Measuring Income Inequality with Consumer Expenditure Data.

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Abstract

Census Bureau CPS tables are commonly used to document income inequality. An unrecognized but nearly equivalent source of inequality data is the Consumer Expenditure (CE) survey which has published tables of quintile income and quintile income shares since 1984.

While CPS and CE money income shares are nearly equal, CE data is a source of quintile demographic characteristics such as earners and income determinants such as taxes and income sources unavailable elsewhere. These finer, more precise measures of income differences suggest gross money income shares overstate quintile differences and trends in income inequality.

Key Words: income equality; distribution; income shares; Gini coefficients; income surveys

JEL: D310, D630, I320

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INTRODUCTION

Income inequality as reflected by growth and changes in relative shares of personal income is a perennial topic of academic research and political debates [1]. Commonly the debates devolve into essentially statistical disputes dependent on national representative surveys found in Current Population Surveys (CPS) conducted by the Bureau of Census [2]. While inequality measures involving quintile income shares and Gini coefficients reported in these surveys indicate growing differences between the lowest and highest quintiles and slowly increasing coefficients, the CPS data is severally circumscribed because it is restricted to reporting household money income measures and does not consider disposable income, number of earners or income sources.

The Consumer Expenditure (CE) Survey, annually conducted by another Federal agency, the Bureau of Labor Statistics [3] is an unrecognized statistical source that can be used to investigate some of the income inequality measures ignored by the CPS. Closely aligned with the CPS, the CE is the only nationwide representative source for quintile statistics on tax payments, earners, and income sources, information which could provide important insights into the nature and causes of inequality. For example, it was not considered in a recent Center on Budget and Policy Priorities "Guide to Statistics on Historical Trends in Income Inequality [4]."

The basic reason for this omission seems to be that CE data is only available in separate annual web based tables or as microdata requiring considerable manipulation to become useful. However, beyond reasons involving convenience of CPS data, CE quintile shares might be ignored because they were alleged to represent "transitory" behavior by Friedman [5] in his consumption function studies of the 1950s. Curiously, CPS shares reflecting the same behavior as the CE data, have been excluded from this allegation. Nevertheless, CE shares, published since 1989, can be found in "Aggregate Expenditure Shares Tables. Quintiles of income before taxes: Tables 2018 to 1989" [6]. These shares are simple averages of annual quintile incomes found in "Quintiles of Income before Taxes," tables for 2018 to 2012 [7], for 2011 to 1984 [8] or available in BLS Bulletins for 1980-81 [9] and 1982-83 [10].

Although CE income shares can add insight into the nature and causes of income inequality, the comparability and consistency of these shares with CPS figures, the presumptive official estimates, should be established. After showing that estimates between the two surveys

of money income shares, Gini coefficients and Q5/Q1 quintile income dispersion ratios are not significantly different, CE shares are adjusted for tax payments thereby reducing inequality measures by about 8 percent. Behavioral units for CPS income shares are households and consumer units for CE shares. While distinctions between these entities is slight [Cf., Appendix 1], both reflect the incomes of multiple earners. Annual CE earner surveys show that income shares are proportional to the number of earners in the reporting unit. When income shares and related dispersion statistics are recalculated on an earner basis, measures of inequality significantly decline. Finally, discussions of inequality largely ignore the income sources defining each income share. To a large extent, share differences are explained by the sources of income received with unearned sources dominating lower quintile incomes and earned incomes dominating higher quintile sources.

MONEY INCOME DISTRIBUTIONS

Current Population Surveys (CPS) and Consumer Expenditure Surveys (CE) are the only sources with enough representative national coverage and detail to provide the basic data necessary to examine historical inequality trends and changes in the size and share of personal income [11]. Derived from March Supplements and Annual Social and Economic Supplements, CPS Income Inequality Data Tables date from 1967 for households. Consumer Expenditure Survey estimates are derived from two separate surveys, an Interview Survey designed to collect data on large and recurring expenditures and a Diary Survey designed to collect data on small, frequently purchased items. CE surveys are conducted by the Census Bureau. Income definitions, coverage and limitations essentially replicate those of the CPS [Cf., Appendix 1]. Periodic reviews indicate CE aggregate income has increased from around 80 percent to around 90 percent of Census money income from 1990 to 2017 [12].

