[] Dendrochronology Program Library Run RS\_I Program COF 11:26 Tue 07 Apr 2020 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 31145

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS COF12K.for

Title of run: Red Spruce, Bartlett, NH (KT Smith)

File of DATED series: RS\_I.rrw

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 not transformed to logarithms N

5 CORRELATION is Pearson (parametric, quantitative)

Critical correlation, 99% confidence level 0.3281

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 1705 to 1993 289 years

Continuous time span is 1705 to 1993 289 years

Portion with two or more series is 1721 to 1993 273 years

>> I132 1892 absent in 1 of 58 series, but is not usually narrow: master index is 0.378

>> I241 1788 absent in 1 of 17 series, but is not usually narrow: master index is 0.713

>> I211 1782 absent in 1 of 15 series, but is not usually narrow: master index is 0.007

>> I462 1808 absent in 1 of 24 series, but is not usually narrow: master index is -0.006

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

\*C\* Number of dated series 68 \*C\*

\*O\* Master series 1705 1993 289 yrs \*O\*

\*F\* Total rings in all series 11280 \*F\*

\*E\* Total dated rings checked 11264 \*E\*

\*C\* Series intercorrelation 0.588 \*C\*

\*H\* Average mean sensitivity 0.221 \*H\*

\*A\* Segments, possible problems 29 \*A\*

\*\*\* Mean length of series 165.0 \*\*\*

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

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

I132 1 absent rings: 1892

I192 1 absent rings: 1811

I241 1 absent rings: 1788

I221 1 absent rings: 1991

I211 2 absent rings: 1780 1782

I311 1 absent rings: 1991

I462 1 absent rings: 1808

I452 1 absent rings: 1794

9 absent rings 0.080%

PART 2: TIME PLOT OF TREE-RING SERIES: Red Spruce, Bartlett, NH (KT Smith) 11:26 Tue 07 Apr 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

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. . . . . . . . . . . . . . . <==================>. . I171 1 1800 1991 192

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PART 2: TIME PLOT OF TREE-RING SERIES: Red Spruce, Bartlett, NH (KT Smith) 11:26 Tue 07 Apr 2020 Page 3

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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

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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

PART 3: Master Dating Series: Red Spruce, Bartlett, NH (KT Smith) 11:26 Tue 07 Apr 2020 Page 4

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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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1750 -0.487 6 1800 0.019 22 1850 0.392 47 1900 -1.367 63 1950 -1.655 68

1751 -0.136 6 1801 0.198 22 1851 1.913 47 1901 -1.761 63 1951 -0.980 68

1752 -0.936 6 1802 -0.029 22 1852 1.038 47 1902 -0.680 63 1952 0.542 68

1753 -0.846 6 1803 0.305 22 1853 -1.109 47 1903 0.507 63 1953 -0.350 68

1754 0.741 6 1804 0.808 22 1854 -2.199 47 1904 1.812 63 1954 0.750 68

1705 1.474 1 1755 -0.570 7 1805 0.850 22 1855 -2.146 47 1905 0.837 63 1955 1.071 68

1706 1.172 1 1756 -0.045 7 1806 0.943 23 1856 -1.203 47 1906 0.962 63 1956 -0.531 68

1707 -0.675 1 1757 -1.409 8 1807 2.471 24 1857 -0.453 47 1907 0.558 63 1957 1.522 68

1708 0.469 1 1758 0.333 8 1808 -0.006 24 1<< 1858 0.526 47 1908 -0.919 64 1958 2.306 68

1709 1.266 1 1759 0.424 8 1809 -0.263 24 1859 0.468 47 1909 -0.932 64 1959 -0.468 68

1710 -1.739 1 1760 0.560 9 1810 -0.845 27 1860 2.095 47 1910 0.001 65 1960 -0.653 68

1711 -1.452 1 1761 -0.013 9 1811 -2.164 27 1 1861 2.785 47 1911 -1.568 65 1961 0.702 68

1712 -0.060 1 1762 -0.349 9 1812 -1.768 27 1862 0.798 47 1912 -1.285 65 1962 0.338 68

1713 3.037 1 1763 0.070 9 1813 -0.445 28 1863 0.680 47 1913 0.774 65 1963 0.203 68

1714 -1.310 1 1764 1.083 9 1814 0.195 28 1864 0.079 47 1914 -0.228 65 1964 -0.841 68

1715 -0.700 1 1765 -0.004 9 1815 1.472 28 1865 1.012 47 1915 -0.168 65 1965 -0.239 68

1716 -1.964 1 1766 -1.391 9 1816 0.764 29 1866 0.334 47 1916 1.055 67 1966 -1.413 68

1717 -2.061 1 1767 -0.458 9 1817 1.095 29 1867 0.264 47 1917 -0.069 67 1967 -1.236 68

1718 -1.909 1 1768 -0.491 9 1818 0.078 29 1868 -0.521 47 1918 1.132 68 1968 -1.052 68

1719 -1.363 1 1769 1.219 9 1819 0.002 29 1869 0.714 47 1919 0.939 68 1969 -0.002 68

1720 -1.087 1 1770 0.070 11 1820 -1.100 31 1870 0.687 47 1920 -0.407 68 1970 0.321 68

1721 -0.850 2 1771 -0.010 11 1821 -0.112 31 1871 -0.965 47 1921 -1.086 68 1971 0.654 68

1722 -0.325 2 1772 0.410 12 1822 0.750 32 1872 -1.117 47 1922 -0.876 68 1972 0.023 68

1723 -0.137 2 1773 0.834 12 1823 -1.542 34 1873 -1.396 47 1923 -2.248 68 1973 0.564 68

1724 1.534 2 1774 0.471 12 1824 -0.696 34 1874 -0.290 48 1924 -0.648 68 1974 -0.272 68

1725 -0.877 2 1775 -0.440 13 1825 -0.541 36 1875 0.433 48 1925 -0.225 68 1975 0.054 68

1726 0.897 2 1776 -0.447 13 1826 -1.251 38 1876 -0.500 48 1926 -0.878 68 1976 0.864 68

1727 1.047 2 1777 0.609 13 1827 -0.507 38 1877 -0.911 48 1927 0.614 68 1977 1.479 68

1728 2.009 2 1778 -0.695 14 1828 0.150 38 1878 -0.569 48 1928 0.463 68 1978 1.317 68

1729 0.600 2 1779 -0.507 14 1829 0.731 40 1879 -0.693 48 1929 -0.104 68 1979 0.152 68

1730 0.220 2 1780 -0.920 15 1 1830 1.883 41 1880 -0.516 48 1930 1.441 68 1980 0.056 68

1731 1.226 3 1781 -0.510 15 1831 -1.069 42 1881 -1.579 48 1931 1.758 68 1981 -1.115 68

1732 -0.092 3 1782 0.007 15 1<< 1832 -0.580 42 1882 -0.691 48 1932 2.095 68 1982 -0.704 68

1733 0.083 3 1783 -0.090 16 1833 1.513 42 1883 -0.103 50 1933 0.177 68 1983 0.206 68

1734 -0.786 3 1784 0.097 16 1834 0.952 45 1884 -0.082 51 1934 -0.451 68 1984 -0.577 68

1735 -0.545 3 1785 1.003 16 1835 1.663 45 1885 -0.341 51 1935 -0.482 68 1985 -0.064 68

1736 -2.334 3 1786 1.417 16 1836 0.840 45 1886 0.425 51 1936 -0.218 68 1986 0.377 68

1737 -0.366 3 1787 0.169 17 1837 1.161 45 1887 -0.621 52 1937 -0.085 68 1987 0.541 68

1738 1.038 4 1788 0.713 17 1<< 1838 0.523 46 1888 0.099 52 1938 -0.113 68 1988 -0.597 68

1739 0.756 4 1789 0.860 17 1839 0.057 46 1889 1.316 55 1939 0.031 68 1989 -0.538 68

1740 0.634 5 1790 1.358 17 1840 -0.646 46 1890 1.863 56 1940 0.507 68 1990 0.245 68

