924 1.237 24 1974 -.946 39

1875 -.289 2 1925 .426 24 1975 -.082 39

1876 .514 2 1926 .749 24 1976 -.108 39

1877 -.475 2 1927 1.277 24 1977 -2.021 39

1878 1.639 3 1928 1.321 24 1978 -.388 39

1879 .905 3 1929 1.083 25 1979 -.380 39

1880 1.347 5 1930 .218 27 1980 .743 39

1881 -.309 6 1931 -.603 29 1981 .612 39

1882 .510 6 1932 -.042 30 1982 1.205 39

1883 .229 6 1933 -.396 30 1983 .613 39

1884 -.680 6 1934 -.592 30 1984 -.687 39

1885 -.542 6 1935 -.657 31 1985 -.131 39

1886 -.286 6 1936 .721 32 1986 -.017 39

1887 .055 6 1937 1.315 32 1987 -.209 39

1888 -.361 6 1938 1.411 33 1988 -.080 39

1889 -2.729 6 1939 -1.161 33 1989 -.170 39

1890 -2.194 8 1940 .647 33 1990 1.025 39

1891 -.410 9 1941 .766 33 1991 -.574 39

1892 -.359 9 1942 .393 33 1992 -.021 39

1893 .541 9 1943 -.615 33 1993 .481 38

1894 .588 9 1944 -.151 33 1994 .610 38

1895 .543 9 1945 -.202 33 1995 -.099 38

1896 .875 9 1946 -.537 33 1996 .449 38

1897 1.666 9 1947 -3.329 33 3 1997 -1.092 37

1898 1.683 9 1948 -1.499 33 2 1998 -.597 36

1899 .772 9 1949 -1.094 33 1999 -.799 36

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PART 4: Master Bar Plot: 10:40 Fri 04 Sep 2020 Page 4

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Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value

1900------A 1950--c 2000--c

1901-------B 1951----a 2001-----@

1902------A 1952-e 2002----a

1903--------C 1953--b 2003--------C

1904--------C 1954------A 2004----a

1905---------D 1955--------C 2005------A

1906--------C 1956---------E 2006------A

1907----a 1957----------E 2007------B

1908---b 1958----------H 2008--------C

1909--b 1959------A 2009--------C

1910---b 1960---------E 2010------A

1911j 1961--------C 2011f

1912-d 1962---b 2012-e

1913-f 1963-----@ 2013------A

1914g 1964-e 2014---------D

1915---a 1965---b 2015----------H

1916--------C 1966i 2016----------G

1917-----@ 1967----a

1868--c 1918-e 1968--------C

1869----------K 1919-d 1969-------B

1870--c 1920-e 1970-------B

1871l 1921-----@ 1971---b

1872------A 1922------A 1972----a

1873---------E 1923----@ 1973-------B

1874f 1924---------E 1974-d

1875---a 1925-------B 1975-----@

1876-------B 1926--------C 1976----@

1877---b 1927---------E 1977h

1878----------G 1928---------E 1978---b

1879---------D 1929---------D 1979---b

1880----------E 1930------A 1980--------C

1881---a 1931--b 1981-------B

1882-------B 1932-----@ 1982---------E

1883------A 1933---b 1983-------B

1884--c 1934--b 1984--c

1885--b 1935--c 1985----a

1886----a 1936--------C 1986-----@

1887-----@ 1937---------E 1987----a

1888---a 1938----------F 1988-----@

1889k 1939-e 1989----a

1890i 1940--------C 1990---------D

1891---b 1941--------C 1991--b

1892---a 1942------B 1992-----@

1893-------B 1943--b 1993-------B

1894-------B 1944----a 1994-------B

1895-------B 1945----a 1995-----@

1896--------D 1946--b 1996-------B

1897----------G 1947m 1997-d

1898----------G 1948f 1998--b

1899--------C 1949-d 1999--c

PART 5: CORRELATION OF SERIES BY SEGMENTS: 10:40 Fri 04 Sep 2020 Page 5

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Correlations of 50-year dated segments, lagged 25 years

Flags: A = correlation under .3281 but highest as dated; B = correlation higher at other than dated position