Annual CE quintile data since 1980 are collected into a dataset CE Data1980-2018 with CPS quintile shares and income added [13]; all monetary variables are deflated by a Personal Consumption Expenditure deflator based on 2012 prices. Although the current version of the Consumer Expenditure survey started in 1980, only results since 1984 are available electronically. The survey is not without its limitations, suggesting that "caution should be used in comparing data from current surveys with those gathered . . . during the first few years, due to changes in concepts and definitions; published data covered only the urban portion of the population. From 1984 onward … integrated data from the Diary and Interview Surveys as well

as for the total population, urban and rural, have been published [14]." Also , as will be seen, income for the lowest quintiles in 1984, 1985 and 1986 are suspiciously much larger or smaller than those in preceding or succeeding years. Real average quintile one (Q1) income fell from $8525 in 1983 to $6313 in 1984 and then recovered from $7375 in 1986 to $8240 in 1987. During these years Q2 income was never less than $20,000 while Q3 income was never greater than $16,000. From 1986 to 1987 Q3 income increased by $13,000, from $14,857 to $27,332, an implausible amount. Since these inconsistencies have no external explanation, they indicate something is amiss and that statistics covering 1980 through 1986 should be viewed with caution.

Appendix Table A contains CE and CPS annual quintile shares of money income from 1980 through 2018 while Appendix Table B contains average real incomes, and comparative statistics to evaluate the similarity of the two distributional estimates. Tables of averages for selected years are included in the text for discussion purposes. Table 1 contains CE and CPS shares of quintile money income. Chi-square values found in Table 2 of annual quintile differences between the two sets of shares are significantly smaller than the one percent test statistic of 13.28 with four degrees of freedom, indicating the shares are not statistically different.

Table 1

Table 2 also contains Gini coefficients and Q5/Q1 ratios which are direct measures of inequality—the larger the ratio, the greater the distance between the incomes of the lowest quintile and those of the highest one. Since 1991-94 both measures for either data sources have differed by a percentage point or less, but over 25 years have increased by about four percent points, indicating increasing inequality. The correlation of annual CE and CPS Gini coefficients [Cf. Appendix 1 for derivation] is .85 while the correlation of their Q5/Q1 ratios is .66 for the entire time period or .90 for years from 1987 to 2018. Overall, with some reservations for earlier years, the CE and CPS estimates of quintile distributions of money income between 1980 and 2018 can be considered essentially identical.

Table 2

TAX ADJUSTMENTS

Because of nonresponse to survey tax questions [15], tax estimation procedures in 2013 were changed from survey responses to estimates produced by Taxsim [16], a tax estimating

model developed by the National Bureau of Economic Research that incorporated CE income estimates and demographic characteristics [17]. The effect of the revision was dramatic. Average federal, state, local and other taxes for the highest income quintile, Q5, increased from $8,985 in 2012 to $28,294 in 2013, Q4 average taxes increased from $1,982 to $7,107 and average household taxes rose from $11,114 to $36,695. Especially noteworthy because of the variety of state taxing laws and reporting procedures was the increase in Q5 state and local taxes from $1,826 to $5,485 and from $526 to $1,762 for Q4.

While subsequent estimates showed similar increases, tax estimates for prior years were not revised. Revising these estimates for years from 1980 to 2012 can involve attempting to replicate CE processing procedures of individual respondents found in annual microdata files, a huge undertaking, or assuming representative behavior and using quintile averages of household income and demographic characteristics. The latter method was selected for reasons of expediency. To construct these estimates, Taxsim was used to estimate federal taxes as FEDSIM for every quintile from 1980 to 2018. (State, local and other tax estimates require respondent data.). As compared with CE estimates of federal taxes (FEDTX) and state, local and other taxes (SLO) averaged over 2013-18 shown in Table 3, the FEDSIM estimate approximated the Q5 CE FEDTX but deteriorated for the lower quintiles, underestimating total CE federal taxes by about 20 percent. Further CE state, local and other taxes, about 25 percent of CE federal taxes, were not estimated.

Table 3

The "Adj. Factor" found in Table 3 is the ratio of total CE taxes divided by FEDSIM that indicates the extent FEDSIM underestimated quintile taxes as reported in CE surveys. This ratio times the appropriate FEDSIM estimate for each year and quintile is used to estimate quintile taxes; eg., for 1980, Q1 tax = 1.776 x FEDSIM, and so on for all quintiles. Annual average disposable income, income shares, Gini coefficients and Q5/Q1 ratios are found in Appendix Table C. Previously indicated data problems in years before 1987 are apparent in that the Q3 income share ranges from 6.1 to 9.0 percent while the range of the Q2 share ranges from 11.7 to 14.1 percent; however, thereafter the distributions reverse as the Q3 share averages 14.2 percent and the Q2 share is 10.5 percent.