1741 -0.618 5 1791 0.392 17 1841 -0.661 46 1891 1.641 57 1941 1.871 68 1991 -0.983 68 2

1742 0.469 5 1792 0.021 17 1842 0.689 46 1892 0.378 58 1<< 1942 0.195 68 1992 1.254 50

1743 0.253 5 1793 1.391 18 1843 0.217 46 1893 -0.776 60 1943 -0.446 68 1993 1.877 14

1744 0.555 5 1794 -2.047 18 1 1844 0.151 46 1894 0.250 61 1944 -0.392 68

1745 0.476 5 1795 -1.721 18 1845 1.199 46 1895 -0.145 62 1945 0.900 68

1746 -0.314 5 1796 -1.375 19 1846 -0.537 46 1896 0.732 62 1946 0.268 68

1747 1.643 6 1797 -0.460 19 1847 -2.272 46 1897 0.141 62 1947 -0.567 68

1748 -0.888 6 1798 -0.428 19 1848 -0.739 46 1898 0.902 63 1948 -2.255 68

1749 -0.408 6 1799 -1.005 20 1849 -1.307 46 1899 -0.414 63 1949 -1.272 68

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PART 4: Master Bar Plot: Red Spruce, Bartlett, NH (KT Smith) 11:26 Tue 07 Apr 2020 Page 5

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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

1750---b 1800-----@ 1850-------B 1900-e 1950g

1751----a 1801------A 1851----------H 1901g 1951-d

1752-d 1802-----@ 1852---------D 1902--c 1952-------B

1753--c 1803------A 1853-d 1903-------B 1953----a

1754--------C 1804--------C 1854i 1904----------G 1954--------C

1705----------F 1755---b 1805--------C 1855i 1905--------C 1955---------D

1706---------E 1756-----@ 1806---------D 1856-e 1906---------D 1956---b

1707--c 1757-f 1807----------J 1857---b 1907-------B 1957----------F

1708-------B 1758------A 1808-----@ 1858-------B 1908-d 1958----------I

1709---------E 1759-------B 1809----a 1859-------B 1909-d 1959---b

1710g 1760-------B 1810--c 1860----------H 1910-----@ 1960--c

1711f 1761-----@ 1811i 1861----------K 1911f 1961--------C

1712-----@ 1762----a 1812g 1862--------C 1912-e 1962-------A

1713----------L 1763-----@ 1813---b 1863--------C 1913--------C 1963------A

1714-e 1764---------D 1814------A 1864-----@ 1914----a 1964--c

1715--c 1765-----@ 1815----------F 1865---------D 1915----a 1965----a

1716h 1766-f 1816--------C 1866------A 1916---------D 1966f

1717h 1767---b 1817---------D 1867------A 1917-----@ 1967-e

1718h 1768---b 1818-----@ 1868---b 1918---------E 1968-d

1719-e 1769---------E 1819-----@ 1869--------C 1919---------D 1969-----@

1720-d 1770-----@ 1820-d 1870--------C 1920---b 1970------A

1721--c 1771-----@ 1821-----@ 1871-d 1921-d 1971--------C

1722----a 1772-------B 1822--------C 1872-d 1922--d 1972-----@

1723----a 1773--------C 1823f 1873-f 1923i 1973-------B

1724----------F 1774-------B 1824--c 1874----a 1924--c 1974----a

1725--d 1775---b 1825---b 1875-------B 1925----a 1975-----@

1726--------D 1776---b 1826-e 1876---b 1926--d 1976--------C

1727---------D 1777-------B 1827---b 1877-d 1927--------B 1977----------F

1728----------H 1778--c 1828------A 1878---b 1928-------B 1978---------E

1729-------B 1779---b 1829--------C 1879--c 1929-----@ 1979------A

1730------A 1780-d 1830----------H 1880---b 1930---------F 1980-----@

1731---------E 1781---b 1831-d 1881f 1931----------G 1981-d

1732-----@ 1782-----@ 1832---b 1882--c 1932----------H 1982--c

1733-----@ 1783-----@ 1833----------F 1883-----@ 1933------A 1983------A

1734--c 1784-----@ 1834---------D 1884-----@ 1934---b 1984---b

1735---b 1785---------D 1835----------G 1885----a 1935---b 1985-----@

1736i 1786---------F 1836--------C 1886-------B 1936----a 1986-------B

1737----a 1787------A 1837---------E 1887--b 1937-----@ 1987-------B

1738---------D 1788--------C 1838-------B 1888-----@ 1938-----@ 1988--b

1739--------C 1789--------C 1839-----@ 1889---------E 1939-----@ 1989---b

1740--------C 1790---------E 1840--c 1890----------G 1940-------B 1990------A

1741--b 1791-------B 1841--c 1891----------G 1941----------G 1991-d

1742-------B 1792-----@ 1842--------C 1892-------B 1942------A 1992---------E

1743------A 1793---------F 1843------A 1893--c 1943---b 1993----------H

1744-------B 1794h 1844------A 1894------A 1944---b

1745-------B 1795g 1845---------E 1895----a 1945--------D

1746----a 1796-e 1846---b 1896--------C 1946------A

1747----------G 1797---b 1847i 1897------A 1947---b

1748--d 1798---b 1848--c 1898--------D 1948i

1749---b 1799-d 1849-e 1899---b 1949-e

PART 5: CORRELATION OF SERIES BY SEGMENTS: Red Spruce, Bartlett, NH (KT Smith) 11:26 Tue 07 Apr 2020 Page 5

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Correlations of 50-year dated segments, lagged 25 years

Flags: A = correlation under 0.3281 but highest as dated; B = correlation higher at other than dated position

Seq Series Time\_span 1700 1725 1750 1775 1800 1825 1850 1875 1900 1925 1950

1749 1774 1799 1824 1849 1874 1899 1924 1949 1974 1999

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1 I171 1800 1991 .50 .64 .76 .72 .74 .61 .34