Seq Series Time\_span 1850 1875 1900 1925 1950 1975

1899 1924 1949 1974 1999 2024

--- -------- --------- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ----

1 90542 1868 1992 .36 .37 .60 .48 .42

2 101159 1871 2002 .37 .36 .56 .58 .22B .24A

3 60252 1878 2008 .46 .39 .31B .35 .30A

4 60172 1880 2007 .41 .51 .56 .37 .31A

5 131032 1880 2009 .35B .57 .63 .56 .42

6 91321 1881 1996 .39B .58 .50 .36

7 70269 1890 2009 .31A .34 .66 .55 .45

8 80301 1890 1997 .54 .58 .53 .29A

9 70332 1891 2009 .43 .45 .39 .29A .28A

10 91391 1900 2001 .25B .21B .49 .47

11 50246 1901 2004 .49 .61 .56 .59

12 80625 1901 2008 .49 .56 .57 .55

13 60059 1902 2009 .61 .58 .60 .48

14 60386 1902 2009 .55 .38 .33A .33

15 121088 1902 2009 .43 .46 .36 .28B

16 90522 1905 2002 .42 .38 .19B .17B

17 80288 1906 2006 .36 .42 .44 .42

18 121105 1906 2009 .46 .53 .54 .48

19 131113 1907 2009 .69 .74 .53 .42

20 172218 1907 2009 .46 .53 .46 .42

21 70152 1916 2008 .67 .71 .46 .39

22 91487 1917 2004 .52 .62 .54 .50

23 50244 1921 2008 .24A .33 .36 .32A

24 152053 1923 2015 .15B .22A .16B .29A

25 70065 1929 2009 .31A .21B .25A

26 40522 1930 2010 .37 .33A .32A

27 70626A 1930 2006 .28A .32A .34

28 100680 1931 2007 .58 .41 .36

29 111094 1931 2009 .64 .44 .34

30 30567A 1932 2013 .34 .35 .39

31 91327 1935 2009 .44 .63 .51

32 100974 1936 2005 .49 .54 .53

33 172210 1938 2014 .49 .36 .28A

34 92183A 1952 2016 .22B .32A

35 111212 1952 2009 .34 .20B

36 33337A 1954 2014 .21B .01B

37 112256 1955 2015 .32A .20A

38 70256 1956 2008 .42 .39

39 100961 1969 2007 .31A

Av segment correlation .37 .40 .47 .48 .40 .36

PART 6: POTENTIAL PROBLEMS: 10:40 Fri 04 Sep 2020 Page 5

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For each series with potential problems the following diagnostics may appear:

[A] Correlations with master dating series of flagged 50-year segments of series filtered with 32-year spline,

at every point from ten years earlier (-10) to ten years later (+10) than dated

[B] Effect of those data values which most lower or raise correlation with master series

Symbol following year indicates value in series is greater (>) or lesser (<) than master series value

[C] Year-to-year changes very different from the mean change in other series

[D] Absent rings (zero values)

[E] Values which are statistical outliers from mean for the year

====================================================================================================================================

90542 1868 to 1992 125 years Series 1

[\*] Early part of series cannot be checked from 1868 to 1870 -- not matched by another series

[B] Entire series, effect on correlation ( .390) is:

Lower 1874> -.031 1877> -.020 1976> -.015 1876< -.015 1892> -.012 1926< -.011 Higher 1947 .060 1911 .041

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1976 +3.9 SD

====================================================================================================================================

101159 1871 to 2002 132 years Series 2

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1950 1999 10 -.21 -.24 -.03 -.11 -.11 .01 -.11 .12 .11 .02 .22| .01 .01 .21 -.16 .07 -.15 .18 -.09 -.07 .29\*

1953 2002 0 -.24 -.21 -.02 -.10 -.11 .03 -.17 .16 .10 .03 .24\* .00 .02 .18 -.15 .07 -.15 .21 -.11 -.10 .23

[B] Entire series, effect on correlation ( .375) is:

Lower 1990< -.036 1877< -.014 1968< -.012 1876> -.011 1874< -.011 1931> -.010 Higher 1947 .055 1889 .016

1950 to 1999 segment:

Lower 1990< -.099 1968< -.036 1997> -.024 1984> -.024 1971> -.021 1999> -.020 Higher 1974 .068 1977 .055

1953 to 2002 segment:

Lower 1990< -.099 1968< -.036 1997> -.025 1984> -.025 1971> -.021 1999> -.021 Higher 1974 .067 1977 .053

====================================================================================================================================

60252 1878 to 2008 131 years Series 3

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1925 1974 1 -.10 -.07 -.10 .08 -.14 -.09 .19 .06 .08 -.17 .31| .46\* .06 .09 .23 .04 .13 -.30 -.10 -.03 -.12

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

1959 2008 0 .02 .12 .06 .06 .11 .02 -.15 -.08 -.16 .02 .30\*-.06 .20 -.17 .01 -.06 .08 -.05 .04 - -

[B] Entire series, effect on correlation ( .462) is:

Lower 1999> -.019 1879< -.016 1931> -.014 1989< -.012 1888> -.011 1964> -.010 Higher 1966 .041 1889 .022

1925 to 1974 segment:

Lower 1931> -.036 1964> -.027 1959> -.019 1973< -.017 1958< -.015 1937< -.014 Higher 1966 .077 1936 .012

1959 to 2008 segment:

Lower 1999> -.046 1964> -.032 1989< -.028 1973< -.021 1959> -.020 1977> -.019 Higher 1966 .171 1984 .021

[D] 4 Absent rings: Year Master N series Absent

1947 -3.329 33 3

1948 -1.499 33 2

1952 -1.234 35 1

1966 -2.210 38 1

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1966 -5.1 SD

====================================================================================================================================

