[] Dendrochronology Program Library Run CACO Program COF 10:39 Fri 04 Sep 2020 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 31295

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

File of DATED series: SCBI\_caco.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 1889 to 2017 129 years

Continuous time span is 1889 to 2017 129 years

Portion with two or more series is 1894 to 2017 124 years

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

\*C\* Number of dated series 17 \*C\*

\*O\* Master series 1889 2017 129 yrs \*O\*

\*F\* Total rings in all series 1488 \*F\*

\*E\* Total dated rings checked 1483 \*E\*

\*C\* Series intercorrelation .376 \*C\*

\*H\* Average mean sensitivity .291 \*H\*

\*A\* Segments, possible problems 19 \*A\*

\*\*\* Mean length of series 87.5 \*\*\*

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

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

142220 1 absent rings: 1923

160989 1 absent rings: 1966

101092 1 absent rings: 1977

3 absent rings .202%

PART 2: TIME PLOT OF TREE-RING SERIES: 10:39 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

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

. . . . . . . . . . . . . . . . . <============> . 40952A 1 1889 2017 129

. . . . . . . . . . . . . . . . . <===========> . 132010 2 1894 2015 122

. . . . . . . . . . . . . . . . . <==========> . 152151 3 1904 2013 110

. . . . . . . . . . . . . . . . . <=========> . 142220 4 1908 2009 102

. . . . . . . . . . . . . . . . . <==========> . 132018 5 1909 2015 107

. . . . . . . . . . . . . . . . . .<=========> . 160989 6 1916 2016 101

. . . . . . . . . . . . . . . . . .<=========> . 52059A 7 1917 2012 96

. . . . . . . . . . . . . . . . . . <========> . 50488A 8 1922 2010 89

. . . . . . . . . . . . . . . . . . <=======> . 101092 9 1923 2006 84

. . . . . . . . . . . . . . . . . . <======> . 030525 10 1933 2008 76

. . . . . . . . . . . . . . . . . . <=======> . 20605A 11 1936 2014 79

. . . . . . . . . . . . . . . . . . <=======> . 151006 12 1938 2016 79

. . . . . . . . . . . . . . . . . . <======> . 70622A 13 1940 2013 74

. . . . . . . . . . . . . . . . . . <=====> . 80398A 14 1942 2008 67

. . . . . . . . . . . . . . . . . . <======> . 142210 15 1944 2017 74

. . . . . . . . . . . . . . . . . . .<====> . 162252 16 1961 2013 53

. . . . . . . . . . . . . . . . . . .<====> . 152118 17 1967 2012 46

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

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: 10:39 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