Ignoring pre 1987 figures, the estimates, while crude, seem reasonable. Tax payments caused higher incomes to fall, thereby reducing inequality as measured by Gini coefficients and

Q5/Q1 ratios. Averages of CE changes in disposable income shares divided by money income shares from 1987 to 2018 found in Table 4 indicate the quintile effects of taxes on inequality. Tax adjustments reduced average income by 13.5 percent, increased Q1 income share by about 22 percent, the share of Q2 by 17 percent, Q3 and Q4 shares 7 and 2 percent, respectively while reducing the Q5 share by 7 percent and the Gini coefficient by 9 percent. While changes in lower quintile shares are significant, overall effects seem modest as the Q5 income share fell from 49.4 to 46.2 percent and the Gini coefficient declined from 42.8 to 39.5, changes indicating that tax adjustments have limited effects on inequality.

Table 4

EARNER ADJUSTMENTS

Inequality is usually measured in terms of household income shares with the implicit assumption that each share represents a single income earning entity. However, household income can reflect the incomes of multiple earners [18]. Thus, the same 2018 income quintile could contain a household of four sisters each averaging $50,000 annually and another reflecting the top coded income of some Silicon Valley zillionaire [19].

As shown in CE earner surveys, household income is influenced by the number of household earners. Table 5 reports survey results for selected years of 1990, 2000, 2010 and 2018 [20]. Real average income of households in 1990 with no earners was $22,200 while the average income of those with three or more earners was $82,100. By 2018 income of the lowest earner group was $25,600 while that of the highest group was $126,500. Income shares varied little over time, averaging about 8.3 percent for households with no earners and 30.1 percent for single earners, 46.5 percent for two earners, and 15.2 percent for three plus earners households. The percent of households represented by each type of earner also has been relatively constant, 21.2, 37.5, 32.3 and 9.2 percent, respectively. In terms of average quintile income, the four earner groups in 2018 would fall in the second, third, fifth and fifth quintiles. Clearly household income is influenced by the number of household earners.

Table 5

Appendix D contains annual earner adjusted average income, quintile shares, Gini coefficients and Q5/Q1 ratios. Income shares were recalculated on an earner basis if earners were greater than one. Since the number of earners rise with income, the adjustments cause shares of the higher quintiles to decline as shares of the lowest ones rise, thereby reducing income

inequality, Gini coefficients and Q5/Q1 ratios, declines consistent with a Gini decline from 43 to 34 found in an "assortative matching" study.by Greenwood, et, al, [21].

Again, ignoring pre 1987 figures, percent changes in earner income share divided by money income share for selected years shown in Table 6 indicate the effects of calculating income shares based on earners rather than by economic unit. The rebasing reduces average income by 40 percent, increases both Q1 and Q2 income shares by about 66 percent because earners were less than one, increases the Q3 share by 23 percent, reduces Q4 and Q5 shares by 6 and 20 percent, respectively, and the Gini coefficient by 29 percent. These changes clearly indicate the sensitively of income inequality measures to income concepts and definitions of income recipients.

Table 6

Table 7 compares average Gini coefficients and Q5/Q1 ratios found for the three CE income measures: CE money income (YY), disposable income (YD) and earner income (YE). Recalculating income as disposable income reduces Gini coefficients by about 8 percent and dispersion ratios by about 25 percent while recalculating income on an earner basis reduces the coefficients by about 30 percent and the ratios more than 50 percent. These recalculations clearly show that finer income definitions reduce rather than increase measures of income inequality.

Table 7

INCOME SOURCES

The implicit assumption that quintiles differ only by their income size also carries over to income sources. Quintiles with a large fraction of total income are supposed to reflect the earnings of highly paid respondents while those with smaller shares reflect the earnings of lesser paid respondents. However, as CE surveys reveal, income sources vary significantly by quintile. Following CE definitions of sources, money income can be divided into market income (Mkt) consisting of wage and salary earnings, self-employment income and interest, dividends, rental and other property income and non-market income (NMkt) consisting of social security, private and government retirement income, public assistance, supplement security income, food stamps, unemployment and workers compensation, veterans benefits, regular contributions for support and other income.

Table 8 shows for selected years of 1990, 2010 and 2018 that market income represents about 86 percent of total real money income and non-market income represents 14 percent.

However, the distribution of income from these different sources varies widely across the quintiles. In 1990, 30 percent of Q1 income was from market sources and 70 percent from non-market sources while 96 percent of Q5 income was market originated and 4 percent non-market. As the table indicates, these divisions are consistent over time suggesting that different income sources could explain income share differences.

