

Appendix to “Business Cycle Accounting for the Japanese Economy”

1990s in Japan

We calculate the data from 1980 to 2003 in Japan following the method by Hayashi and Prescott (2002). We used SNA93, while Hayashi and Prescott used SNA68. There are three differences between Hayashi and Prescott database and our data base.

The first one is the definition of consumption. While Hayashi and Prescott use “private final consumption” in SNA68 which includes the social security benefits for the medical cost. Therefore, we use “actual final consumption of households” in SNA93 including “social transfers in kind.” “Social transfers in kind” consists “social benefits in kind” and “Transfers of individual non-market goods and services.” “Social benefits in kind” are the social security benefits for the healthcare cost. “Transfers of individual non-market goods and services” are public expenditure for text book, education, and health services.

The second is the difference in the definition of government consumption due to the classification of “social transfers in kind.”

Finally, while Hayashi and Prescott estimate the market value of capital depreciations, we calculate those from the new data in the reconciliation account of the SNA93 data set.

1920s in Japan

Original Data Description

- Op.1: Personal consumption expenditure in million yen
- Op.2: General government consumption expenditure in million yen
- Op.3: Gross domestic fixed capital in million yen
- Op.4: Private gross domestic fixed capital in million yen
- Op.5: Government gross domestic fixed capital in million yen
- Op.6: Current account in million yen
- Op.7: Exports of goods and services and factor income received from abroad in million yen
- Op.8: Imports of Goods and services and factor income paid abroad in million yen
- Op.9: Gross national Expenditure at market prices in million yen
- Op.10: Net income form abroad in million yen
- Op.11: GNP deflator
- Op.12: Provisions for the consumption of fixed capital in million yen
- Op.13: Real net capital stock (residence included) in 1934-1936 prices, in millions of yen
- Op.14: Real capital stock for the private sector in 1960 prices, in billion yen
- Op.15: Real capital stock for the public sector in 1960 prices, in billion yen

- Op.16: Population (unit person)
- Op.17: Male population for 1885-1919.
- Op.18: Male population from 0 to 4 years old.
- Op.19: Male population from 5 to 9 years old.
- Op.20: Male population from 10 to 14 years old.
- Op.21: Male population from 15 to 19 years old.
- Op.22: Male population over 60 years old.
- Op.23: 60 years old Male population
- Op.24: 61 years old Male population
- Op.25: 62 years old Male population
- Op.26: 63 years old Male population
- Op.27: 64 years old Male population
- Op.28: 65 years old Male population
- Op.29: 66 years old Male population
- Op.30: 67 years old Male population
- Op.31: 68 years old Male population
- Op.32: 69 years old Male population
- Op.33: Female population for 1885-1929.
- Op.34: Female population from 0 to 4 years old.
- Op.35: Female population from 5 to 9 years old.
- Op.36: Female population from 10 to 14 years old.
- Op.37: Female population from 15 to 19 years old.
- Op.38: Female population over 60 years old.
- Op.39: 60 years old Female population
- Op.40: 61 years old Female population
- Op.41: 62 years old Female population
- Op.42: 63 years old Female population
- Op.43: 64 years old Female population
- Op.44: 65 years old Female population
- Op.45: 66 years old Female population
- Op.46: 67 years old Female population
- Op.47: 68 years old Female population
- Op.48: 69 years old Female population
- Op.49: Male gainful workers (over 10 years old) unit person.
- Op.50: Female gainful workers (over 10 years old) unit person.
- Op.51: Daily average of actual hours worked in mine.

- Op.52: Daily average of actual hours worked in factory.
- Op.53: Monthly average of days worked in mine.
- Op.54: Monthly average of days worked in factory.
- Op.55: Daily average of hours worked in factory.
- Op.56: Days worked in a year in factory.