2 I172 1772 1991 .45 .52 .56 .69 .75 .71 .72 .72 .64

3 I182 1757 1991 .69 .75 .80 .77 .74 .69 .70 .72 .54

4 I191 1829 1991 .56 .63 .74 .71 .69 .68

5 I152 1760 1991 .64 .72 .73 .76 .70 .69 .69 .65 .58

6 I132 1889 1991 .63 .74 .60 .46

7 I121 1787 1991 .87 .83 .78 .64 .65 .66 .47 .46

8 I112 1796 1991 .81 .84 .71 .53 .48 .57 .65 .56

9 I151 1810 1991 .73 .81 .71 .50 .28A .31A .33A

10 I181 1800 1991 .76 .79 .67 .52 .60 .75 .60

11 I122 1775 1991 .73 .77 .70 .66 .65 .54 .38 .40

12 I162 1770 1991 .71 .73 .76 .79 .62 .57 .73 .78 .70

13 I111 1850 1991 .59 .43 .45 .42 .38

14 I131 1820 1991 .73 .75 .68 .67 .75 .57 .37

15 I141 1783 1991 .76 .77 .68 .59 .57 .42 .32A .39

16 I161 1747 1991 .62 .58 .71 .73 .78 .72 .47 .55 .80 .76

17 I142 1740 1991 .29A .38 .67 .82 .76 .63 .58 .43 .36 .43

18 I192 1799 1991 .69 .69 .68 .69 .74 .70 .76 .65

19 I261 1891 1992 .29B .44 .55 .59

20 I242 1731 1992 -.10B-.18B .23B .60 .78 .80 .78 .70 .67 .70

21 I241 1721 1992 .00B-.02B-.20B-.08B-.05B .12B .20B .04B .26B .23B .26B

22 I252 1705 1992 .23B .25B .48 .70 .75 .85 .71 .71 .76 .66 .55

23 I262 1894 1992 .60 .63 .61 .65

24 I221 1822 1992 .80 .79 .70 .73 .59 .53 .53

25 I281 1823 1992 .80 .80 .70 .62 .72 .72 .74

26 I292 1807 1992 .67 .82 .72 .56 .62 .69 .62

27 I282 1838 1992 .71 .75 .73 .74 .65 .61

28 I231 1834 1992 .69 .77 .83 .82 .62 .54

29 I232 1887 1992 .80 .80 .68 .65

30 I291 1826 1992 .78 .62 .66 .77 .70 .65

31 I272 1825 1992 .73 .49 .51 .66 .68 .66

32 I271 1823 1992 .71 .68 .52 .52 .47 .55 .66

33 I222 1831 1992 .80 .68 .60 .62 .49 .42

34 I251 1755 1992 .66 .69 .58 .75 .71 .60 .71 .67 .55

35 I212 1834 1992 .51 .52 .44 .58 .72 .59

36 I211 1738 1992 -.09B .28A .56 .63 .69 .63 .67 .73 .68 .57

37 I392 1816 1992 .75 .75 .73 .55 .64 .58 .53

38 I391 1826 1992 .70 .68 .63 .67 .65 .65

39 I382 1892 1992 .51 .54 .46 .53

40 I381 1890 1992 .51 .50 .42 .51

41 I372 1834 1992 .50 .57 .75 .77 .68 .65

42 I371 1820 1992 .45 .38 .53 .69 .68 .68 .54

43 I362 1883 1992 .48 .70 .66 .60

44 I342 1889 1992 .33 .46 .59 .57

45 I341 1916 1992 .48 .52 .51

46 I361 1908 1992 .70 .69 .65

47 I321 1884 1992 .41 .73 .71 .69

48 I322 1895 1992 .63 .68 .70 .61

49 I332 1893 1992 .39 .51 .66 .64

50 I331 1889 1992 .40 .49 .64 .60

51 I351 1893 1992 .70 .76 .77 .69

52 I352 1874 1992 .40 .40 .71 .67 .53

53 I311 1829 1992 .77 .63 .67 .69 .62 .61

54 I312 1780 1992 .29B .61 .74 .71 .74 .71 .59 .43

55 I431 1916 1993 .37 .48 .59

56 I432 1898 1993 .47 .49 .60 .63

57 I421 1883 1993 .29B .43 .52 .52

58 I411 1918 1993 .37 .25A .33

59 I412 1910 1993 .55 .44 .42

60 I491 1813 1993 .59 .66 .73 .75 .71 .62 .69

61 I492 1778 1993 .74 .60 .69 .77 .76 .85 .80 .76

62 I451 1825 1993 .72 .65 .70 .79 .74 .73

63 I481 1830 1993 .78 .68 .64 .67 .61 .53

64 I482 1806 1993 .78 .80 .69 .64 .58 .56 .59

65 I471 1810 1993 .70 .70 .61 .63 .61 .53 .53

66 I472 1810 1993 .45 .44 .61 .65 .62 .48 .49

67 I462 1793 1993 .30A .27B .60 .58 .59 .74 .74 .63

68 I452 1770 1993 .38 .48 .70 .70 .69 .67 .59 .54 .57

Av segment correlation 0.12 0.16 0.41 0.59 0.66 0.70 0.65 0.59 0.62 0.60 0.56

PART 6: POTENTIAL PROBLEMS: Red Spruce, Bartlett, NH (KT Smith) 11:26 Tue 07 Apr 2020 Page 6

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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

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

I171 1800 to 1991 192 years Series 1

[B] Entire series, effect on correlation ( 0.571) is:

Lower 1833<-0.021 1989>-0.017 1838>-0.012 1988>-0.012 1985<-0.011 1970>-0.009 Higher 1957 0.010 1823 0.009

[E] Outliers 4 3.0 SD above or -4.5 SD below mean for year

1813 +3.1 SD; 1838 +3.6 SD; 1970 +4.2 SD; 1989 +4.4 SD

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

I172 1772 to 1991 220 years Series 2

[B] Entire series, effect on correlation ( 0.632) is:

Lower 1816<-0.016 1945<-0.009 1812>-0.009 1772<-0.008 1839<-0.007 1920>-0.006 Higher 1794 0.011 1823 0.007

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

1777 +3.1 SD

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

I182 1757 to 1991 235 years Series 3

[B] Entire series, effect on correlation ( 0.698) is:

Lower 1831>-0.010 1986<-0.009 1918<-0.009 1991>-0.007 1946>-0.006 1878>-0.006 Higher 1794 0.008 1861 0.006

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

I191 1829 to 1991 163 years Series 4

[B] Entire series, effect on correlation ( 0.646) is:

Lower 1835<-0.020 1853>-0.015 1980>-0.011 1935>-0.009 1874>-0.009 1916<-0.007 Higher 1831 0.011 1851 0.008

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

1874 +3.1 SD; 1875 +4.0 SD

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

I152 1760 to 1991 232 years Series 5

[B] Entire series, effect on correlation ( 0.645) is:

Lower 1767>-0.017 1831>-0.009 1796>-0.008 1980>-0.008 1991>-0.007 1934>-0.006 Higher 1794 0.015 1807 0.010

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

1980 +3.6 SD

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

I132 1889 to 1991 103 years Series 6

[B] Entire series, effect on correlation ( 0.524) is:

Lower 1893>-0.039 1892<-0.026 1988>-0.020 1991>-0.017 1963>-0.016 1974>-0.013 Higher 1904 0.020 1948 0.016

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

1892 1893 4.5 SD

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

1892 0.378 58 1 >> WARNING: Ring is not usually narrow

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

1963 +3.3 SD

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

I121 1787 to 1991 205 years Series 7

[B] Entire series, effect on correlation ( 0.659) is:

Lower 1958<-0.011 1921>-0.010 1954<-0.008 1894<-0.007 1891<-0.007 1879>-0.007 Higher 1794 0.013 1807 0.008

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

1962 +3.2 SD

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

I112 1796 to 1991 196 years Series 8

[B] Entire series, effect on correlation ( 0.626) is:

Lower 1991>-0.016 1922>-0.011 1890<-0.010 1990<-0.008 1906<-0.007 1954<-0.007 Higher 1807 0.014 1957 0.010

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

I151 1810 to 1991 182 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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1900 1949 0 .09 .13 .12 -.17 .00 -.13 -.05 -.20 .02 -.11 .28\*-.08 -.01 -.06 .04 .16 .19 -.18 .00 .01 -.09

1925 1974 0 .09 .18 .01 -.04 .01 .00 .02 -.09 -.13 -.03 .31\*-.20 -.22 .12 .05 .12 .17 -.14 -.10 .09 -.20

1942 1991 0 -.07 .22 -.06 .18 .00 .05 -.13 -.04 -.02 -.01 .33\*-.26 -.16 - - - - - - - -

[B] Entire series, effect on correlation ( 0.480) is:

Lower 1926>-0.019 1977<-0.016 1812>-0.015 1986<-0.011 1985>-0.010 1810>-0.010 Higher 1860 0.015 1823 0.015

1900 to 1949 segment:

Lower 1926>-0.065 1931<-0.029 1910<-0.027 1934>-0.019 1949>-0.017 1920>-0.017 Higher 1941 0.053 1948 0.052

1925 to 1974 segment:

Lower 1926>-0.062 1931<-0.029 1974>-0.026 1964>-0.024 1957<-0.020 1962>-0.020 Higher 1959 0.055 1958 0.054

1942 to 1991 segment:

Lower 1977<-0.052 1986<-0.032 1957<-0.023 1964>-0.022 1974>-0.021 1955<-0.016 Higher 1958 0.052 1959 0.044

[E] Outliers 3 3.0 SD above or -4.5 SD below mean for year

1812 +3.0 SD; 1926 +4.3 SD; 1985 +4.0 SD

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

I181 1800 to 1991 192 years Series 10

[B] Entire series, effect on correlation ( 0.658) is:

Lower 1904<-0.012 1878>-0.012 1986<-0.011 1902<-0.009 1991>-0.008 1903<-0.008 Higher 1957 0.009 1823 0.008

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

I122 1775 to 1991 217 years Series 11

[B] Entire series, effect on correlation ( 0.601) is:

Lower 1974>-0.023 1777<-0.013 1984>-0.009 1891<-0.007 1900>-0.007 1946>-0.006 Higher 1807 0.011 1794 0.011