Table 8

Changes in income sources offers potential for explaining changes in income inequality. The income of any quintile is equal to its market income plus its non-market income ($Mkt_i + NMkt_i = Y_i$) or in terms of the relative share of total income, the relative income share of any quintile is equal to its relative share of market income plus its relative share of non-market income ($\%Mkt_i/\Sigma Y + \%NMkt_i/\Sigma Y = \%Y_i/\Sigma Y$). Table 9 shows quintile shares of market and non-market shares. For example, in 1990 Q1 income was 3.5 percent of total 1990 income as represented by 1.0 percent of market income and 2.5 percent of non-market income. On the other hand, Q5 income was 48.1 percent share of total income as represented by 46.0 percent of market income and 2.1 percent of non-market income.

Table 9.

Deterioration in the income sources of lower quintile income shares over time is apparent. The Q1 non-market share fell from 2.5 percent in in 1990 to 2.2 percent in 2010 to 1.9 percent in 2018 and the Q3 market share declined from 12.2 to 11.3 to 11.1 percent. However, these changes are offset by the Q5 market income share which increased from 46.0 to 47.7 to 50.4 percent. Overall, measured inequality as represented by quintile income shares changed as the Q1 share fell from 3.5 to 2.9 percent between 1990 to 2018, the Q3 share declined from 15.4 percent to 14 percent, Q2 and Q4 shares declined, and the Q5 share increased from 48.1 to 52.2 percent—changes in total that caused the Gini coefficient to rise from 41.8 to 43.7 to 45.5.

Table 10 shows changes in percentage point shares from 1990 to 2010 and from 2010 to 2018. In the first period the income share of Q1 fell 0.4 percentage points of which 80 percent resulted from a decline in non-market income. Q2 suffered the same disproportionate decline in non-market income. However, Q3 and Q4 suffered significant declines in market rather than non-market income. For example, the market income of Q3 fell 0.9 percentage points while its non-market share increased 0.1 points. On the other hand, Q5 enjoyed increases in both its income shares. The pattern continues from 2010 to 2018. Q1 continues to loss non-market share,

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Q2 suffers market income loss and Q3, Q4 and Q5s lose non-market shares. However, the Q5 loss is offset by a significant gain in market income share.

Table 10.

The division of income into different sources clearly shows that changes in income inequality can not be attributed to single causes. As shown the lower four quintiles lost income shares primarily because of declines in non-market incomes as represented by a wide variety of social payments and support systems. Meanwhile the income share of the highest quintile increased as a result of market based activities involving relative increases in wages and salaries, self-employed income and investment earnings. The effects of these different income sources raise questions as to the relevancy of universal measures of income in equality.

CONCLUSIONS

Statistics derived from Consumer Expenditure surveys offer new sights into the determinates of income inequality. These statistics, whose significance has been largely unrecognized because of cumbersome availability or elaborate data accessing, provide details from nationally representative surveys on a variety of respondent characteristics not found elsewhere.

Since 1987 quintile money income shares from Consumer Expenditure (CE) surveys and Current Population (CPS) surveys have been nearly identical. However, unlike CPS measures which are limited to money income, CE shares can be adjusted for tax payments, thereby reducing Gini coefficients and Q5/Q1 income dispersion ratios by about 8 percent. CE shares also can be calculated in terms of income earners rather than economic units, thereby reducing inequality by about 30 percent. These adjustments indicate that income inequality is very sensitive its measurement, especially to respondent definitions.

Consumer Expenditure data on sources of income disclose that low income quintiles have different income sources than high income ones suggesting that gross measures are unreliable indicators of inequality. Most likely comparing households with one part-time earner against those with three or more full time earners or comparing households whose income is largely composed of non-market supplements against those whose is income is largely market based are at best problematic, even potentially biased, comparisons.

While income inequality is a controversial topic that touches many different interests and agendas, Consumer Expenditure data provides a heretofore underutilized means to systematically examine both its historical dimensions and its empirical basis.

Footnotes.

BLS = U.S. Bureau of Labor Statistics

CB = U.S. Census Bureau

(month/year last accessed)

[1] Compare Ryscavage, P. (1999). Income Inequality in America: An Analysis of Trends. M.E. Sharpe: Armonk, NY with Piketty, T., Saez, E, and Zucman, G. (2018). Distributional National Accounts: Methods and Estimates for the United States, *Quarterly Journal of Economics*, 133(2): 553–609, https://doi.org/10.1093/qje/qjx043, Gramm, P. and Solon, M. (2014). How to Distort Income Inequality. Wall Street Journal, Nov. 11, 2014 and Early, J. F. (2018). Reassessing the Facts about Inequality, Poverty, and Redistribution. Cato Institute. https://www.cato.org/sites/cato.org/files/pubs/pdf/pa-839-updated-2.pdf

[2] CB. Historical Income Tables: Income Inequality. https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-income-inequality.html

[3] BLS. CE Tables. https://www.bls.gov/cex/tables.htm .