60172 1880 to 2007 128 years Series 4

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1958 2007 0 .15 -.07 -.10 -.09 -.01 -.03 -.03 .09 -.06 .18 .31\*-.04 .28 -.12 .07 -.18 -.34 .15 -.07 .07 -

[B] Entire series, effect on correlation ( .425) is:

Lower 1977> -.023 1880< -.021 1967< -.020 1999> -.012 1975< -.011 1890> -.010 Higher 1889 .046 1947 .045

1958 to 2007 segment:

Lower 1977> -.065 1967< -.051 1999> -.031 1975< -.026 1964> -.017 2006> -.017 Higher 1958 .054 1997 .047

====================================================================================================================================

131032 1880 to 2009 130 years Series 5

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1880 1929 1 -.12 -.07 -.24 .13 -.25 -.02 .09 .16 .15 .06 .35| .36\* .25 .11 .08 -.01 .12 -.08 .05 -.21 -.15

[B] Entire series, effect on correlation ( .467) is:

Lower 1889> -.041 2004> -.015 1898< -.011 2009< -.007 1893< -.007 1920> -.007 Higher 1939 .015 1947 .012

1880 to 1929 segment:

Lower 1889> -.094 1898< -.028 1893< -.018 1920> -.016 1892< -.012 1888< -.011 Higher 1914 .035 1890 .026

[D] 3 Absent rings: Year Master N series Absent

1914 -1.741 20 1

1919 -1.069 22 1

1947 -3.329 33 3

====================================================================================================================================

91321 1881 to 1996 116 years Series 6

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1881 1930 1 -.22 -.21 -.18 -.28 -.12 -.23 -.35 -.02 .02 .32 .39| .39\* .26 .10 .07 .28 .20 .14 -.05 .05 .00

[B] Entire series, effect on correlation ( .389) is:

Lower 1982< -.047 1881> -.039 1954< -.016 1984> -.014 1941< -.013 1950> -.012 Higher 1947 .048 1939 .042

1881 to 1930 segment:

Lower 1881> -.112 1900< -.035 1926< -.024 1887< -.019 1883< -.016 1923> -.012 Higher 1889 .081 1911 .038

====================================================================================================================================

70269 1890 to 2009 120 years Series 7

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1890 1939 0 -.22 -.04 -.10 .02 .04 .14 .01 -.05 .21 .25 .31\*-.11 .05 -.22 .09 .18 -.12 -.02 .12 .02 .17

[B] Entire series, effect on correlation ( .439) is:

Lower 1911> -.062 1980< -.040 1916< -.021 1901< -.018 1974> -.012 1914> -.011 Higher 1977 .045 1947 .039

1890 to 1939 segment:

Lower 1911> -.159 1916< -.052 1901< -.043 1914> -.026 1906< -.017 1921< -.016 Higher 1939 .123 1890 .040

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1911 +3.7 SD

====================================================================================================================================

80301 1890 to 1997 108 years Series 8

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1948 1997 0 -.05 -.12 .05 .19 -.16 -.04 -.11 .00 -.03 -.06 .29\* .18 -.14 .27 -.05 .22 -.13 .07 -.02 -.30 .04

[B] Entire series, effect on correlation ( .434) is:

Lower 1997> -.018 1895< -.017 1964> -.017 1977> -.011 1982< -.010 1961< -.010 Higher 1939 .041 1911 .022

1948 to 1997 segment:

Lower 1997> -.040 1964> -.039 1982< -.029 1961< -.028 1956< -.025 1990< -.022 Higher 1966 .059 1991 .050

[D] 1 Absent rings: Year Master N series Absent

1920 -1.280 22 1

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1920 -5.3 SD

====================================================================================================================================

70332 1891 to 2009 119 years Series 9

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1950 1999 0 -.08 -.16 .04 -.05 .24 .24 -.02 .10 .27 -.23 .29\*-.05 .15 -.04 -.17 -.08 -.29 .14 .02 -.01 -.01

1960 2009 0 -.08 -.05 -.02 -.07 .25 .18 -.03 -.03 .26 -.33 .28\*-.07 .14 -.05 -.18 .04 -.19 .27 - - -

[B] Entire series, effect on correlation ( .339) is:

Lower 1978> -.021 1893< -.017 1962> -.014 1966> -.014 1918> -.013 1947> -.012 Higher 1939 .031 1911 .025

1950 to 1999 segment:

Lower 1966> -.035 1978> -.035 1962> -.029 1968< -.017 1980< -.015 1955< -.014 Higher 1997 .077 1991 .035

1960 to 2009 segment:

Lower 1966> -.036 1978> -.028 1962> -.027 1968< -.020 1980< -.018 1990< -.016 Higher 1997 .084 1991 .036

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1978 +4.0 SD; 1997 -4.8 SD

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91391 1900 to 2001 102 years Series 10

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1900 1949 6 -.25 -.12 -.06 -.15 -.22 .04 .19 .17 .20 .10 .25| .11 .08 .12 .14 .16 .27\* .06 .07 -.10 -.09