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

1974 +3.6 SD

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

I162 1770 to 1991 222 years Series 12

[B] Entire series, effect on correlation ( 0.693) is:

Lower 1880>-0.019 1785<-0.010 1986>-0.008 1804<-0.008 1846>-0.007 1881>-0.007 Higher 1794 0.014 1957 0.008

[E] Outliers 3 3.0 SD above or -4.5 SD below mean for year

1880 +4.2 SD; 1881 +3.2 SD; 1986 +3.5 SD

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

I111 1850 to 1991 142 years Series 13

[B] Entire series, effect on correlation ( 0.456) is:

Lower 1991>-0.033 1957<-0.018 1990<-0.014 1954<-0.013 1886<-0.011 1946>-0.010 Higher 1861 0.021 1948 0.021

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

1913 +3.4 SD; 1946 +3.3 SD

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

I131 1820 to 1991 172 years Series 14

[B] Entire series, effect on correlation ( 0.606) is:

Lower 1984>-0.019 1950>-0.019 1982>-0.012 1964>-0.011 1879>-0.011 1954<-0.009 Higher 1948 0.013 1860 0.011

[E] Outliers 3 3.0 SD above or -4.5 SD below mean for year

1879 +3.1 SD; 1964 +3.1 SD; 1984 +3.5 SD

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I141 1783 to 1991 209 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

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1925 1974 0 .23 -.10 .23 -.10 -.01 -.10 -.03 -.21 .03 .04 .32\*-.08 -.10 -.01 .05 .00 .13 -.11 -.07 .03 -.15

[B] Entire series, effect on correlation ( 0.553) is:

Lower 1942>-0.013 1927<-0.012 1958<-0.010 1930<-0.008 1945<-0.008 1851<-0.008 Higher 1860 0.013 1847 0.010

1925 to 1974 segment:

Lower 1942>-0.041 1927<-0.036 1958<-0.032 1945<-0.025 1930<-0.024 1953>-0.014 Higher 1948 0.038 1932 0.025

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

1942 +3.1 SD; 1971 +3.7 SD

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

I161 1747 to 1991 245 years Series 16

[B] Entire series, effect on correlation ( 0.666) is:

Lower 1783>-0.011 1918<-0.010 1991>-0.009 1835<-0.009 1933>-0.008 1880>-0.008 Higher 1794 0.008 1957 0.007

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

1783 +3.3 SD; 1813 +3.2 SD

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

I142 1740 to 1991 252 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

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

1740 1789 0 -.22 .05 -.27 .10 -.23 .12 -.25 .09 .19 -.18 .29\*-.06 .18 -.09 .03 .20 -.23 .07 -.19 -.15 -.02

[B] Entire series, effect on correlation ( 0.534) is:

Lower 1931<-0.013 1949>-0.011 1895>-0.010 1911>-0.010 1777<-0.008 1984>-0.008 Higher 1807 0.009 1860 0.008

1740 to 1789 segment:

Lower 1777<-0.043 1757>-0.041 1775>-0.040 1751<-0.032 1747<-0.025 1740>-0.021 Higher 1748 0.050 1766 0.035

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

1949 +3.0 SD

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

I192 1799 to 1991 193 years Series 18

[B] Entire series, effect on correlation ( 0.690) is:

Lower 1874>-0.009 1839>-0.008 1991>-0.007 1983<-0.006 1853>-0.006 1919<-0.006 Higher 1833 0.008 1807 0.008

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

1811 -2.164 27 1

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

1874 +3.3 SD; 1977 +3.0 SD

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I261 1891 to 1992 102 years Series 19

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

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

1891 1940 -6 -.12 -.01 -.10 -.03 .47\* .01 -.04 -.09 -.16 -.02 .29|-.14 -.14 .08 -.12 -.11 .08 .01 .03 .23 -.07

[B] Entire series, effect on correlation ( 0.444) is:

Lower 1891<-0.024 1952<-0.019 1930<-0.018 1920>-0.018 1942>-0.016 1905<-0.014 Higher 1992 0.021 1904 0.021

1891 to 1940 segment:

Lower 1891<-0.046 1920>-0.035 1930<-0.034 1916<-0.024 1895>-0.024 1900>-0.024 Higher 1904 0.060 1932 0.048

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

1920 +3.1 SD

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I242 1731 to 1992 262 years Series 20

[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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1731 1780 -5 -.04 -.03 -.07 .14 -.26 .22\* .07 -.11 -.14 .16 -.10| .09 .16 -.26 .14 -.14 -.09 .05 -.13 .22 -.12

1750 1799 -4 -.02 -.01 .06 .17 -.16 .20 .30\*-.09 .02 .13 -.18| .03 -.04 -.27 .04 -.34 -.09 .04 -.22 .09 .09

1775 1824 -4 -.17 -.07 -.05 .09 -.07 .00 .46\* .09 .43 .06 .23|-.12 -.26 -.26 -.42 -.19 -.20 -.04 .12 -.05 .17

[B] Entire series, effect on correlation ( 0.469) is:

Lower 1752>-0.059 1770>-0.018 1747<-0.016 1794>-0.013 1769<-0.011 1808>-0.009 Higher 1992 0.011 1904 0.009

1731 to 1780 segment:

Lower 1752>-0.175 1770>-0.036 1747<-0.034 1769<-0.026 1756<-0.022 1740<-0.020 Higher 1736 0.080 1766 0.030

1750 to 1799 segment:

Lower 1752>-0.163 1770>-0.030 1769<-0.024 1756<-0.020 1795>-0.019 1759<-0.013 Higher 1790 0.040 1766 0.033

1775 to 1824 segment:

Lower 1808>-0.050 1794>-0.050 1795>-0.044 1775>-0.025 1776>-0.022 1814<-0.016 Higher 1807 0.037 1790 0.033

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

1751 1752 5.1 SD 1752 1753 -5.5 SD 1769 1770 4.6 SD

[E] Outliers 3 3.0 SD above or -4.5 SD below mean for year

1752 +7.3 SD; 1770 +3.3 SD; 1795 +3.6 SD

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I241 1721 to 1992 272 years Series 21

[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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1721 1770 7 -.04 .07 -.04 -.03 .02 -.10 .02 -.14 .28 .00 .00|-.05 .10 .05 -.20 .08 -.16 .54\*-.44 -.01 -.14

1725 1774 7 .00 .20 -.05 -.08 .09 -.07 .05 -.16 .19 .02 -.02|-.08 .06 .03 -.14 .03 -.18 .58\*-.39 .08 -.15

1750 1799 7 .22 .05 .04 -.04 .20 -.19 -.18 -.21 -.14 .07 -.20|-.12 .10 .12 .11 .12 .08 .52\*-.06 .11 -.04

1775 1824 7 .06 .10 .02 -.06 -.07 -.08 -.10 -.01 -.08 .25 -.08|-.06 -.16 -.14 .08 -.03 .08 .43\* .26 .17 .04

1800 1849 -1 -.14 .10 -.16 -.04 .02 -.01 .17 .10 .07 .73\*-.05| .05 -.02 -.31 .02 -.14 .07 .19 .10 .13 -.07

1825 1874 -1 .01 .17 -.13 .04 .02 -.17 -.03 -.05 .12 .85\* .12| .03 .09 -.20 .14 -.15 .06 .04 .12 .15 -.26

1850 1899 -1 -.08 .04 .06 .09 -.12 -.13 -.14 .16 .22 .79\* .20| .16 -.08 .07 .11 .01 -.07 .14 .09 -.08 -.37

1875 1924 -1 -.12 .01 -.13 .20 -.30 -.20 .11 .07 .02 .78\* .04| .06 .06 -.09 -.13 .25 -.21 .09 .10 -.30 -.05

1900 1949 -1 .08 -.14 -.33 -.05 -.36 -.15 .04 -.07 .10 .73\* .26| .08 .15 -.17 -.22 .07 -.31 -.20 .16 -.22 .13

1925 1974 -1 -.06 -.22 -.25 -.21 -.27 .05 .08 -.08 .13 .65\* .23|-.09 .22 .08 -.04 -.02 -.17 -.19 -.04 -.20 -.05