[4] Stone, C, Trisi, D., Sherman, S., and Beltran, J. (2020). Guide to Statistics on Historical Trends in Income Inequality. Center on Budget and Policy Priorities. https://www.cbpp.org/research/poverty-and-inequality/a-guide-to-statistics-on-historical-trends-in-income-inequality).

[5] Friedman, M. (1957). Theory of the Consumption Function. Princeton, Princeton U.P.

[6] BLS. Aggregate Expenditure Shares Tables. Quintiles of income before taxes: Tables 2018 to 1989. https://www.bls.gov/cex/csxashar.htm. (06/2020)

[7] BLS. Combined Expenditure, Share, and Standard Error Tables. Quintiles of income before taxes: Tables 2018 to 2012. https://www.bls.gov/cex/csxcombined.htm (06/2020)

[8] BLS. Expenditure Tables. Quintiles of income before taxes. Tables 2011 to 1984, 1972-72, 1960-61. https://www.bls.gov/cex/csxstnd.htm (06/2020)

[9] BLS Bulletin 2225 (1985). Consumer Expenditure Survey: Interview Survey 1980-81.

[10] BLS Bulletin 2246 (1986). Consumer Expenditure Survey: Interview Survey 1982-83.

[11] Both CPS and CE sources are used by the Congressional Budget Office for its distributional estimates; see Congressional Budget Office. (2014). The Distribution of Household Income and Federal Taxes, 2011. Appendix: Data and Methods. https://www.cbo.gov/publication/49440 06/2020).

[12]. See generally BLS. (2020). Data Quality in the Consumer Expenditure Surveys: CE income to the Current Population Survey (CPS). https://www.bls.gov/cex/cecomparison.htm#CPS. For a recent review see Hubener, E. (2019). Table 1A. Aggregate income and ratios for Current Population Survey (CPS) and three alternative measures of CE income, 2002–2017. https://www.bls.gov/cex/cecpstotalincome2002-17.xlsx . (06/2020

[13] CB. Table H-2. Share of Aggregate Income Received . . .; Table H-3. Mean Household Income Received by Each Fifth and Top 5 Percent, All Races: 1967 to 2018. https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-income-households.html (06/2020).

[14] BLS. Are historical data from the Consumer Expenditure Surveys available? https://www.bls.gov/cex/csxfaqs.htm (06/2020).

[15] BLS. Why are 2013 income taxes so different than earlier years? https://www.bls.gov/cex/csxfaqs.htm (06/2020).

[16] TAXSIM (nd). Internet TAXSIM Version 9. National Bureau of Economic Research. http://users.nber.org/~taxsim/taxsim9/ .

[17] Paulin, G.D. and Hawk, W. (Mar 2015). Improving data quality in Consumer Expenditure Survey with TAXSIM. Monthly Labor Review, pp 1-13. https://doi.org/10.21916/mlr.2015.5. (06/2020)

[18] Literature reviewed in Donovan, S. A., Labonte, M. and Dalaker, J. (2016). The U.S. Income Distribution: Trends and Issues. Congressional Research Service. https://fas.org/sgp/crs/misc/R44705.pdf (06/2020)

[19] Crain, V. and Wilson, T. J. (May 2017). Use with caution: interpreting Consumer Expenditure income group data. Beyond the Numbers: Prices & Spending, vol 6 (5), pp

1-7. https://www.bls.gov/opub/btn/volume-6/use-with-caution-interpreting-consumer-expenditure-income-group-data.htm. (06/2020)

[20] CE Table. Number of earners in consumer unit, 1990, 2000, 2010, 2018. https://www.bls.gov/cex/csxcombined.htm, https://www.bls.gov/cex/csxstnd.htm

[21] Greenwood, J., Guner, N., Kocharkov, G., and Santos, C. (2014). Marry Your Like: Assortative Mating and Income Inequality. American Economic Review, vol. 104, pp. 348-353.

Appendix 1. Definitions, Data Organization, Gini Coefficient

CENSUS BUREAU DEFINITIONS (edited, from Census Glossary,

https://www.census.gov/glossary/

Household: Includes related family members and all the unrelated people, if any, such as lodgers, foster children, wards, or employees who share the housing unit; a person living alone; a group of unrelated people sharing a housing unit.

Household Income: The income of all people 15 years and older living in the household.