Sources

- Op.1: , Table 1. Gross National Expenditure: Current Prices, 1885-1940, “National Income” in LTES (Long Term Economic Statistics, Hitotsubashi University).
- Op.2: same as Op.1.
- Op.3: same as Op.1.
- Op.4: Table 4. Gross Domestic Fixed Capital Formation: Current Prices, 1885-1940. “National Income” in LTES.
- Op.5: same as Op.4.
- Op.6: same as Op.1.
- Op.7: same as Op.1.
- Op.8: same as Op.1.
- Op.9: same as Op.1.
- Op.10: Table 7. External Transactions and Balances of Japan Proper I: Net Balance, Current Prices, 1868-1940. “National Income” in LTES.
- Op.11: Table 30. Deflators A : 1885-1940., “National Income” in LTES.
- Op.12: Table 8. Gross National Product : Current Prices, 1885-1940. “National Income” in LTES.
- Op.13: Table 1. Aggregate Capital Stock in 1934-36 prices, “Capital Stock” in LTES.
- Op.14: Reference table3. Gross Capital Stock: Private vs. Public (1905-1960) , “Capital Stock” in LTES.
- Op.15: same as Op.14.
- Op.16: Op.17+Op.33 before 1920. After 1920, Table 2. Total Population by Sex and Age Groups (Oct. 1st): 1920-1940. “Labor forces” in LTES.
- Op.17: Table 1. Population by Sex and Age Groups (Japanese only, at the End of the Year) Male: 1871-1920. “Labor forces” in LTES.
- Op.18: Table 1, “Labor forces” in LTES for 1885-1919 and Table 2, “Labor forces” in LTES for 1920-40 in “Labor forces” in LTES.
- Op.19: same as Op.18.
- Op.20: same as Op.18.

- Op.21: same as Op.18.
- Op.22: same as Op.18.
- Op.23: For 1898-1919, we use Table 3. Population by Sex and Age in Single Years (Japanese only, at the End of the Year): Male, 1898-1920. For 1920-40, we use Table 4. Total Population by Sex and Age in Single Years (Oct. 1st): Male, 1920-1940 in “Labor forces” in LTES.
- Op.24: same as Op.23.
- Op.25: same as Op.23.
- Op.26: same as Op.23.
- Op.27: same as Op.23.
- Op.28: same as Op.23.
- Op.29: same as Op.23.
- Op.30: same as Op.23.
- Op.31: same as Op.23.
- Op.32: same as Op.23.
- Op.33: Table 1. Population by Sex and Age Groups (Japanese only, at the End of the Year) Female: 1871-1920. “Labor forces” in LTES.
- Op.34: Table 1 (Female), “Labor forces” in LTES for 1885-1919 and Table 2 (Female), “Labor forces” in LTES for 1920-40 in “Labor forces” in LTES.
- Op.35: same as Op.34.
- Op.36: same as Op.34.
- Op.37: same as Op.34.
- Op.38: same as Op.34.
- Op.39: For 1898-1919, we use Table 3. Population by Sex and Age in Single Years (Japanese only, at the End of the Year): Female, 1898-1920. For 1920-40, we use Table 4. Total Population by Sex and Age in Single Years (Oct. 1st): Male, 1920-1940 in “Labor forces” in LTES.
- Op.40: same as Op.39.
- Op.41: same as Op.39.
- Op.42: same as Op.39.
- Op.43: same as Op.39.
- Op.44: same as Op.39.
- Op.45: same as Op.39.
- Op.46: same as Op.39.
- Op.47: same as Op.39.
- Op.48: same as Op.39.
- Op.49: Table 5. Number of Gainful Workers by Sex and Age Groups (Japanese only, in the

Mid of the Year): Male, 1872-1920; Table 6. Number of Gainful Workers by Sex and Age Groups (Oct. 1st), 1920-1940. in “Labor forces” in LTES.

- Op.50: Table 5. Number of Gainful Workers by Sex and Age Groups (Japanese only, in the Mid of the Year): Female, 1872-1920; Table 6. Number of Gainful Workers by Sex and Age Groups (Oct. 1st), 1920-1940 in “Labor forces” in LTES.
- Op.51: Table 13. Hours and Days Worked; (1) Daily Average of Regular Working Hours (1923-1938) ; Daily Average of Actual Hours Worked (1939-1945) in “Hundred-year Statistics of the Japanese Economy,” Bank of Japan (1966).
- Op.52: same as Op.51.
- Op.53: Table 13. Hours and Days Worked; (3) Monthly Average of Days Worked in “Hundred-year Statistics of the Japanese Economy,” Bank of Japan (1966).
- Op.54: same as Op.53.
- Op.55: IX. Industries and wages, Table 90. Number of factory, employee, wages, days and hours worked (the whole country). in “Nippon Teikoku Toukei Nenkan”. For 1919-21, we assume that the data are 11 hours.
- Op.56: same as Op.55. For 1919-21, we assume that the data are 300 days.