1943 1992 -1 .02 -.01 -.10 .04 -.17 -.04 .03 -.04 .08 .58\* .26|-.25 - - - - - - - - -

[B] Entire series, effect on correlation ( 0.083) is:

Lower 1831>-0.017 1770>-0.015 1959>-0.014 1729<-0.013 1957<-0.011 1808>-0.009 Higher 1958 0.015 1861 0.012

1721 to 1770 segment:

Lower 1770>-0.066 1729<-0.054 1766>-0.038 1762>-0.036 1732>-0.032 1745<-0.022 Higher 1747 0.048 1748 0.042

1725 to 1774 segment:

Lower 1770>-0.065 1729<-0.052 1766>-0.040 1762>-0.037 1732>-0.033 1745<-0.021 Higher 1747 0.052 1748 0.041

1750 to 1799 segment:

Lower 1770>-0.043 1766>-0.036 1762>-0.026 1799>-0.020 1788<-0.020 1790<-0.017 Higher 1794 0.045 1754 0.039

1775 to 1824 segment:

Lower 1808>-0.053 1799>-0.029 1788<-0.026 1815<-0.026 1790<-0.023 1777<-0.013 Higher 1807 0.074 1811 0.029

1800 to 1849 segment:

Lower 1831>-0.092 1808>-0.047 1826>-0.033 1815<-0.024 1837<-0.023 1848<-0.013 Higher 1833 0.057 1807 0.053

1825 to 1874 segment:

Lower 1831>-0.101 1826>-0.035 1837<-0.030 1848<-0.021 1850<-0.020 1845<-0.017 Higher 1861 0.061 1854 0.043

1850 to 1899 segment:

Lower 1887>-0.046 1899>-0.044 1898<-0.034 1896<-0.025 1850<-0.024 1894<-0.016 Higher 1861 0.071 1890 0.046

1875 to 1924 segment:

Lower 1918<-0.041 1887>-0.036 1899>-0.033 1914>-0.031 1920>-0.029 1904<-0.028 Higher 1890 0.061 1891 0.052

1900 to 1949 segment:

Lower 1918<-0.049 1914>-0.043 1920>-0.038 1904<-0.036 1942>-0.026 1917>-0.024 Higher 1930 0.060 1948 0.054

1925 to 1974 segment:

Lower 1959>-0.109 1957<-0.084 1942>-0.026 1956>-0.023 1945<-0.022 1969<-0.014 Higher 1958 0.083 1948 0.066

1943 to 1992 segment:

Lower 1959>-0.102 1957<-0.079 1956>-0.022 1979>-0.021 1945<-0.021 1950>-0.014 Higher 1958 0.077 1948 0.053

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

1769 1770 4.9 SD 1830 1831 4.3 SD

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

1788 0.713 17 1 >> WARNING: Ring is not usually narrow

[E] Outliers 6 3.0 SD above or -4.5 SD below mean for year

1762 +3.2 SD; 1766 +3.4 SD; 1770 +4.4 SD; 1799 +3.6 SD; 1831 +3.7 SD; 1959 +4.2 SD

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I252 1705 to 1992 288 years Series 22

[\*] Early part of series cannot be checked from 1705 to 1720 -- 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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1721 1770 -7 -.25 .03 -.31 .29\*-.13 .15 -.03 -.01 .09 -.16 .23|-.20 .11 -.20 .16 -.01 -.19 -.10 .05 .21 -.01

1725 1774 -7 -.22 .00 -.27 .28\*-.12 .14 .00 .00 .12 -.17 .25|-.16 .04 -.17 .10 .06 -.28 -.12 .05 .16 .06

[B] Entire series, effect on correlation ( 0.568) is:

Lower 1729>-0.021 1770<-0.019 1725>-0.018 1765>-0.017 1991>-0.009 1817<-0.009 Higher 1794 0.007 1807 0.007

1721 to 1770 segment:

Lower 1729>-0.063 1765>-0.050 1770<-0.042 1725>-0.037 1722>-0.021 1734>-0.021 Higher 1747 0.042 1736 0.041

1725 to 1774 segment:

Lower 1729>-0.066 1765>-0.052 1770<-0.044 1725>-0.040 1734>-0.022 1745>-0.012 Higher 1736 0.044 1747 0.042

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

1769 1770 -4.3 SD

[E] Outliers 4 3.0 SD above or -4.5 SD below mean for year

1725 +3.0 SD; 1729 +3.1 SD; 1765 +3.5 SD; 1886 +3.2 SD

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I262 1894 to 1992 99 years Series 23

[B] Entire series, effect on correlation ( 0.627) is:

Lower 1938>-0.014 1917>-0.014 1903<-0.013 1951>-0.013 1958<-0.009 1977<-0.009 Higher 1911 0.019 1941 0.011

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I221 1822 to 1992 171 years Series 24

[B] Entire series, effect on correlation ( 0.660) is:

Lower 1945<-0.015 1949>-0.011 1986<-0.009 1984>-0.009 1933>-0.008 1946>-0.008 Higher 1833 0.009 1992 0.009

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

1991 -0.983 68 2

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I281 1823 to 1992 170 years Series 25

[B] Entire series, effect on correlation ( 0.728) is:

Lower 1914>-0.008 1882>-0.006 1973<-0.005 1965>-0.005 1875<-0.005 1938>-0.004 Higher 1957 0.009 1823 0.008

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I292 1807 to 1992 186 years Series 26

[B] Entire series, effect on correlation ( 0.643) is:

Lower 1808>-0.024 1807<-0.010 1886<-0.009 1830<-0.008 1916<-0.008 1825>-0.008 Higher 1831 0.009 1941 0.008

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

1807 1808 4.1 SD

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

1825 +3.1 SD; 1983 +3.9 SD

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I282 1838 to 1992 155 years Series 27

[B] Entire series, effect on correlation ( 0.691) is:

Lower 1987<-0.012 1973<-0.010 1944>-0.009 1885>-0.008 1898<-0.007 1970<-0.007 Higher 1861 0.008 1959 0.007

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I231 1834 to 1992 159 years Series 28

[B] Entire series, effect on correlation ( 0.692) is:

Lower 1973<-0.019 1872>-0.016 1845<-0.012 1945<-0.010 1967>-0.009 1959>-0.008 Higher 1923 0.009 1941 0.008

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I232 1887 to 1992 106 years Series 29

[B] Entire series, effect on correlation ( 0.735) is:

Lower 1933>-0.018 1959>-0.015 1991>-0.009 1983>-0.008 1973<-0.008 1927<-0.007 Higher 1923 0.013 1957 0.012

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I291 1826 to 1992 167 years Series 30

[B] Entire series, effect on correlation ( 0.691) is:

Lower 1886<-0.014 1991>-0.014 1879>-0.011 1932<-0.010 1826>-0.008 1934>-0.006 Higher 1831 0.010 1861 0.008

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I272 1825 to 1992 168 years Series 31

[B] Entire series, effect on correlation ( 0.641) is:

Lower 1880>-0.013 1881>-0.012 1889<-0.011 1916<-0.009 1851<-0.007 1922>-0.007 Higher 1831 0.012 1992 0.011

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

1881 +3.4 SD

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I271 1823 to 1992 170 years Series 32

[B] Entire series, effect on correlation ( 0.604) is:

Lower 1941<-0.017 1910>-0.015 1880>-0.012 1946>-0.009 1851<-0.009 1971<-0.008 Higher 1831 0.013 1823 0.011

[E] Outliers 3 3.0 SD above or -4.5 SD below mean for year

1910 +4.2 SD; 1911 +3.3 SD; 1946 +3.8 SD

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I222 1831 to 1992 162 years Series 33

[B] Entire series, effect on correlation ( 0.589) is:

Lower 1945<-0.016 1974<-0.015 1973>-0.014 1984>-0.012 1977<-0.011 1990<-0.009 Higher 1833 0.012 1992 0.011

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

1973 1974 -4.7 SD

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

1973 +4.9 SD

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I251 1755 to 1992 238 years Series 34