Income. "Money income" is the income received on a regular basis (exclusive of certain money receipts such as capital gains and lump-sum payments) before payments for personal income taxes, social security, union dues, medicare deductions; includes income received from wages, salary, commissions, bonuses, and tips; self-employment income; interest, dividends, net rental income, royalty income; Social Security or Railroad Retirement income; Supplemental Security Income (SSI); any cash public assistance or welfare payments; retirement, survivor, or disability benefits; other income received regularly such as Veterans' (VA) payments, unemployment and/or worker's compensation, child support, and alimony.

CONSUMER EXPENDITURE SURVEY DEFINITIONS (edited, from Consumer Expenditure Definitions. https://www.bls.gov/cex/csxgloss.htm),

Consumer unit: Comprises all members of a household related by blood, marriage, adoption, or legal arrangements; a person living alone who is financially independent; or two or more persons living together using their income to make joint expenditure decisions. Financial independence is determined by housing, food, and other living expenses.

Earner: A consumer unit member, 14 years of age or older, having worked at least 1 week during the 12 months prior to the interview date.

Income: The combined income of all consumer unit members (14 years of age or over); money income before taxes includes: wages and salaries before deductions for taxes, pensions, union dues; self-employment income; Social Security, private and government retirement income; interest, dividends, rental income, other property income; unemployment and workers' compensation; veterans' benefits; public assistance, supplemental security income, food stamps; supplemental security income; regular contributions for support; other income; cash scholarships, fellowships, or stipends.

DATA ORGANIZATION

Complied Consumer Expenditure data for 1980 to 2018 referenced as "CE Data1980-2018" was compiled into a single spreadsheet as a Pivot Table with records identified by year and quintile. The dataset contains annual quintile figures on a variety of consumer unit survey items involving demographic characteristics, income types and sources, expenditures and financial situation. Data was taken from Quintiles of income before taxes tables found as Combined Expenditure, Share, and Standard Error Tables. Tables 2018 to 2012 [7]; Expenditure Tables. Tables 2011 to 1984 [8]; Consumer Expenditure Survey: Interview Survey 1980-81, 1982-83 9 [9, 10]. Also included in the table are CPS 1980- 2018 quintile shares and a BEA PCE price deflator base 2012. Data was not edited

GINI COEFFICIENT

The Gini coefficient is calculated as $G = \left(\frac{2}{N}\right)\sum r_i s_i - (n+1)/n$ where r_i represents integer ranking, the same as quintile order, 1,2, … n, and s_i represents relative share. To illustrate using 2018 CE money income as an example,

rank (r_i)	Income	share(s_i)	$r_i s_i$
1	11,285	.0287	.0287
2	31,237	.0795	.1590
3	54,900	.1397	.4192
4	90,478	.2303	.9212
5	204,975	.5217	2.6087
Total	392,875	1.0000	4.1368

With n =5, G = 0.4547. Rstated in EXCEL the function becomes G = 0.4*SUMPRODUCT(r_1:r_n, s_1:s_n)-1.2. It suffers small sample bias. With n of 5, the range of Gini coefficient is 0 to .80, with n of 10, the range is 0 to .90; with n of 100 the range is 0 to .99, the expected range of inequality measures, from perfect equality to perfect inequality. Small sample adjustments simply increase coefficients to unfamiliar sizes, not comparable with other published quintile coefficients such as those from the Census Bureau. Consequently, the function as shown above was used.

Tables

Table 1. Household Money Income: CE and CPS Quintile Shares.

	Consumer Expenditure Survey					Current Population Survey				
GRP1	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
1980-86	3.25	9.17	16.02	24.92	46.64	3.94	9.92	16.45	24.59	45.10
1987-90	3.51	8.88	15.45	24.25	47.91	3.81	9.60	15.97	24.13	46.49
1991-94	3.51	8.69	15.08	23.97	48.76	3.67	9.21	15.45	23.82	47.85
1995-98	3.47	8.64	15.08	24.27	48.54	3.62	8.98	15.06	23.27	49.08
1999-02	3.37	8.47	14.80	23.91	49.45	3.53	8.83	14.78	23.10	49.77
2003-06	3.29	8.70	14.84	23.61	49.56	3.39	8.66	14.64	23.11	50.20
2007-10	3.22	8.66	14.69	23.25	50.19	3.37	8.60	14.65	23.32	50.06
2011-14	3.06	8.31	14.34	23.20	51.08	3.15	8.28	14.31	23.05	51.20
2015-18	3.04	7.99	14.00	23.07	51.90	3.09	8.23	14.17	22.82	51.69
Ave.	3.30	8.66	15.01	23.91	49.13	3.54	9.00	15.16	23.55	48.74

Source: CE Data 1980-2018.

Table 2. CE, CPS Comparative Statistics.