Construction series description

- Cp.1: Private + government fixed capital
- Cp.2: Less: duplication between private and government domestic fixed capital in million yen
- Cp.3: Private domestic fixed capital less duplication divided proportionally in million yen.
- Cp.4: Government domestic fixed capital less duplication divided proportionally in million yen.
- Cp.5: Private consumption in million yen
- Cp.6: Government consumption including government domestic fixed capital in million yen
- Cp.7: Investment in million yen
- Cp.8: Current account in million yen
- Cp.9: Gross national product in million yen
- Cp.10: Private consumption in million yen
- Cp.11: Government consumption including government domestic fixed capital in million yen
- Cp.12: Investment including current account in million yen
- Cp.13: Gross national product in million yen
- Cp.14: Real private consumption in million yen
- Cp.15: Real government consumption in million yen
- Cp.16: Real investment including current account in million yen

- Cp.17: Real gross national product in million yen
- Cp.18: Government consumption over GNP
- Cp.19: Real depreciation in million yen
- Cp.20: Real net private capital stock in million yen
- Cp.21: Nominal capital stock abroad
- Cp.22: Real capital stock abroad
- Cp.23: Real private and abroad capital stock
- Cp.24: Depreciation rate
- Cp.25: δ , The 1920-35 average depreciation rate
- Cp.26: Working-age population over 10 years old, unit person
- Cp.27: Working-age population over 10 years old, in million persons
- Cp.28: Growth rate of working-age population
- Cp.29: gn , The 1920-35 geometric average of working-age population growth rate
- Cp.30: Number of gainful workers over 10 years old, unit person
- Cp.31: Number of gainful workers over 10 years old, in million persons
- Cp.32: Hours worked in a year in factory
- Cp.33: Per-capita labor
- Cp.34: Real GNP per capita
- Cp.35: Real capital per capita
- Cp.36: Manhours in thousand hours
- Cp.37: α , The 1920-35 average of capital share
- Cp.38: Total factor productivity
- Cp.39: Labor augmented technological factor
- Cp.40: gz , The 1920-35 geometric average of labor augmented technological growth rate
- Cp.41: real consumption in effective labor unit
- Cp.42: real government expenditure in effective labor unit
- Cp.43: real investment + current account in effective labor unit
- Cp.44: real output in effective labor unit
- Cp.45: real capital stock in effective labor unit

Construction of series

- Cp.1: Equals Op.4 + Op.5
- Cp.2: Equals Op.3 – Cp.1
- Cp.3: Equals Op.4 + (Op.4 / Cp.1)*Cp.2
- Cp.4: Equals Op.5 + (Op.5 / Cp.1)*Cp.2
- Cp.5: Equals Op.1

- Cp.6: Equals Op.2 + Cp.4
- Cp.7: Equals Cp.3
- Cp.8: Equals Op.6
- Cp.9: Equals Cp.5 + Cp.6 + Cp.7 + Cp.8
- Cp.10: Equals Cp.5
- Cp.11: Equals Cp.6
- Cp.12: Cp.7 + Cp.8
- Cp.13: Equals Cp.10 + Cp.11 + Cp.12 = Cp.9
- Cp.14: Equals Cp.10 / Op.11 *100
- Cp.15: Equals Cp.11 / Op.11 *100
- Cp.16: Equals Cp.12 / Op.11 *100
- Cp.17: Equals Cp.13 / Op.11 *100
- Cp.18: Equals Cp.15 / Cp.17
- Cp.19: Equals Op.12/ Op.11 *100
- Cp.20: Equals Op.13 * (Op.14 / (Op.14 + Op.15))
- Cp.21: $Cp.21(1917) = 25 * Op.10$. For 1885-1916, $Cp.21(t) = Cp.21(t+1) - Cp.8(t)$. For 1918-1940, $Cp.21(t+1) = Cp.21(t) + Cp.8(t)$
- Cp.22: Equals Cp.21 / Op.11 * 100
- Cp.23: Equals Cp.20 + Cp.22
- Cp.24: Equals Cp.19 / Cp.23
- Cp.25: The 1920-35 average of Cp.24
- Cp.26: Equals Op.16 – Op.18 – Op.19 – Op.34 – Op.35
- Cp.27: Equals Cp.26 / 1000000
- Cp.28: Working-age growth rate at t equals $(Cp.27(t+1) - Cp.27(t)) / Cp.27(t)$
- Cp.29: Equals $(Cp.28(1935) / Cp.28(1920))^{(1/15)} - 1$
- Cp.30: Equals Op.49 + Op.50
- Cp.31: Equals Cp.30 / 1000000
- Cp.32: Equals Op.55 * Op.56 for 1910-23. For 1924-35, Cp.32 equals Op.52 * Op.54 * 12
- Cp.33: Equals $(Cp.31 * Cp.32) / (Cp.27 * 5760)$
- Cp.34: Equals Cp.17 / Cp.27
- Cp.35: Equals Cp.23 / Cp.27
- Cp.36: Equals Cp.31 * Cp.32 /1000
- Cp.37: Equals Cpp.14 (below)
 - To construct capital share, see “capital share” sheet
 - ◇ Opp.1: Labor share for private non-agricultural industry
 - ◇ Opp.2: Labor share of total cost for agricultural industry