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

1900 -2.649 2 1950 .250 15 2000 -.157 17

1901 -.027 2 1951 -.023 15 2001 .919 17

1902 .083 2 1952 -2.197 15 2002 .143 17

1903 2.640 2 1953 -.805 15 2003 .193 17

1904 1.617 3 1954 -.550 15 2004 .254 17

1905 -.752 3 1955 .564 15 2005 .304 17

1906 -.665 3 1956 .940 15 2006 -1.109 17

1907 -.647 3 1957 1.106 15 2007 -.768 16

1908 -.076 4 1958 1.486 15 2008 -.397 16

1909 .316 5 1959 -.400 15 2009 -.938 14

1910 .574 5 1960 .943 15 2010 -.730 13

1911 -1.947 5 1961 1.121 16 2011 .816 12

1912 .127 5 1962 -.689 16 2012 .691 12

1913 -.868 5 1963 -.709 16 2013 .208 10

1914 -.296 5 1964 -1.213 16 2014 .458 7

1915 .812 5 1965 -.434 16 2015 -.050 6

1916 2.508 6 1966 -3.042 16 1 2016 .302 4

1917 .173 7 1967 -.386 17 2017 2.045 2

1918 -.418 7 1968 .514 17

1919 .241 7 1969 .428 17

1920 -.909 7 1970 1.384 17

1921 -.155 7 1971 .203 17

1922 -.416 8 1972 .798 17

1923 -1.551 9 1 1973 .882 17

1924 1.077 9 1974 .798 17

1925 -1.081 9 1975 .859 17

1926 -.687 9 1976 .280 17

1927 .437 9 1977 -1.432 17 1

1928 .652 9 1978 .404 17

1929 1.636 9 1979 -.481 17

1930 .075 9 1980 -.613 17

1931 -.450 9 1981 -.690 17

1932 .504 9 1982 .248 17

1933 .364 10 1983 -.190 17

1934 -.825 10 1984 -.381 17

1935 .771 10 1985 .605 17

1936 .637 11 1986 .669 17

1937 -.133 11 1987 -1.966 17

1938 .251 12 1988 -.317 17

1889 -1.400 1 1939 -1.835 12 1989 .386 17

1890 -2.049 1 1940 .285 13 1990 .552 17

1891 -1.193 1 1941 .871 13 1991 -.665 17

1892 -.623 1 1942 .243 14 1992 -.913 17

1893 -.148 1 1943 .375 14 1993 1.198 17

1894 .525 2 1944 -.950 15 1994 .095 17

1895 3.267 2 1945 .143 15 1995 -.270 17

1896 1.942 2 1946 .175 15 1996 -.462 17

1897 1.133 2 1947 .405 15 1997 .617 17

1898 -.843 2 1948 -.284 15 1998 .633 17

1899 -1.872 2 1949 .000 15 1999 -.431 17

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PART 4: Master Bar Plot: 10:39 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

1900k 1950------A 2000----a

1901----@ 1951----@ 2001---------D

1902-----@ 1952i 2002-----A

1903----------K 1953-c 2003------A

1904----------F 1954---b 2004------A

1905--c 1955--------B 2005------A

1906--c 1956---------D 2006-d

1907--c 1957---------D 2007--c

1908----@ 1958----------F 2008---b

1909------A 1959---b 2009-d

1910--------B 1960---------D 2010--c

1911h 1961---------D 2011---------C

1912-----A 1962--c 2012--------C

1913-c 1963--c 2013------A

1914---a 1964-e 2014-------B

1915---------C 1965---b 2015----@

1916----------J 1966l 2016------A

1917-----A 1967---b 2017----------H

1918---b 1968-------B

1919------A 1969-------B

1920-d 1970----------F

1921----a 1971------A

1922---b 1972---------C

1923f 1973---------D

1924---------D 1974---------C

1925-d 1975---------C

1926--c 1976------A

1927-------B 1977f

1928--------C 1978-------B

1929----------G 1979---b

1930-----@ 1980--b

1931---b 1981--c

1932-------B 1982------A

1933-------A 1983----a

1934-c 1984---b

1935---------C 1985--------B

1936--------C 1986--------C

1937----a 1987h

1938------A 1988---a

1889f 1939g 1989-------B

1890h 1940------A 1990--------B

1891-e 1941---------C 1991--c

1892--b 1942------A 1992-d

1893----a 1943-------A 1993---------E

1894-------B 1944-d 1994-----@

1895----------M 1945-----A 1995----a

1896----------H 1946-----A 1996---b

1897---------E 1947-------B 1997--------B

1898-c 1948----a 1998--------C

1899g 1949-----@ 1999---b

PART 5: CORRELATION OF SERIES BY SEGMENTS: 10:39 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 1875 1900 1925 1950 1975

1924 1949 1974 1999 2024

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

1 40952A 1889 2017 .25A .17B .48 .68 .38

2 132010 1894 2015 .51 .49 .65 .58 .40

3 152151 1904 2013 .43 .64 .57 .48

4 142220 1908 2009 .38 .42 .49 .42

5 132018 1909 2015 .43 .46 .53 .51

6 160989 1916 2016 .32A .36 .46 .31A

7 52059A 1917 2012 .34 .28B .35 .31A

8 50488A 1922 2010 .34 .32A .46 .35

9 101092 1923 2006 .31B .32A .32A .36

10 030525 1933 2008 .35 .47 .34

11 20605A 1936 2014 .30A .51 .45

12 151006 1938 2016 .20B .26A .13B

13 70622A 1940 2013 .43 .43 .27A

14 80398A 1942 2008 .33 .35 .21B

15 142210 1944 2017 .42 .40 .40

16 162252 1961 2013 .33B .29A

17 152118 1967 2012 .28B

Av segment correlation .38 .36 .40 .44 .35

PART 6: POTENTIAL PROBLEMS: 10:39 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

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40952A 1889 to 2017 129 years Series 1

[\*] Early part of series cannot be checked from 1889 to 1893 -- 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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1894 1943 0 - - - - - -.14 -.06 -.15 .19 .02 .25\* .21 -.17 -.11 -.12 -.16 .01 -.15 .17 .07 -.17

1900 1949 -2 -.24 .13 .06 .10 -.18 -.11 .00 -.13 .21\*-.11 .17| .18 -.13 .03 -.02 .00 .02 -.25 .04 -.03 -.13

[B] Entire series, effect on correlation ( .363) is:

Lower 1922< -.063 1898> -.034 1946< -.012 2012< -.012 1933> -.010 2006> -.010 Higher 1966 .048 1987 .030

1894 to 1943 segment:

Lower 1922< -.158 1898> -.049 1933> -.019 1909< -.017 1918> -.012 1941< -.012 Higher 1895 .059 1903 .041

1900 to 1949 segment:

Lower 1922< -.125 1946< -.020 1933> -.019 1909< -.016 1918> -.015 1944> -.014 Higher 1903 .058 1916 .052

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

1921 1922 -4.1 SD

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

1922 -5.1 SD

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

132010 1894 to 2015 122 years Series 2

[B] Entire series, effect on correlation ( .486) is:

Lower 2014< -.028 1898< -.020 1956< -.017 1987> -.015 1904< -.013 1913> -.011 Higher 1952 .030 1966 .017

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152151 1904 to 2013 110 years Series 3

[B] Entire series, effect on correlation ( .468) is:

Lower 1917> -.021 1981> -.017 2003> -.016 1986< -.015 1922> -.015 1975< -.011 Higher 1966 .045 1987 .022

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

1939 -4.9 SD; 2003 +3.0 SD

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142220 1908 to 2009 102 years Series 4

[B] Entire series, effect on correlation ( .438) is:

Lower 1927< -.022 1930> -.016 1998< -.013 2007> -.013 1920> -.011 1908> -.011 Higher 1966 .039 1923 .021

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

1923 -1.551 9 1

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

1923 -4.9 SD

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132018 1909 to 2015 107 years Series 5

[B] Entire series, effect on correlation ( .491) is:

Lower 1952> -.038 1913> -.017 2003< -.013 2004< -.012 2009> -.010 2002> -.010 Higher 1987 .033 1916 .021

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160989 1916 to 2016 101 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

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1916 1965 0 .02 -.05 .12 -.07 .02 -.05 -.17 -.04 .06 .09 .32\*-.19 -.09 .06 -.25 .14 -.03 .03 .08 -.03 .12

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

1967 2016 0 .16 -.03 -.06 .02 -.21 .15 -.04 -.12 -.02 -.14 .31\*-.09 - - - - - - - - -

[B] Entire series, effect on correlation ( .430) is:

Lower 1930> -.029 1964> -.022 1917> -.019 1948> -.012 1962> -.010 2009> -.010 Higher 1966 .119 1952 .021

1916 to 1965 segment:

Lower 1930> -.071 1964> -.053 1917> -.041 1948> -.027 1921< -.025 1962> -.014 Higher 1952 .077 1939 .043

1967 to 2016 segment:

Lower 2014< -.029 2009> -.029 2002> -.024 1983> -.019 2001< -.018 2010> -.017 Higher 1987 .094 1970 .019

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

1966 -3.042 16 1

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

1966 -5.6 SD

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52059A 1917 to 2012 96 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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1925 1974 9 -.22 .17 -.09 -.03 .07 .04 .15 .00 .03 -.11 .28| .00 -.17 -.11 -.12 -.08 -.10 -.12 -.16 .30\*-.18

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

1963 2012 0 -.12 -.20 .03 -.02 -.09 .16 .27 .00 .03 -.20 .31\*-.03 -.21 .01 -.20 -.11 - - - - -

[B] Entire series, effect on correlation ( .269) is:

Lower 1968< -.055 1944> -.020 1923> -.019 1970< -.017 2012< -.014 1943< -.013 Higher 1966 .070 2006 .014

1925 to 1974 segment:

Lower 1968< -.093 1944> -.041 1952> -.027 1970< -.026 1925> -.021 1943< -.020 Higher 1966 .129 1961 .018

1963 to 2012 segment:

Lower 1968< -.113 1970< -.035 2012< -.027 1979> -.019 1985< -.015 1982< -.015 Higher 1966 .138 2006 .025

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50488A 1922 to 2010 89 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

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1925 1974 0 -.01 -.16 .26 -.15 -.30 -.06 -.33 .09 -.09 .11 .32\* .01 .08 .05 .00 -.07 .09 -.12 -.15 -.22 .02

[B] Entire series, effect on correlation ( .366) is:

Lower 1933< -.040 1966> -.031 1922> -.019 1960< -.014 1938< -.010 1939> -.009 Higher 1952 .027 1977 .022

1925 to 1974 segment:

Lower 1933< -.074 1966> -.048 1960< -.024 1938< -.017 1961< -.014 1926< -.013 Higher 1952 .061 1970 .034

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

2006 -4.5 SD

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101092 1923 to 2006 84 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

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1923 1972 5 -.13 .05 .21 -.05 -.08 -.05 -.13 .12 -.01 -.25 .31|-.19 -.16 .04 .01 .35\*-.10 .07 -.11 .11 -.05