[B] Entire series, effect on correlation ( 0.628) is:

Lower 1982<-0.018 1817<-0.010 1831>-0.010 1973<-0.007 1876>-0.006 1816>-0.005 Higher 1794 0.011 1958 0.007

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I212 1834 to 1992 159 years Series 35

[B] Entire series, effect on correlation ( 0.548) is:

Lower 1834>-0.025 1890<-0.022 1900>-0.018 1835<-0.010 1985<-0.008 1990<-0.008 Higher 1941 0.012 1959 0.011

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

1834 1835 -4.6 SD

[E] Outliers 3 3.0 SD above or -4.5 SD below mean for year

1834 +3.9 SD; 1882 +3.4 SD; 1900 +3.0 SD

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I211 1738 to 1992 255 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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1738 1787 -4 .09 .24 -.10 .05 -.17 -.18 .34\*-.12 .20 -.02 -.09| .08 -.09 .13 -.08 .12 -.01 -.24 -.13 .15 -.16

1750 1799 0 -.13 .08 -.22 .17 -.08 -.03 .25 -.15 .21 -.02 .28\* .07 -.11 .04 -.10 .17 -.27 -.25 -.21 .18 -.11

[B] Entire series, effect on correlation ( 0.503) is:

Lower 1748>-0.024 1741>-0.019 1977<-0.012 1964>-0.010 1744<-0.009 1768>-0.009 Higher 1794 0.012 1992 0.011

1738 to 1787 segment:

Lower 1748>-0.085 1741>-0.066 1768>-0.028 1744<-0.028 1771>-0.017 1787>-0.014 Higher 1747 0.084 1757 0.055

1750 to 1799 segment:

Lower 1768>-0.036 1771>-0.028 1777<-0.022 1773<-0.018 1785<-0.018 1787>-0.017 Higher 1794 0.097 1793 0.060

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

1780 -0.920 15 1

1782 0.007 15 1 >> WARNING: Ring is not usually narrow

[E] Outliers 3 3.0 SD above or -4.5 SD below mean for year

1748 +4.5 SD; 1875 +3.2 SD; 1894 +3.7 SD

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I392 1816 to 1992 177 years Series 37

[B] Entire series, effect on correlation ( 0.635) is:

Lower 1956>-0.013 1904<-0.013 1955<-0.009 1959>-0.007 1839>-0.007 1897>-0.006 Higher 1823 0.012 1948 0.011

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

1842 +3.2 SD

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I391 1826 to 1992 167 years Series 38

[B] Entire series, effect on correlation ( 0.647) is:

Lower 1984>-0.014 1835<-0.012 1972>-0.011 1885>-0.010 1942>-0.009 1920>-0.009 Higher 1948 0.012 1831 0.012

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

1833 +3.2 SD

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I382 1892 to 1992 101 years Series 39

[B] Entire series, effect on correlation ( 0.520) is:

Lower 1941<-0.031 1932<-0.019 1958<-0.019 1918<-0.018 1898<-0.016 1906<-0.014 Higher 1923 0.023 1911 0.020

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I381 1890 to 1992 103 years Series 40

[B] Entire series, effect on correlation ( 0.482) is:

Lower 1941<-0.029 1914>-0.015 1890<-0.015 1918<-0.014 1959>-0.012 1951>-0.011 Higher 1923 0.022 1900 0.013

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I372 1834 to 1992 159 years Series 41

[B] Entire series, effect on correlation ( 0.642) is:

Lower 1871>-0.016 1836<-0.010 1974>-0.009 1865<-0.008 1873>-0.008 1863<-0.007 Higher 1948 0.013 1957 0.010

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I371 1820 to 1992 173 years Series 42

[B] Entire series, effect on correlation ( 0.523) is:

Lower 1873>-0.019 1830<-0.018 1991>-0.014 1827>-0.013 1832>-0.009 1872>-0.009 Higher 1851 0.012 1923 0.011

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

1832 +3.1 SD; 1873 +3.8 SD

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I362 1883 to 1992 110 years Series 43

[B] Entire series, effect on correlation ( 0.552) is:

Lower 1898<-0.029 1888>-0.024 1890<-0.016 1901>-0.014 1956>-0.012 1972>-0.010 Higher 1923 0.022 1948 0.021

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

1888 +4.0 SD; 1987 +3.1 SD

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I342 1889 to 1992 104 years Series 44

[B] Entire series, effect on correlation ( 0.454) is:

Lower 1904<-0.028 1889<-0.023 1977<-0.015 1903<-0.015 1982>-0.012 1890<-0.012 Higher 1957 0.029 1948 0.019

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

1898 +3.6 SD

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I341 1916 to 1992 77 years Series 45

[B] Entire series, effect on correlation ( 0.441) is:

Lower 1974>-0.030 1924>-0.029 1981>-0.024 1919<-0.019 1922>-0.017 1983<-0.016 Higher 1957 0.033 1992 0.028

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

1924 +4.8 SD

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I361 1908 to 1992 85 years Series 46

[B] Entire series, effect on correlation ( 0.652) is:

Lower 1908>-0.017 1963<-0.012 1931<-0.011 1978<-0.011 1914>-0.011 1956>-0.010 Higher 1948 0.022 1923 0.019

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I321 1884 to 1992 109 years Series 47

[B] Entire series, effect on correlation ( 0.551) is:

Lower 1887>-0.064 1979>-0.028 1888<-0.024 1890<-0.022 1916<-0.014 1932<-0.014 Higher 1992 0.023 1948 0.020

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

1887 1888 -4.2 SD

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

1887 +4.5 SD; 1979 +3.3 SD

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I322 1895 to 1992 98 years Series 48

[B] Entire series, effect on correlation ( 0.621) is:

Lower 1988>-0.018 1952<-0.016 1977<-0.016 1909>-0.015 1897<-0.015 1947>-0.013 Higher 1948 0.024 1957 0.020

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I332 1893 to 1992 100 years Series 49

[B] Entire series, effect on correlation ( 0.513) is:

Lower 1895>-0.026 1896<-0.023 1906<-0.022 1909>-0.019 1979>-0.018 1904<-0.014 Higher 1923 0.030 1948 0.023

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

1895 +3.4 SD; 1910 +3.2 SD

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

I331 1889 to 1992 104 years Series 50

[B] Entire series, effect on correlation ( 0.502) is:

Lower 1919<-0.039 1913<-0.024 1914>-0.023 1922>-0.015 1974>-0.015 1899>-0.012 Higher 1923 0.025 1992 0.024

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

1919 -4.5 SD; 1922 +3.2 SD

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I351 1893 to 1992 100 years Series 51

[B] Entire series, effect on correlation ( 0.697) is:

Lower 1938>-0.012 1901>-0.011 1896<-0.008 1978<-0.008 1898<-0.008 1988>-0.008 Higher 1923 0.012 1904 0.012

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I352 1874 to 1992 119 years Series 52

[B] Entire series, effect on correlation ( 0.504) is:

Lower 1898<-0.032 1877>-0.023 1890<-0.016 1981>-0.014 1876>-0.013 1875<-0.012 Higher 1957 0.023 1904 0.017

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

1877 +3.4 SD

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I311 1829 to 1992 164 years Series 53

[B] Entire series, effect on correlation ( 0.678) is:

Lower 1890<-0.014 1942>-0.011 1871>-0.011 1945<-0.009 1961<-0.008 1829<-0.007 Higher 1831 0.010 1992 0.009

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

1991 -0.983 68 2

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I312 1780 to 1992 213 years Series 54

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

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

1780 1829 1 -.10 -.13 .12 -.09 -.13 -.05 -.15 -.05 .20 -.09 .29| .34\*-.17 .20 -.04 .00 -.15 -.21 .13 -.26 -.14

[B] Entire series, effect on correlation ( 0.560) is:

Lower 1786<-0.019 1807<-0.019 1961<-0.011 1945<-0.011 1792>-0.009 1871>-0.008 Higher 1831 0.012 1948 0.011

1780 to 1829 segment:

Lower 1786<-0.068 1807<-0.062 1792>-0.024 1781>-0.016 1828<-0.015 1793<-0.015 Higher 1811 0.041 1794 0.032

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

1785 1786 -4.2 SD

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

1785 +4.1 SD; 1985 +3.9 SD

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I431 1916 to 1993 78 years Series 55

[B] Entire series, effect on correlation ( 0.430) is:

Lower 1920>-0.058 1916<-0.022 1926>-0.020 1977<-0.016 1930<-0.014 1922>-0.013 Higher 1948 0.027 1923 0.027

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

1920 +3.9 SD

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I432 1898 to 1993 96 years Series 56

[B] Entire series, effect on correlation ( 0.551) is:

Lower 1977<-0.029 1918<-0.022 1925>-0.018 1959>-0.016 1958<-0.014 1942>-0.010 Higher 1911 0.019 1948 0.018

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

1910 +3.2 SD; 1925 +3.6 SD

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I421 1883 to 1993 111 years Series 57

[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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1883 1932 -3 -.32 .08 -.20 -.21 .12 -.07 -.01 .39\*-.02 .02 .29|-.16 -.13 .20 -.17 .08 .15 -.30 -.05 .12 -.02

[B] Entire series, effect on correlation ( 0.388) is:

Lower 1922>-0.028 1956>-0.023 1909>-0.018 1941<-0.016 1887>-0.014 1921>-0.013 Higher 1948 0.033 1923 0.027

1883 to 1932 segment:

Lower 1922>-0.053 1909>-0.034 1887>-0.027 1893>-0.024 1921>-0.024 1914>-0.024 Higher 1923 0.071 1911 0.047

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

1922 +4.1 SD; 1956 +3.1 SD

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I411 1918 to 1993 76 years Series 58

[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 0 -.01 -.10 -.11 -.10 -.19 .01 -.06 -.07 .03 -.32 .25\* .14 .10 .07 -.19 -.13 .08 .12 .02 -.02 -.02

[B] Entire series, effect on correlation ( 0.375) is:

Lower 1958<-0.042 1934>-0.021 1956>-0.017 1968>-0.014 1951>-0.013 1944>-0.013 Higher 1923 0.044 1948 0.036

1925 to 1974 segment:

Lower 1958<-0.064 1934>-0.029 1956>-0.022 1968>-0.020 1951>-0.018 1944>-0.017 Higher 1948 0.074 1927 0.034

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I412 1910 to 1993 84 years Series 59

[B] Entire series, effect on correlation ( 0.501) is:

Lower 1981>-0.031 1958<-0.027 1956>-0.019 1968>-0.018 1940<-0.015 1944>-0.013 Higher 1923 0.033 1948 0.030

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I491 1813 to 1993 181 years Series 60

[B] Entire series, effect on correlation ( 0.654) is:

Lower 1831>-0.020 1815<-0.019 1825>-0.010 1967>-0.009 1927<-0.009 1814>-0.009 Higher 1823 0.009 1957 0.009

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I492 1778 to 1993 216 years Series 61

[B] Entire series, effect on correlation ( 0.740) is:

Lower 1832<-0.017 1831>-0.014 1804<-0.011 1889<-0.010 1829<-0.008 1988>-0.004 Higher 1794 0.012 1957 0.005

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I451 1825 to 1993 169 years Series 62

[B] Entire series, effect on correlation ( 0.721) is:

Lower 1825>-0.008 1851<-0.008 1833<-0.007 1979<-0.007 1880<-0.007 1993<-0.006 Higher 1831 0.009 1992 0.008

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I481 1830 to 1993 164 years Series 63

[B] Entire series, effect on correlation ( 0.656) is:

Lower 1992<-0.018 1880>-0.017 1948>-0.012 1886<-0.011 1973>-0.010 1932<-0.005 Higher 1957 0.011 1860 0.010

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

1880 +3.2 SD; 1973 +3.3 SD

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I482 1806 to 1993 188 years Series 64

[B] Entire series, effect on correlation ( 0.667) is:

Lower 1879>-0.012 1886<-0.012 1931<-0.011 1948>-0.010 1942>-0.006 1820>-0.006 Higher 1860 0.009 1833 0.008

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

1879 +3.0 SD

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I471 1810 to 1993 184 years Series 65

[B] Entire series, effect on correlation ( 0.611) is:

Lower 1931<-0.011 1976<-0.008 1963>-0.008 1966>-0.008 1918<-0.007 1834>-0.007 Higher 1860 0.011 1941 0.009

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

1963 +3.4 SD

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I472 1810 to 1993 184 years Series 66

[B] Entire series, effect on correlation ( 0.520) is:

Lower 1833<-0.014 1835<-0.013 1880>-0.013 1830<-0.013 1829<-0.011 1980>-0.009 Higher 1851 0.013 1941 0.011

[E] Outliers 4 3.0 SD above or -4.5 SD below mean for year

1851 +3.1 SD; 1880 +3.5 SD; 1941 +3.0 SD; 1980 +4.3 SD

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I462 1793 to 1993 201 years Series 67

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

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

1793 1842 0 -.15 .17 .01 .21 -.23 -.06 -.17 -.03 .21 -.16 .30\* .01 -.17 .00 -.14 .18 .23 -.04 .23 -.04 -.23

1800 1849 8 -.14 .19 .09 .21 -.11 -.09 -.16 .07 .08 -.11 .27|-.01 -.16 -.03 -.19 .09 .22 .05 .34\* .02 -.18

[B] Entire series, effect on correlation ( 0.552) is:

Lower 1807<-0.023 1809>-0.016 1833<-0.010 1876>-0.008 1973<-0.007 1895>-0.007 Higher 1794 0.017 1861 0.012

1793 to 1842 segment:

Lower 1807<-0.068 1809>-0.041 1833<-0.028 1835<-0.017 1795>-0.014 1811>-0.013 Higher 1794 0.095 1831 0.037

1800 to 1849 segment:

Lower 1807<-0.072 1809>-0.044 1833<-0.030 1835<-0.017 1840>-0.014 1845<-0.014 Higher 1847 0.044 1831 0.044

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

1808 -0.006 24 1 >> WARNING: Ring is not usually narrow

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

1811 +3.2 SD

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I452 1770 to 1993 224 years Series 68

[B] Entire series, effect on correlation ( 0.612) is:

Lower 1790<-0.013 1772<-0.009 1947>-0.008 1796>-0.008 1778>-0.007 1836<-0.007 Higher 1794 0.016 1861 0.009

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

1794 -2.047 18 1

[E] Outliers 3 3.0 SD above or -4.5 SD below mean for year

1778 +3.1 SD; 1969 +3.2 SD; 1987 +3.4 SD

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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 I171 1800 1991 192 7 0 0.571 1.45 3.67 0.669 0.831 0.203 0.80 0.286 0.025 1