- ◇ Opp.3: Land rent share of total cost for agricultural industry
- ◇ Opp.4: Capital interest share of total cost for agricultural industry
- ◇ Opp.5: Current input value share of total cost for agricultural industry
- ◇ Opp.6: Net domestic product in agriculture, forestry and fisheries
- ◇ Opp.7: Net domestic product in mining and manufacturing
- ◇ Opp.8: Net domestic product in construction
- ◇ Opp.9: Net domestic product in transportation and communication
- ◇ Opp.10: Net domestic product in business services
- ◇ Opp.11: Net domestic product in imputed rent

Sources of opp

- ◇ Opp.1: Attended table 2 “Labor share” in Minami and Ono (1978).
- ◇ Opp.2: Table 2-11 “Factor Shares in Total Cost” in Hayami (1975).
- ◇ Opp.3: same as Opp.2.
- ◇ Opp.4: same as Opp.2.
- ◇ Opp.5: same as Opp.2.
- ◇ Opp.6: Table 9. Net Domestic Product by Industry at Market Prices: Current Prices, 1885-1940 in “National Income” in LTES.
- ◇ Opp.7: same as Opp.6.
- ◇ Opp.8: same as Opp.6.
- ◇ Opp.9: same as Opp.6.
- ◇ Opp.10: same as Opp.6.
- ◇ Opp.11: same as Opp.6.

Constructed series

- ◇ Cpp.1: Labor share in total cost in agriculture in each year
- ◇ Cpp.2: Capital share in total cost in agriculture in each year
- ◇ Cpp.3: Labor share in value added in agriculture in each year
- ◇ Cpp.4: Capital share in value added in agriculture in each year
- ◇ Cpp.5: Net domestic product
- ◇ Cpp.6: Net domestic product in primary industry
- ◇ Cpp.7: Net domestic product in non-primary industry
- ◇ Cpp.8: Labor share in value added in agriculture in 1920-35
- ◇ Cpp.9: Labor share in value added in non-agriculture in 1920-35
- ◇ Cpp.10: Net domestic product in primary industry in 1920-35
- ◇ Cpp.11: Net domestic product in non-primary industry in 1920-35

- ◇ Cpp.12: Weighted average of labor share in 1920-35
- ◇ Cpp.13: Average labor share for 1920-35
- ◇ Cpp.14: Average capital share for 1920-35

Construction of series

- ◇ Cpp.1: we apply Opp.2 to each year
 - ◇ Cpp.2: we apply Opp.4 to each year
 - ◇ Cpp.3: Equals $C_{pp.1} / (C_{pp.1} + C_{pp.2})$
 - ◇ Cpp.4: Equals $C_{pp.2} / (C_{pp.1} + C_{pp.2})$
 - ◇ Cpp.5: Equals $Opp.6 + Opp.7 + Opp.8 + Opp.9 + Opp.10 + Opp.11$
 - ◇ Cpp.6: Equals Opp.6
 - ◇ Cpp.7: Equals $Opp.7 + Opp.8 + Opp.9 + Opp.10 + Opp.11$
 - ◇ Cpp.8: Equals Cpp.3 in 1920-35
 - ◇ Cpp.9: Equals Cpp.4 in 1920-35
 - ◇ Cpp.10: Equals Cpp.6 in 1920-35
 - ◇ Cpp.11: Equals Cpp.7 in 1920-35
 - ◇ Cpp.12: Equals $C_{pp.8} * (C_{pp.10} / (C_{pp.10} + C_{pp.11})) + C_{pp.9} * (C_{pp.11} / (C_{pp.10} + C_{pp.11}))$
 - ◇ Cpp.13: The 1920-35 average of Cpp.12
 - ◇ Cpp.14: Equals $1 - C_{pp.13}$
- Cp.38: Equals $C_{p.17} / ((C_{p.23} \wedge C_{p.37}) * ((C_{p.31} * C_{p.32}) \wedge (1 - C_{p.37})))$
 - Cp.39: Equals $C_{p.38} \wedge (1 / (1 - C_{p.37}))$
 - Cp.40: Equals $(C_{p.39}(1935) / C_{p.39}(1920)) \wedge (1/15) - 1$
 - Cp.41: Equals $C_{p.14} / ((1 + C_{p.40}) \wedge (t-1920) * C_{p.27})$
 - Cp.42: Equals $C_{p.15} / ((1 + C_{p.40}) \wedge (t-1920) * C_{p.27})$
 - Cp.43: Equals $C_{p.16} / ((1 + C_{p.40}) \wedge (t-1920) * C_{p.27})$
 - Cp.44: Equals $C_{p.17} / ((1 + C_{p.40}) \wedge (t-1920) * C_{p.27})$
 - Cp.45: Equals $C_{p.23} / ((1 + C_{p.40}) \wedge (t-1920) * C_{p.27})$