1925 1974 6 -.04 .01 -.05 -.19 -.15 .00 -.04 .03 -.05 -.13 .21| .02 .14 .03 .02 -.08 .30\* .03 -.07 .01 -.05

[B] Entire series, effect on correlation ( .354) is:

Lower 1947> -.050 1955< -.022 1949> -.016 1903< -.014 1904< -.013 1960< -.012 Higher 1977 .060 1911 .030

1900 to 1949 segment:

Lower 1947> -.083 1903< -.032 1949> -.032 1904< -.030 1941< -.028 1915< -.023 Higher 1911 .089 1940 .027

1925 to 1974 segment:

Lower 1947> -.068 1955< -.046 1949> -.030 1941< -.025 1960< -.025 1956< -.023 Higher 1958 .037 1966 .034

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1949 +3.0 SD; 1954 +3.1 SD

====================================================================================================================================

50246 1901 to 2004 104 years Series 11

[B] Entire series, effect on correlation ( .529) is:

Lower 1904< -.021 1925> -.013 1906< -.012 1918> -.010 1912> -.009 1911> -.009 Higher 1939 .040 1947 .013

====================================================================================================================================

80625 1901 to 2008 108 years Series 12

[B] Entire series, effect on correlation ( .505) is:

Lower 1905< -.015 1939> -.014 1928< -.013 1943> -.011 1973< -.010 1911> -.010 Higher 1947 .059 1977 .038

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60059 1902 to 2009 108 years Series 13

[B] Entire series, effect on correlation ( .552) is:

Lower 1980< -.025 2004> -.018 1933> -.018 2003< -.018 1926< -.015 1959> -.012 Higher 1911 .043 1947 .040

====================================================================================================================================

60386 1902 to 2009 108 years Series 14

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1950 1999 0 -.28 -.13 .08 -.13 -.10 -.12 -.05 -.12 .16 .14 .33\* .05 -.11 .13 -.08 -.01 .02 .14 -.10 -.15 -.03

[B] Entire series, effect on correlation ( .525) is:

Lower 1958< -.016 1919> -.014 1937< -.013 1991> -.013 1984> -.012 1997> -.012 Higher 1947 .097 1911 .042

1950 to 1999 segment:

Lower 1958< -.037 1967< -.025 1962> -.025 1985< -.023 1984> -.023 1991> -.022 Higher 1977 .134 1974 .032

[D] 2 Absent rings: Year Master N series Absent

1947 -3.329 33 3

1948 -1.499 33 2

====================================================================================================================================

121088 1902 to 2009 108 years Series 15

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1960 2009 7 .01 .07 .10 .13 .04 .11 .11 -.32 -.08 -.08 .28|-.11 .09 .17 -.26 -.08 .13 .30\* - - -

[B] Entire series, effect on correlation ( .376) is:

Lower 1993< -.014 1991> -.014 1971< -.012 1982< -.009 1929< -.009 2005< -.009 Higher 1939 .037 1947 .014

1960 to 2009 segment:

Lower 1991> -.030 1993< -.029 1982< -.020 2001< -.018 2005< -.018 1966> -.018 Higher 1974 .032 1984 .029

====================================================================================================================================

90522 1905 to 2002 98 years Series 16

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1950 1999 10 -.04 -.02 .05 -.09 .10 .06 .00 .09 -.07 -.02 .19| .01 .02 -.03 -.12 -.14 -.14 .03 -.02 -.18 .22\*

1953 2002 10 -.04 -.06 .04 -.06 .08 .02 -.01 .13 -.06 -.02 .17|-.01 .07 -.02 -.11 -.14 -.13 -.01 .00 -.10 .19\*

[B] Entire series, effect on correlation ( .301) is:

Lower 1939> -.024 1981< -.023 1948> -.018 1956< -.017 1980< -.015 1965< -.015 Higher 1947 .102 1958 .027

1950 to 1999 segment:

Lower 1981< -.038 1956< -.030 1977> -.028 1980< -.027 1998> -.022 1995> -.021 Higher 1997 .082 1958 .067

1953 to 2002 segment:

Lower 1981< -.037 1956< -.029 1977> -.027 1980< -.026 1998> -.022 1995> -.022 Higher 1997 .087 1958 .068

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1948 +3.0 SD

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80288 1906 to 2006 101 years Series 17

[B] Entire series, effect on correlation ( .378) is:

Lower 1949> -.019 1968< -.017 2004> -.016 1920< -.012 1929< -.012 1946> -.012 Higher 1939 .054 1984 .014

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121105 1906 to 2009 104 years Series 18

[B] Entire series, effect on correlation ( .488) is:

Lower 1914> -.026 1947> -.024 1933< -.018 1913> -.017 2007< -.016 1993< -.016 Higher 1911 .022 1924 .014

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131113 1907 to 2009 103 years Series 19

[B] Entire series, effect on correlation ( .575) is:

Lower 1978< -.036 2004< -.032 1913> -.016 2006< -.010 1974> -.010 1999> -.009 Higher 1911 .036 1939 .016

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172218 1907 to 2009 103 years Series 20

[B] Entire series, effect on correlation ( .443) is:

Lower 1935< -.040 1929< -.032 1918> -.017 1916< -.015 1957< -.013 1921< -.013 Higher 1947 .068 1939 .043

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70152 1916 to 2008 93 years Series 21

[B] Entire series, effect on correlation ( .529) is:

Lower 1992< -.029 1991> -.018 1923> -.016 1938< -.014 1988< -.013 1975< -.011 Higher 1947 .089 1997 .017

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91487 1917 to 2004 88 years Series 22

[B] Entire series, effect on correlation ( .493) is:

Lower 2004> -.023 1994< -.021 1976< -.016 1920> -.016 1927< -.015 1922< -.011 Higher 1939 .053 1977 .020

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1921 +3.1 SD

====================================================================================================================================

50244 1921 to 2008 88 years Series 23

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1921 1970 0 -.11 .01 -.18 -.09 -.30 .00 .17 .12 .18 -.08 .24\* .22 -.16 .11 -.05 .00 -.28 -.18 -.12 .07 -.07

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

1959 2008 0 .05 .16 -.04 .09 -.11 -.27 -.05 -.05 .07 -.04 .32\* .08 .01 .07 .13 .01 .06 -.26 .13 - -

[B] Entire series, effect on correlation ( .238) is:

Lower 1922< -.091 1964> -.024 1973< -.021 1936< -.020 1984> -.020 1938< -.014 Higher 1966 .044 1947 .043

1921 to 1970 segment:

Lower 1922< -.137 1964> -.037 1936< -.028 1938< -.019 1927< -.018 1939> -.018 Higher 1966 .066 1947 .064

1959 to 2008 segment:

Lower 1973< -.062 1964> -.057 1984> -.047 1992< -.025 1993< -.018 1994< -.015 Higher 1966 .098 1990 .048

[C] Year-to-year changes diverging by over 4.0 std deviations:

1921 1922 -4.6 SD

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152053 1923 to 2015 93 years Series 24

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1923 1972 -10 .17\*-.09 .01 -.26 -.27 -.21 -.25 -.34 -.08 -.06 .15| .03 .02 .08 .00 -.18 -.03 -.09 -.07 -.01 -.13

1925 1974 0 .21 -.06 .03 -.32 -.30 -.17 -.25 -.30 -.10 -.09 .22\*-.04 .04 .10 -.06 -.21 -.06 -.10 -.06 -.01 -.12

1950 1999 7 .17 .03 -.17 .03 -.30 -.16 -.35 -.24 -.11 -.18 .16| .00 .13 .08 .16 .10 .01 .21\*-.25 .09 -.02

1966 2015 0 .03 -.08 .00 .27 -.10 -.01 -.25 -.24 -.09 -.01 .29\* .05 - - - - - - - - -

[B] Entire series, effect on correlation ( .182) is:

Lower 1993< -.026 1990< -.024 1946> -.018 1997> -.018 1999> -.017 1960< -.016 Higher 2011 .029 1984 .026

1923 to 1972 segment:

Lower 1946> -.031 1960< -.026 1923> -.025 1924< -.025 1927< -.024 1957< -.021 Higher 1947 .046 1966 .030

1925 to 1974 segment:

Lower 1946> -.034 1960< -.028 1927< -.026 1957< -.024 1938< -.021 1961< -.020 Higher 1947 .035 1937 .029

1950 to 1999 segment:

Lower 1993< -.051 1990< -.047 1997> -.039 1999> -.035 1960< -.029 1957< -.024 Higher 1984 .056 1991 .045

1966 to 2015 segment:

Lower 1993< -.069 1990< -.063 1997> -.040 1999> -.036 1982< -.018 2003< -.017 Higher 2011 .056 1984 .049

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70065 1929 to 2009 81 years Series 25

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1929 1978 0 -.17 .03 .03 .09 -.07 -.07 .10 .16 .11 .25 .31\* .26 .00 -.06 -.04 -.08 -.07 -.32 -.12 -.23 -.05

1950 1999 10 .13 -.13 .03 .22 -.05 -.04 -.08 .26 .10 .24 .21| .04 -.13 -.20 -.15 -.06 -.23 -.03 -.02 -.06 .27\*

1960 2009 0 .16 .08 -.08 .13 -.16 -.10 -.09 .16 .07 .09 .25\* .04 -.06 -.16 -.08 .03 -.20 .06 - - -

[B] Entire series, effect on correlation ( .242) is:

Lower 1939> -.029 1929< -.024 1954< -.022 1997> -.016 2009< -.015 1990< -.014 Higher 1947 .024 1974 .021

1929 to 1978 segment:

Lower 1939> -.045 1929< -.043 1954< -.040 1959> -.021 1955< -.014 1946< -.014 Higher 1947 .033 1974 .026