2 I172 1772 1991 220 9 0 0.632 1.15 2.71 0.552 0.829 0.231 0.90 0.300 0.021 1

3 I182 1757 1991 235 9 0 0.698 0.93 2.85 0.554 0.879 0.272 0.86 0.327 0.001 2

4 I191 1829 1991 163 6 0 0.646 0.96 2.59 0.491 0.870 0.190 0.62 0.253 -0.004 2

5 I152 1760 1991 232 9 0 0.645 1.07 3.53 0.604 0.891 0.211 1.20 0.293 0.016 1

6 I132 1889 1991 103 4 0 0.524 1.03 4.36 0.660 0.855 0.238 0.70 0.293 0.060 1

7 I121 1787 1991 205 8 0 0.659 0.98 2.83 0.494 0.842 0.202 0.77 0.281 -0.006 2

8 I112 1796 1991 196 8 0 0.626 1.09 3.42 0.650 0.883 0.220 1.05 0.325 0.019 1

9 I151 1810 1991 182 7 3 0.480 1.05 2.92 0.557 0.887 0.216 0.86 0.276 -0.015 1

10 I181 1800 1991 192 7 0 0.658 0.81 2.93 0.502 0.911 0.222 0.67 0.283 0.028 1

11 I122 1775 1991 217 8 0 0.601 0.77 1.98 0.343 0.831 0.190 0.79 0.270 0.017 1

12 I162 1770 1991 222 9 0 0.693 0.85 2.52 0.488 0.822 0.262 1.04 0.357 0.019 1

13 I111 1850 1991 142 5 0 0.456 1.00 2.75 0.566 0.862 0.193 1.17 0.305 -0.028 1

14 I131 1820 1991 172 7 0 0.606 1.10 2.46 0.414 0.820 0.199 0.67 0.252 0.046 1

15 I141 1783 1991 209 8 1 0.553 0.62 2.15 0.445 0.922 0.227 1.03 0.327 -0.012 1

16 I161 1747 1991 245 10 0 0.666 0.69 2.16 0.417 0.854 0.256 0.88 0.329 -0.001 2

17 I142 1740 1991 252 10 1 0.534 0.91 3.89 0.743 0.939 0.218 0.71 0.275 0.017 1

18 I192 1799 1991 193 8 0 0.690 0.95 3.50 0.592 0.895 0.235 1.07 0.303 0.007 2

19 I261 1891 1992 102 4 1 0.444 1.69 3.67 0.642 0.654 0.225 0.72 0.303 0.002 1

20 I242 1731 1992 262 10 3 0.469 0.73 3.60 0.606 0.932 0.242 1.40 0.348 -0.011 1

21 I241 1721 1992 272 11 11 0.083 0.75 3.41 0.596 0.950 0.238 1.20 0.340 0.004 1

22 I252 1705 1992 288 11 2 0.568 0.87 3.13 0.698 0.914 0.271 1.10 0.393 0.005 1

23 I262 1894 1992 99 4 0 0.627 2.03 4.11 0.684 0.701 0.221 0.57 0.275 0.063 1

24 I221 1822 1992 171 7 0 0.660 0.87 2.72 0.627 0.903 0.279 0.86 0.361 -0.003 1

25 I281 1823 1992 170 7 0 0.728 1.39 4.39 0.754 0.844 0.210 0.84 0.294 0.007 2

26 I292 1807 1992 186 7 0 0.643 0.91 2.34 0.475 0.839 0.246 0.98 0.333 0.002 2

27 I282 1838 1992 155 6 0 0.691 1.01 2.38 0.345 0.807 0.172 0.59 0.234 0.032 1

28 I231 1834 1992 159 6 0 0.692 1.24 4.05 0.722 0.922 0.173 0.51 0.225 -0.015 1

29 I232 1887 1992 106 4 0 0.735 1.21 3.18 0.632 0.916 0.155 0.54 0.202 0.010 1

30 I291 1826 1992 167 6 0 0.691 0.97 2.61 0.479 0.811 0.236 0.98 0.319 0.001 2

31 I272 1825 1992 168 6 0 0.641 1.21 5.15 0.830 0.797 0.214 0.91 0.321 0.012 2

32 I271 1823 1992 170 7 0 0.604 1.29 4.26 0.789 0.844 0.209 1.03 0.302 0.013 2

33 I222 1831 1992 162 6 0 0.589 0.95 3.50 0.717 0.880 0.259 1.35 0.359 -0.004 1

34 I251 1755 1992 238 9 0 0.628 0.68 2.20 0.412 0.881 0.222 1.11 0.324 0.023 1

35 I212 1834 1992 159 6 0 0.548 1.46 3.74 0.795 0.878 0.192 1.04 0.263 0.020 2

36 I211 1738 1992 255 10 2 0.503 0.99 3.80 0.802 0.931 0.291 1.18 0.378 0.035 1

37 I392 1816 1992 177 7 0 0.635 1.52 3.43 0.686 0.853 0.197 0.67 0.263 0.012 1

38 I391 1826 1992 167 6 0 0.647 1.26 2.30 0.489 0.838 0.188 0.82 0.242 0.009 1

39 I382 1892 1992 101 4 0 0.520 1.37 3.00 0.592 0.798 0.229 0.66 0.268 0.003 1

40 I381 1890 1992 103 4 0 0.482 1.64 3.06 0.530 0.665 0.219 0.64 0.253 0.021 1

41 I372 1834 1992 159 6 0 0.642 0.93 2.53 0.495 0.901 0.200 0.79 0.269 -0.014 2

42 I371 1820 1992 173 7 0 0.523 0.97 2.47 0.554 0.931 0.174 0.65 0.233 0.052 1

43 I362 1883 1992 110 4 0 0.552 1.46 3.19 0.602 0.738 0.221 1.18 0.330 -0.001 1

44 I342 1889 1992 104 4 0 0.454 1.79 3.56 0.651 0.661 0.235 1.08 0.321 0.024 1

45 I341 1916 1992 77 3 0 0.441 1.37 3.43 0.530 0.752 0.204 1.07 0.316 -0.017 1

46 I361 1908 1992 85 3 0 0.652 1.67 3.22 0.537 0.652 0.209 0.60 0.265 -0.008 1

47 I321 1884 1992 109 4 0 0.551 1.43 2.68 0.443 0.738 0.179 0.73 0.239 0.062 1

48 I322 1895 1992 98 4 0 0.621 1.56 2.95 0.490 0.779 0.164 0.51 0.215 0.019 2

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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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49 I332 1893 1992 100 4 0 0.513 1.29 2.25 0.369 0.699 0.172 0.53 0.226 0.000 1

50 I331 1889 1992 104 4 0 0.502 1.72 3.02 0.504 0.549 0.215 0.64 0.280 0.012 2

51 I351 1893 1992 100 4 0 0.697 1.53 2.91 0.499 0.637 0.222 0.58 0.277 -0.004 1

52 I352 1874 1992 119 5 0 0.504 0.97 2.23 0.381 0.805 0.193 0.62 0.265 0.022 1

53 I311 1829 1992 164 6 0 0.678 1.06 2.64 0.647 0.877 0.264 0.98 0.340 0.001 1

54 I312 1780 1992 213 8 1 0.560 1.05 3.48 0.737 0.906 0.245 1.34 0.344 -0.023 1

55 I431 1916 1993 78 3 0 0.430 2.11 3.60 0.567 0.641 0.183 0.61 0.240 -0.032 1

56 I432 1898 1993 96 4 0 0.551 2.08 3.69 0.634 0.664 0.192 0.65 0.257 -0.009 1

57 I421 1883 1993 111 4 1 0.388 1.51 3.76 0.764 0.827 0.215 0.75 0.296 -0.004 1

58 I411 1918 1993 76 3 1 0.375 1.81 3.74 0.690 0.760 0.211 0.55 0.259 0.003 1

59 I412 1910 1993 84 3 0 0.501 1.75 3.25 0.684 0.766 0.214 0.47 0.258 0.015 1

60 I491 1813 1993 181 7 0 0.654 1.40 2.67 0.538 0.850 0.155 0.51 0.206 -0.003 1

61 I492 1778 1993 216 8 0 0.740 1.28 2.69 0.585 0.878 0.182 0.76 0.238 0.004 2

62 I451 1825 1993 169 6 0 0.721 0.79 1.57 0.283 0.760 0.206 0.69 0.265 -0.006 2

63 I481 1830 1993 164 6 0 0.656 1.01 2.56 0.449 0.827 0.200 0.86 0.277 -0.006 2

64 I482 1806 1993 188 7 0 0.667 1.01 2.70 0.520 0.898 0.185 0.74 0.251 0.032 1

65 I471 1810 1993 184 7 0 0.611 0.73 2.11 0.376 0.811 0.230 0.97 0.320 0.002 3

66 I472 1810 1993 184 7 0 0.520 0.61 3.09 0.501 0.869 0.236 1.15 0.358 0.009 4

67 I462 1793 1993 201 8 2 0.552 0.64 2.50 0.636 0.953 0.264 0.95 0.328 0.031 3

68 I452 1770 1993 224 9 0 0.612 0.88 2.91 0.573 0.858 0.297 0.99 0.376 -0.005 2

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Total or mean: 11280 435 29 0.588 1.09 5.15 0.572 0.847 0.221 1.40 0.298 0.009

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