For U.S.A. in 1920s

Observation series description for U.S.

- Oa.1: Gross domestic product in billions of dollars
- Oa.2: Personal consumption on expenditures in billions of dollars
- Oa.3: Government consumption on expenditures and gross investment in billions of dollars
- Oa.4: Gross private domestic investment in billions of dollars
- Oa.5: Net exports of goods and services in billions of dollars
- Oa.6: Net foreign income in billions of dollars
- Oa.7: Gross national product in billions of dollars
- Oa.8: Gross national product in millions of dollars
- Oa.9: Consumption expenditures in millions of dollars
- Oa.10: Investment in millions of dollars
- Oa.11: Change in business inventories in millions of dollars
- Oa.12: Net foreign investment in millions of dollars
- Oa.13: Government purchases of goods and services in millions of dollars
- Oa.14: Real GNP in millions of 1929 dollars
- Oa.15: Real consumption on expenditures in millions of 1929 dollars
- Oa.16: Real private investment in millions of 1929 dollars
- Oa.17: Real change in business inventories in millions of 1929 dollars
- Oa.18: Real net foreign investment in millions of 1929 dollars
- Oa.19: Real government purchases of goods and services in millions of 1929 dollars
- Oa.20: Real capital consumption on allowances in millions of 1929 dollars
- Oa.21: Real net factor income from abroad in millions of 1929 dollars
- Oa.22: Total manhours including military in millions of persons
- Oa.23: Total civilian manhours in millions of persons
- Oa.24: Working-age population over 16 in thousands of persons
- Oa.25: Real capital stocks of national economy in millions of 1929 dollars
- Oa.26: Real net foreign assets in millions of 1929 dollars
- Oa.27: Real general government assets in millions of 1929 dollars
- Oa.28: U.S. government bonds yields (%)
- Oa.29: α , Capital share of Chari et al. (2002).

Sources for U.S.

- Oa.1: U.S. Department of Commerce, Bureau of Economic Analysis web site
(<http://www.bea.doc.gov/bea/dn/nipaweb/SelectTable.asp>)
- Oa.2: same as Oa.1

- Oa.3: same as Oa.1
- Oa.4: same as Oa.1
- Oa.5: same as Oa.1
- Oa.6: same as Oa.1
- Oa.7: same as Oa.1
- Oa.8: TABLE A-IIb Gross National Product, Commerce Concept, Derivation from Kuznets Estimates, 1869-1929; and Reconciliation with Kuznets Estimate, 1937, 1948, and 1953 (millions of current dollars) in Kendrick (1961)
- Oa.9: same as Oa.8
- Oa.10: same as Oa.8
- Oa.11: same as Oa.8
- Oa.12: same as Oa.8
- Oa.13: same as Oa.8
- Oa.14: TABLE A-IIa Gross National Product, Commerce Concept, Deviation from Kuznets Estimates, 1869-1957 (millions of 1929 dollars) Oa.15: Real consumption on expenditures in Kendrick(1961)
- Oa.15: Real consumption on expenditures in Kendrick (1961)
- Oa.16: same as Oa.14
- Oa.17: same as Oa.14
- Oa.18: same as Oa.14
- Oa.19: same as Oa.14
- Oa.20: TABLE A-III National Product, Commerce Concept, by Sector, 1869-1957 (millions of 1929 dollars) in Kendrick (1961)
- Oa.21: same as Oa.20
- Oa.22: TABLE A-X National Economy: Manhours, by Major Sector, 1869-1957 (millions) in Kendrick (1961)
- Oa.23: same as Oa.22
- Oa.24: Series A39, Historical Statistics of the United States (1975).
- Oa.25: TABLE A-XV National Economy: Real Capital Stocks, by Major Sector, 1869-1957 (millions of 1929 dollars) in Kendrick (1961)
- Oa.26: same as Oa.25
- Oa.27: same as Oa.25
- Oa.28: Series X474, Historical Statistics of the United States (1975).
- Oa.29: Chari et al. (2002)

Constructed series for U.S.