	Real Average Money Income			Gini Coefficients		Q5/Q1 Dispersion	
GRP1	CE	CPS	Chi-Sq	CE	CPS	CE	CPS
1980-86	46,551	52,796	.321	41.0	38.8	14.6	11.5
1987-90	49,913	58,907	.147	41.7	40.0	13.7	12.2
1991-94	51,000	59,291	.120	42.3	41.2	13.9	13.1
1995-98	52,974	65,590	.076	42.3	42.1	14.0	13.6
1999-02	58,812	72,335	.072	43.0	42.7	14.7	14.1
2003-06	65,491	72,743	.046	43.0	43.2	15.1	14.8
2007-10	67,116	72,313	.014	43.4	43.2	15.6	14.9
2011-14	64,611	72,532	.013	44.4	44.3	16.7	16.2
2015-18	70,357	80,693	.059	45.1	44.7	17.1	16.7
Ave.	57,614	66,338	.114	42.8	42.0	15.0	13.9

Source: CE Data 1980-2018.

Table 3. Average Quintile Real Taxes ($), 2013 -2018

Tax Calculation	Q1	Q2	Q3	Q4	Q5	Total
FEDSIM	-249	-4,183	197	4,989	27,915	28,669
CE:FEDTX	-409	-568	1,859	6,295	28,518	35,694
CE:SLO	-34	190	862	2,074	6,662	9,754
CE:Total	-443	-378	2,721	8,369	35,180	45,448
Adj. Factor	1.776	0.090	13.812	1.677	1.260	1.585

Source: CE Data1980-2018.

Table 4. Percent Change Income, Shares and, Inequality Statistics
with Disposable Income as Divisor Rather than Money Income

GRP1	%chg Y	%chg Q1	%chg Q2	%chg Q3	%chg Q4	%chg Q5	%chg Gini	%chg Q5/Q1
1987-90	-17.29	25.38	21.66	-15.31	5.08	-3.53	-5.62	-22.94
1991-94	-13.75	23.65	17.12	6.49	1.02	-7.17	-9.36	-24.92
1995-98	-13.35	27.64	16.78	9.88	0.04	-8.03	-10.55	-27.67
1999-02	-13.75	21.14	17.28	9.61	1.92	-8.19	-9.78	-24.21
2003-06	-12.25	19.55	15.35	9.76	2.17	-7.93	-9.29	-22.97
2007-10	-12.03	18.64	15.26	11.64	2.31	-8.29	-9.50	-22.68
2011-14	-10.69	16.34	13.56	20.50	1.01	-9.38	-10.35	-22.11
2015-18	-14.90	22.59	19.12	0.36	4.55	-6.37	-7.50	-23.61
Ave	-13.50	21.87	17.01	6.62	2.26	-7.36	-8.99	-23.89

Source: CE Data1980-2018

Table 5. Average Real CE Money Income, Income
Share and Consumer Units by Earners

		Number Earners		
Year	0	1	2	3
		Average Income		
1990	22,214	40,160	68,516	82,099
2000	22,288	47,063	80,459	88,102
2010	25,553	53,350	96,564	110,878
2018	25,568	56,105	110,483	126,519
		Income Share		
1990	8.69	29.45	44.80	17.09
2000	7.84	30.60	46.78	14.89
2010	8.56	31.94	46.10	13.40
2018	7.97	28.32	48.16	15.55
		Percent Consumer Units		
1990	19.69	36.92	32.92	10.48
2000	20.08	37.10	33.18	9.64
2010	21.86	39.08	31.17	7.89
2018	22.66	36.71	31.70	8.94

Source: CE Table Number of earners in consumer
unit, 1990, 2000, 2010, 2018.

Table 6. Percent Change Income, Shares and, Inequality Statistics
with Earner Income as Divisor Rather than Money Income

GRP1	%chg Y	%chg Q1	%chg Q2	%chg Q3	%chg Q4	%chg Q5	%chg Gini	%chg Q5/Q1
1987-90	-40.09	66.91	66.91	19.22	-5.92	-20.52	-30.47	-52.38
1991-94	-38.91	63.73	63.73	23.65	-6.38	-20.11	-29.46	-51.19
1995-98	-39.92	66.45	66.45	23.43	-6.19	-20.74	-30.24	-52.38
1999-02	-40.06	66.87	66.87	21.44	-5.94	-19.56	-28.75	-51.79
2003-06	-40.01	66.71	66.71	19.08	-4.69	-19.64	-28.64	-51.79
2007-10	-38.65	63.00	63.00	20.87	-5.47	-18.50	-27.05	-50.00
2011-14	-39.02	64.00	64.00	26.16	-3.53	-19.97	-27.46	-51.19
2015-18	-40.23	67.34	67.34	26.41	-7.04	-18.34	-26.71	-51.19
Ave	-39.61	65.63	65.63	22.53	-5.64	-19.67	-28.60	-51.49
Ave. Earners		0.58	0.93	1.36	1.75	2.08	--	--