1925 1974 0 -.14 .02 .08 -.06 -.05 -.05 -.09 .13 .02 -.18 .32\*-.16 -.13 -.01 -.02 .29 -.13 .07 -.13 .10 -.05

1950 1999 0 .10 .00 -.04 .08 .07 -.12 -.03 .10 -.03 -.21 .32\*-.21 -.19 -.08 .13 .01 -.24 .12 .01 .02 -.02

[B] Entire series, effect on correlation ( .336) is:

Lower 1952> -.031 1972< -.022 1997< -.022 2006> -.020 1923> -.018 1981> -.015 Higher 1977 .053 1966 .040

1923 to 1972 segment:

Lower 1952> -.053 1972< -.037 1923> -.031 1947< -.023 1926> -.018 1953> -.014 Higher 1966 .077 1939 .070

1925 to 1974 segment:

Lower 1952> -.062 1972< -.038 1947< -.023 1926> -.021 1953> -.017 1951> -.015 Higher 1966 .082 1939 .077

1950 to 1999 segment:

Lower 1952> -.050 1972< -.038 1997< -.037 1981> -.024 1996< -.015 1953> -.011 Higher 1977 .066 1966 .060

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

1977 -1.432 17 1

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

1977 -4.5 SD

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030525 1933 to 2008 76 years Series 10

[B] Entire series, effect on correlation ( .337) is:

Lower 2006> -.056 1993< -.025 1940< -.024 1975< -.015 1979> -.013 1934> -.011 Higher 1987 .118 1952 .018

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

1939 1940 -4.0 SD

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

2006 +3.1 SD

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20605A 1936 to 2014 79 years Series 11

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

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

1936 1985 0 .06 -.21 -.11 -.04 -.14 .04 -.01 -.05 .06 .06 .30\*-.10 -.03 .04 .25 -.14 -.33 -.06 .21 -.09 .11

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

Lower 1983< -.024 1966> -.023 1980> -.018 1940< -.018 1943< -.017 1955< -.015 Higher 1987 .083 1977 .029

1936 to 1985 segment:

Lower 1983< -.028 1980> -.026 1966> -.025 1940< -.023 1943< -.023 1955< -.020 Higher 1977 .049 1952 .036

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151006 1938 to 2016 79 years Series 12

[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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1938 1987 3 .06 -.27 -.19 -.01 .01 -.08 .13 -.04 .01 .08 .20|-.03 -.09 .26\*-.11 -.14 -.03 .18 .01 -.09 .03

1950 1999 0 -.02 -.26 .02 .16 -.22 -.11 .09 .05 .05 -.11 .26\*-.03 -.08 .10 -.07 -.03 -.05 .06 -.04 -.22 .01

1967 2016 -7 -.01 -.19 .10 .18\*-.21 -.16 .11 .12 .07 .00 .13|-.08 - - - - - - - - -

[B] Entire series, effect on correlation ( .178) is:

Lower 1939> -.043 1945< -.026 1994< -.026 1977> -.022 1948> -.022 1989< -.018 Higher 1966 .057 2006 .024

1938 to 1987 segment:

Lower 1939> -.058 1945< -.049 1948> -.030 1977> -.028 1958< -.024 1967< -.019 Higher 1966 .092 1959 .031

1950 to 1999 segment:

Lower 1994< -.055 1977> -.037 1987> -.035 1989< -.026 1958< -.019 1967< -.014 Higher 1966 .069 1959 .027

1967 to 2016 segment:

Lower 1977> -.042 1987> -.033 1989< -.028 1994< -.027 1967< -.015 1983> -.014 Higher 2006 .050 2011 .026

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70622A 1940 to 2013 74 years Series 13

[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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1964 2013 0 -.30 -.03 -.23 -.03 -.24 -.12 .18 .02 -.08 .02 .27\* .10 -.06 .15 -.10 - - - - - -

[B] Entire series, effect on correlation ( .349) is:

Lower 2013< -.031 2006> -.025 1987> -.021 1982< -.021 2001< -.021 1980< -.018 Higher 1977 .023 1944 .018

1964 to 2013 segment:

Lower 2013< -.039 2006> -.035 1987> -.028 1982< -.027 2001< -.027 1980< -.016 Higher 1977 .035 1966 .031

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

1997 +3.7 SD

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80398A 1942 to 2008 67 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

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1959 2008 -4 -.07 -.26 -.27 .21 -.30 -.06 .23\*-.01 -.03 .09 .21| .12 -.05 .10 .11 -.09 -.16 -.10 .10 -.03 -

[B] Entire series, effect on correlation ( .316) is:

Lower 1978< -.097 1977> -.031 1987> -.020 1962> -.020 2002< -.018 1959> -.015 Higher 1952 .068 1966 .056

1959 to 2008 segment:

Lower 1978< -.128 1977> -.035 1962> -.021 2002< -.020 1959> -.016 1999> -.013 Higher 1966 .096 1993 .028

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

1977 1978 -4.4 SD

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142210 1944 to 2017 74 years Series 15

[B] Entire series, effect on correlation ( .363) is:

Lower 1959> -.038 1999> -.021 1994> -.021 1981> -.019 1955< -.019 1961< -.019 Higher 1952 .077 1987 .052

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162252 1961 to 2013 53 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

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

1961 2010 4 .25 -.08 .09 -.01 .04 -.05 -.17 .11 -.14 -.20 .33|-.02 .14 -.07 .39\*-.18 .07 -.16 - - -

1964 2013 0 .04 -.03 .10 .15 .13 .01 -.08 -.08 -.03 -.20 .29\*-.05 .11 -.04 .03 - - - - - -

[B] Entire series, effect on correlation ( .331) is:

Lower 1985< -.045 1980> -.030 2005< -.017 1996> -.017 1972< -.012 1999> -.011 Higher 1970 .036 1962 .022

1961 to 2010 segment:

Lower 1985< -.048 1980> -.030 2005< -.019 1996> -.016 1972< -.013 1999> -.011 Higher 1970 .038 1961 .021

1964 to 2013 segment:

Lower 1985< -.070 1980> -.044 2005< -.027 1996> -.024 1972< -.018 1986< -.014 Higher 1966 .054 1970 .052

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152118 1967 to 2012 46 years Series 17

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

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

1967 2012 -10 .37\*-.17 .30 .12 -.06 -.05 .03 -.05 -.34 .03 .28|-.13 -.05 .02 .20 .20 - - - - -

[B] Entire series, effect on correlation ( .283) is:

Lower 2001< -.062 1980> -.040 1970< -.034 1972< -.033 1988< -.020 1981> -.019 Higher 1987 .297 1993 .026

1967 to 2012 segment:

Lower 2001< -.062 1980> -.040 1970< -.034 1972< -.033 1988< -.020 1981> -.019 Higher 1987 .297 1993 .026

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PART 7: DESCRIPTIVE STATISTICS: 10:39 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 ()

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

1 40952A 1889 2017 129 5 2 .363 1.63 5.24 .960 .765 .259 2.79 .391 -.025 1

2 132010 1894 2015 122 5 0 .486 .87 2.48 .413 .733 .261 2.74 .519 -.067 1

3 152151 1904 2013 110 4 0 .468 1.22 3.10 .647 .828 .248 2.74 .357 -.028 1

4 142220 1908 2009 102 4 0 .438 1.16 5.24 .829 .770 .302 2.47 .336 -.087 1

5 132018 1909 2015 107 4 0 .491 1.59 3.86 .788 .774 .277 2.75 .497 -.029 1

6 160989 1916 2016 101 4 2 .430 .60 1.55 .300 .582 .338 2.59 .294 -.059 1

7 52059A 1917 2012 96 4 2 .269 .53 1.77 .298 .611 .367 2.82 .582 -.032 1

8 50488A 1922 2010 89 4 1 .366 1.10 5.01 .934 .796 .284 2.90 .408 -.036 1

9 101092 1923 2006 84 4 3 .336 .41 1.82 .275 .594 .370 2.43 .405 -.048 1

10 030525 1933 2008 76 3 0 .337 1.03 4.04 .829 .709 .348 2.64 .415 -.088 1

11 20605A 1936 2014 79 3 1 .390 .90 2.39 .558 .756 .310 2.92 .563 .007 1

12 151006 1938 2016 79 3 3 .178 .85 1.76 .352 .691 .243 2.69 .499 .056 1

13 70622A 1940 2013 74 3 1 .349 1.33 3.61 .627 .645 .227 3.20 .541 .164 1

14 80398A 1942 2008 67 3 1 .316 1.21 4.01 .963 .861 .240 2.89 .554 -.011 1

15 142210 1944 2017 74 3 0 .363 .56 1.35 .259 .631 .280 2.74 .515 -.028 1

16 162252 1961 2013 53 2 2 .331 .85 4.24 1.084 .937 .302 2.56 .389 -.146 1

17 152118 1967 2012 46 1 1 .283 .90 2.66 .501 .519 .334 2.66 .457 .028 1

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Total or mean: 1488 59 19 .376 1.01 5.24 .622 .721 .291 3.20 .449 -.028

- = [ COFECHA CACO COF ] = -