- Ca.1: GNP
- Ca.2: Real GNP
- Ca.3: GNP deflator
- Ca.4: Real consumption in millions of 1929 dollars
- Ca.5: Real government purchases in millions of 1929 dollars
- Ca.6: Real investment + current account in millions of 1929 dollars
- Ca.7: Real GNP in millions of 1929 dollars
- Ca.8: Working-age population over 16 in millions of persons
- Ca.9: growth rate of working-age population
- Ca.10: *gn*, The 1923-38 geometric average of working-age population growth rate
- Ca.11: Per-capita labor
- Ca.12: Real private capital stocks in millions of 1929 dollars
- Ca.13: Depreciation rate
- Ca.14: δ , The 1923-28 average depreciation rate
- Ca.15: Real output per capita
- Ca.16: Real capital per capita
- Ca.17: Total factor productivity
- Ca.18: Labor augmented technological factor
- Ca.19: *gz*, The 1929-39 geometric average of labor augmented technological growth rate
- Ca.20: real consumption in effective labor unit
- Ca.21: real government expenditure in effective labor unit
- Ca.22: real investment + current account in effective labor unit
- Ca.23: real output in effective labor unit
- Ca.24: real capital stock in effective labor unit

Construction of series for U.S.

- Ca.1: Equals $Oa.9 + Oa.10 + Oa.11 + Oa.12 + Oa.13$
- Ca.2: Equals $Oa.15 + Oa.16 + Oa.17 + Oa.18 + Oa.19$
- Ca.3: Equals $Oa.8 / Oa.14$ from 1889-1929. From 1930 to 53, Ca.3 equals $Oa.7 * 1000 / Oa.14$
- Ca.4: Equals $Oa.9 / Ca.3$ from 1889-1929. From 1930 to 53, Ca.4 equals $Oa.2 * 1000 / Ca.3$

- Ca.5: Equals $Oa.13 / Ca.3$ from 1889-1929. From 1930 to 53, Ca.5 equals $Oa.3 * 1000 / Ca.3$
- Ca.6: Equals $(Oa.10 + Oa.11 + Oa.12) / Ca.3$ from 1889-1929. From 1930 to 53, Ca.6 equals $(Oa.4 + Oa.5 + Oa.6) * 1000 / Ca.3$
- Ca.7: Equals $Ca.4 + Ca.5 + Ca.6$
- Ca.8: Equals $Oa.24 / 1000$
- Ca.9: Ca.9(t) equals $(Ca.8(t+1) - Ca.8(t)) / Ca.8(t)$
- Ca.10: Equals $(Ca.9(1928) / Ca.9(1923))^{(1/5)} - 1$
- Ca.11: Equals $Oa.23 / Ca.8 * 5760$
- Ca.12: Equals $Oa.25 - Oa.27$
- Ca.13: Equals $Oa.20 / Ca.12$
- Ca.14: The 1923-28 average of Ca.13
- Ca.15: Equals $Ca.7 / Ca.8$
- Ca.16: Equals $Ca.12 / Ca.8$
- Ca.17: Equals $Ca.7 / ((Ca.12^{Oa.29}) * (Oa.23^{(1 - Oa.29)}))$
- Ca.18: Equals $Ca.17^{(1 / (1 - Oa.29))}$
- Ca.19: Equals $(Ca.18(1939) / Ca.18(1929))^{(1/10)} - 1$
- Ca.20: $Ca.4 / ((1 + Ca.19)^{(t-1929)} * Ca.8)$
- Ca.21: $Ca.5 / ((1 + Ca.19)^{(t-1929)} * Ca.8)$
- Ca.22: $Ca.6 / ((1 + Ca.19)^{(t-1929)} * Ca.8)$
- Ca.23: $Ca.7 / ((1 + Ca.19)^{(t-1929)} * Ca.8)$
- Ca.24: $Ca.12 / ((1 + Ca.19)^{(t-1929)} * Ca.8)$