1950 to 1999 segment:

Lower 1954< -.044 1990< -.029 1997> -.027 1959> -.024 1991> -.022 1955< -.018 Higher 1974 .046 1984 .031

1960 to 2009 segment:

Lower 2009< -.031 1997> -.030 1990< -.029 1991> -.025 2006< -.022 1987< -.017 Higher 1974 .042 1984 .027

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40522 1930 to 2010 81 years Series 26

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1950 1999 0 .01 .00 .02 .00 .02 .00 -.04 .14 -.03 -.04 .33\*-.32 -.14 -.01 -.16 -.05 -.23 .24 -.02 -.07 .21

1961 2010 0 .09 -.03 -.08 -.09 -.13 -.14 -.02 .18 .01 .06 .32\*-.27 -.03 .06 .00 .06 -.21 - - - -

[B] Entire series, effect on correlation ( .261) is:

Lower 1955< -.038 1988< -.033 1947> -.024 1991> -.020 1984> -.016 1956< -.016 Higher 1977 .099 1966 .025

1950 to 1999 segment:

Lower 1955< -.057 1988< -.050 1991> -.039 1984> -.032 1956< -.024 1980< -.011 Higher 1977 .158 1966 .029

1961 to 2010 segment:

Lower 1988< -.064 1991> -.039 1984> -.031 2004> -.028 2007< -.021 1980< -.016 Higher 1977 .188 1966 .038

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70626A 1930 to 2006 77 years Series 27

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1930 1979 0 .20 -.09 .01 .06 -.22 .07 -.08 .16 .16 .17 .28\* .18 .00 .03 -.07 -.21 -.23 -.19 -.33 -.11 -.15

1950 1999 0 .14 -.14 .05 .01 -.14 -.09 .16 .09 .27 -.07 .32\* .06 .02 .17 -.22 -.06 -.41 -.11 -.14 -.18 .07

[B] Entire series, effect on correlation ( .244) is:

Lower 1939> -.072 1940< -.027 1991> -.024 1999< -.022 1981< -.018 1943> -.013 Higher 1977 .027 1947 .024

1930 to 1979 segment:

Lower 1939> -.120 1940< -.054 1930< -.031 1943> -.021 1951< -.013 1973< -.011 Higher 1947 .054 1977 .050

1950 to 1999 segment:

Lower 1999< -.059 1991> -.047 1981< -.031 1998> -.016 1971> -.014 1994< -.012 Higher 1977 .041 1974 .025

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1939 +3.1 SD

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100680 1931 to 2007 77 years Series 28

[B] Entire series, effect on correlation ( .467) is:

Lower 1983< -.037 2002< -.033 1997> -.030 1960< -.030 1940< -.020 1939> -.016 Higher 1947 .090 1977 .039

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111094 1931 to 2009 79 years Series 29

[B] Entire series, effect on correlation ( .531) is:

Lower 1981< -.041 1973< -.032 1978< -.030 1977> -.028 2003< -.021 1967< -.017 Higher 1966 .049 1947 .049

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30567A 1932 to 2013 82 years Series 30

[B] Entire series, effect on correlation ( .305) is:

Lower 1956< -.035 1949< -.028 1939> -.027 2004> -.024 1952> -.018 2013< -.017 Higher 1947 .085 1977 .055

[C] Year-to-year changes diverging by over 4.0 std deviations:

1948 1949 -4.1 SD

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1949 -4.6 SD

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91327 1935 to 2009 75 years Series 31

[B] Entire series, effect on correlation ( .408) is:

Lower 1947> -.055 2005< -.026 1948< -.021 2004> -.021 1996< -.019 1945< -.016 Higher 1977 .051 1966 .038

[C] Year-to-year changes diverging by over 4.0 std deviations:

1947 1948 -4.1 SD

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100974 1936 to 2005 70 years Series 32

[B] Entire series, effect on correlation ( .502) is:

Lower 1947> -.044 1975< -.028 1984> -.024 1974> -.021 1976< -.016 1940< -.013 Higher 1966 .058 1991 .019

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172210 1938 to 2014 77 years Series 33

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1965 2014 0 .05 -.11 -.11 .24 .02 -.04 .05 -.20 .01 -.01 .28\*-.04 .15 - - - - - - - -

[B] Entire series, effect on correlation ( .391) is:

Lower 2011> -.059 1958< -.024 1952> -.022 1964> -.015 2001< -.015 1939> -.013 Higher 1947 .111 1997 .023

1965 to 2014 segment:

Lower 2011> -.107 2001< -.024 2000> -.019 1971> -.016 1973< -.015 1969< -.013 Higher 1997 .051 1966 .026

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92183A 1952 to 2016 65 years Series 34

[\*] Later part of series cannot be checked from 2016 to 2016 -- not matched by another series

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1952 2001 3 .06 -.27 -.22 .09 -.20 -.14 .11 -.38 .17 -.02 .22| .11 -.03 .28\*-.26 .15 -.02 -.17 .25 -.33 -.09

1966 2015 0 .12 -.21 -.10 .24 -.11 -.12 .04 -.36 .17 -.02 .32\* .06 - - - - - - - - -

[B] Entire series, effect on correlation ( .273) is:

Lower 1977> -.090 1991> -.046 1958< -.036 1981< -.032 2000> -.027 1963< -.022 Higher 1966 .158 2011 .032

1952 to 2001 segment:

Lower 1977> -.100 1991> -.051 1958< -.040 1981< -.036 2000> -.029 1963< -.023 Higher 1966 .205 1955 .021

1966 to 2015 segment:

Lower 1977> -.123 1991> -.060 1981< -.047 2000> -.033 1974> -.013 1994< -.011 Higher 1966 .194 2011 .037

====================================================================================================================================

111212 1952 to 2009 58 years Series 35

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1960 2009 -6 -.13 -.16 -.09 -.12 .23\* .00 -.06 -.05 .01 -.02 .20|-.09 .17 -.27 -.25 -.03 .10 .14 - - -

[B] Entire series, effect on correlation ( .266) is:

Lower 1974> -.076 2004> -.027 2005< -.022 1982< -.013 2008< -.011 1968< -.011 Higher 1997 .035 1966 .020

1960 to 2009 segment:

Lower 1974> -.115 2005< -.043 2004> -.038 1982< -.021 2008< -.020 1968< -.017 Higher 1997 .061 1966 .050

[C] Year-to-year changes diverging by over 4.0 std deviations:

1952 1953 4.4 SD

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1952 -5.4 SD; 1974 +3.2 SD

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33337A 1954 to 2014 61 years Series 36

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1954 2003 10 .10 -.20 -.13 -.13 -.37 .06 -.14 .17 .19 .13 .21| .06 .05 .05 -.07 -.14 -.13 .00 -.16 -.18 .21\*

1965 2014 -3 .28 -.08 -.07 -.23 -.34 .02 -.18 .32\* .14 .00 .01| .12 -.07 - - - - - - - -

[B] Entire series, effect on correlation ( .122) is:

Lower 2014< -.056 1994< -.050 1991> -.030 2004> -.023 2012> -.015 1962> -.014 Higher 1964 .036 1958 .023

1954 to 2003 segment:

Lower 1994< -.074 1991> -.042 1977> -.023 1984> -.019 1962> -.018 1976< -.016 Higher 1964 .040 1958 .026

1965 to 2014 segment:

Lower 2014< -.066 1994< -.057 1991> -.031 2004> -.024 2012> -.015 2010< -.015 Higher 2011 .030 1990 .028

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112256 1955 to 2015 61 years Series 37

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1955 2004 0 .10 -.34 -.20 -.05 -.35 -.13 -.23 -.08 .01 .06 .32\* .09 .16 -.08 -.17 .04 -.12 -.01 -.06 -.06 -.03

1966 2015 0 .05 -.03 -.03 .13 -.11 -.08 -.01 -.14 .07 -.10 .20\* .05 - - - - - - - - -

[B] Entire series, effect on correlation ( .229) is:

Lower 1997> -.062 2015< -.051 2006< -.046 1960< -.043 2008< -.023 1971> -.016 Higher 2011 .042 1966 .033

1955 to 2004 segment:

Lower 1997> -.097 1960< -.075 1971> -.024 1990< -.019 2003< -.013 1965< -.011 Higher 1966 .046 1958 .032

1966 to 2015 segment:

Lower 1997> -.069 2015< -.067 2006< -.060 2008< -.031 1971> -.016 1990< -.015 Higher 2011 .054 1966 .045

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70256 1956 to 2008 53 years Series 38

[B] Entire series, effect on correlation ( .356) is:

Lower 1984> -.062 2007< -.047 1958< -.040 2006> -.021 1957< -.016 1971> -.011 Higher 1966 .102 1964 .042

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100961 1969 to 2007 39 years Series 39

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1969 2007 0 .07 .01 -.17 .08 -.17 -.04 -.02 -.09 .09 .01 .31\*-.01 -.05 .19 -.47 -.10 -.01 .07 .07 .05 -

[B] Entire series, effect on correlation ( .313) is:

Lower 1986< -.092 1978< -.043 1991> -.030 2003< -.020 1999> -.017 2000> -.016 Higher 1982 .036 1997 .032

1969 to 2007 segment:

Lower 1986< -.092 1978< -.043 1991> -.030 2003< -.020 1999> -.017 2000> -.016 Higher 1982 .036 1997 .032

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PART 7: DESCRIPTIVE STATISTICS: 10:40 Fri 04 Sep 2020 Page 6

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Corr //-------- Unfiltered --------\\ //---- Filtered -----\\

No. No. No. with Mean Max Std Auto Mean Max Std Auto AR

Seq Series Interval Years Segmt Flags Master msmt msmt dev corr sens value dev corr ()

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1 90542 1868 1992 125 5 0 .390 1.34 5.93 .718 .404 .264 3.18 .442 .016 1

2 101159 1871 2002 132 6 2 .375 .73 2.73 .542 .845 .296 2.63 .462 -.040 1

3 60252 1878 2008 131 5 2 .462 .49 1.69 .333 .716 .413 2.56 .345 -.036 1

4 60172 1880 2007 128 5 1 .425 .85 2.43 .364 .696 .246 2.86 .466 .016 1

5 131032 1880 2009 130 5 1 .467 .82 3.30 .562 .767 .375 2.66 .377 -.090 1

6 91321 1881 1996 116 4 1 .389 1.11 3.65 .837 .843 .309 2.91 .543 -.019 1

7 70269 1890 2009 120 5 1 .439 1.22 3.23 .719 .787 .301 2.69 .497 -.042 1

8 80301 1890 1997 108 4 1 .434 .55 2.02 .431 .832 .318 2.69 .416 -.004 1

9 70332 1891 2009 119 5 2 .339 .93 3.77 .781 .746 .316 3.12 .357 .010 2

10 91391 1900 2001 102 4 2 .354 1.61 5.27 .681 .776 .201 2.91 .481 .041 2

11 50246 1901 2004 104 4 0 .529 .89 2.55 .501 .771 .280 2.82 .413 -.051 2

12 80625 1901 2008 108 4 0 .505 1.08 4.62 .662 .823 .221 2.67 .419 .045 1

13 60059 1902 2009 108 4 0 .552 1.65 3.30 .464 .574 .193 2.66 .509 -.017 1

14 60386 1902 2009 108 4 1 .525 .95 2.86 .743 .890 .296 2.53 .397 .048 1

15 121088 1902 2009 108 4 1 .376 .83 2.56 .499 .791 .300 2.86 .521 -.052 1

16 90522 1905 2002 98 4 2 .301 1.19 4.10 .791 .734 .280 2.94 .528 .028 1

17 80288 1906 2006 101 4 0 .378 1.14 3.95 .662 .748 .290 2.69 .460 -.034 3

18 121105 1906 2009 104 4 0 .488 1.77 4.34 .731 .711 .198 2.89 .575 .007 2

19 131113 1907 2009 103 4 0 .575 1.81 3.73 .729 .866 .139 2.54 .438 -.030 1

20 172218 1907 2009 103 4 0 .443 .73 3.25 .625 .853 .329 2.66 .463 -.138 1

21 70152 1916 2008 93 4 0 .529 .85 8.35 1.074 .682 .308 2.85 .478 -.102 1

22 91487 1917 2004 88 4 0 .493 1.40 10.18 1.268 .701 .243 2.77 .371 -.026 1

23 50244 1921 2008 88 4 2 .238 .83 3.58 .731 .789 .316 2.86 .404 -.051 1

24 152053 1923 2015 93 4 4 .182 .63 2.78 .523 .848 .282 2.71 .544 .014 1

25 70065 1929 2009 81 3 3 .242 1.03 2.06 .375 .566 .228 2.68 .611 -.051 1

26 40522 1930 2010 81 3 2 .261 .53 1.32 .295 .829 .303 2.64 .459 -.033 1

27 70626A 1930 2006 77 3 2 .244 .76 3.72 .792 .870 .221 2.54 .416 -.088 1

28 100680 1931 2007 77 3 0 .467 1.23 3.13 .763 .863 .305 2.77 .601 .026 1

29 111094 1931 2009 79 3 0 .531 1.72 4.79 .919 .728 .295 2.63 .524 -.039 1

30 30567A 1932 2013 82 3 0 .305 .94 2.59 .573 .718 .284 2.93 .435 -.029 1

31 91327 1935 2009 75 3 0 .408 2.36 3.87 .559 .320 .224 2.55 .498 -.016 1

32 100974 1936 2005 70 3 0 .502 .94 2.34 .547 .755 .321 2.56 .475 -.073 1

33 172210 1938 2014 77 3 1 .391 .44 1.66 .355 .856 .318 2.92 .507 -.005 1

34 92183A 1952 2016 65 2 2 .273 .84 1.76 .435 .779 .281 2.54 .409 -.056 1

35 111212 1952 2009 58 2 1 .266 .83 4.45 .737 .752 .249 2.59 .369 -.088 1

36 33337A 1954 2014 61 2 2 .122 .81 1.97 .401 .794 .267 2.67 .596 -.041 1

37 112256 1955 2015 61 2 2 .229 .63 1.75 .402 .871 .242 2.62 .508 .023 2

38 70256 1956 2008 53 2 0 .356 1.46 4.53 .965 .562 .360 3.10 .658 -.192 1

39 100961 1969 2007 39 1 1 .313 .96 3.27 .744 .822 .335 2.83 .592 .095 1

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Total or mean: 3654 142 39 .399 1.04 10.18 .632 .751 .281 3.18 .468 -.026

- = [ COFECHA CAGL COF ] = -