Source: CE Data1980-2018

Table 7. Inequality Statistics, CE Money Income (YY),
CE Disposable Income (YD, CE Earner Income (YE)

GRP1	Gini Coefficients			Q5/Q1		
	YY	YD	YE	YY	YD	YE
1980-86	41.0	40.3	27.8	14.6	10.4	6.7
1987-90	41.7	39.3	29.0	13.7	10.5	6.5
1991-94	42.3	38.3	29.8	13.9	10.5	6.8
1995-98	42.3	37.9	29.5	14.0	10.1	6.7
1999-02	43.0	38.8	30.7	14.7	11.1	7.1
2003-06	43.0	39.0	30.7	15.1	11.6	7.3
2007-10	43.4	39.3	31.7	15.6	12.1	7.8
2011-14	44.4	39.8	32.2	16.7	13.0	8.1
2015-18	45.1	41.7	33.1	17.1	13.1	8.3
Ave	42.8	39.5	30.3	15.0	11.3	7.2
%Ave./YY	100.0	92.2	70.8	100.0	75.4	48.1

Source: CE Data1980-2018.

Table 8. Quintile Shares Market, NonMarket Money Income (%).

Quin	1990		2010		2018	
	Mkt	NMkt	Mkt	NMkt	Mkt	NMkt
Q1	29.5	70.5	30.6	69.4	33.2	66.8
Q2	58.9	41.1	61.5	38.5	58.0	42.0
Q3	79.6	20.4	77.7	22.3	79.3	20.7
Q4	90.9	9.1	87.7	12.3	89.8	10.2
Q5	95.5	4.5	94.7	5.3	96.0	4.0
Total	86.4	13.6	85.7	14.3	87.4	12.6
Ave. YY	43,432	6,853	55,973	9,311	63,497	9,161

Source: CE Data1980-2018.

Table 9. Shares Market (MktT) and NonMarket (NMkt) Money Income (%).

Quin	1990			2010			2018		
	Mkt	NMkt	Total	Mkt	NMkt	Total	Mkt	NMkt	Total
Q1	1.0	2.5	3.5	1.0	2.2	3.2	1.0	1.9	2.9
Q2	5.2	3.6	8.9	5.3	3.3	8.6	4.6	3.3	8.0
Q3	12.2	3.1	15.4	11.3	3.3	14.6	11.1	2.9	14.0
Q4	21.9	2.2	24.1	20.4	2.9	23.3	20.7	2.3	23.0
Q5	46.0	2.1	48.1	47.7	2.6	50.4	50.1	2.1	52.2
Total	86.4	13.6	100.0	85.7	14.3	100.0	87.4	12.6	100.0
Ave. YY	43,432	6,853	50,285	55,973	9,311	65,283	63,497	9,161	72,658

Source: CE Data1980-2018.

Table 10. Changes Market, NonMarket Income, 2010-1990 and 2018 -2010.

Quin	Change 2010 - 1990					Change 2018 - 2010				
	Mkt	NMkt	Total	%Mkt	%NMkt	Mkt	NMkt	Total	%Mkt	%NMkt
Q1	-0.1	-0.3	-0.4	-20.5	-79.5	0.0	-0.3	-0.3	-5.8	-94.2
Q2	0.1	-0.3	-0.3	18.4	-118.4	-0.7	0.0	-0.6	-106.5	6.5
Q3	-0.9	0.1	-0.8	-114.5	14.5	-0.2	-0.4	-0.6	-40.5	-59.5
Q4	-1.4	0.7	-0.8	-182.5	82.5	0.2	-0.5	-0.3	89.8	-189.8
Q5	1.7	0.5	2.2	77.7	22.3	2.3	-0.5	1.8	129.7	-29.7
Total	-0.6	0.6	0.0	--	--	1.7	-1.7	0.0	--	--

Source: CE Data1980-2018.

Appendix 2 Annual Tables.

Appendix A. CE, CPS Quintile Money Income Shares

YR	Consumer Expenditure Survey					Current Population Survey				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
1980	3.38	9.74	16.88	25.21	44.79	4.09	10.19	16.81	24.76	44.15
1981	3.56	9.88	16.80	25.14	44.62	4.04	10.06	16.67	24.85	44.38
1982	3.74	9.54	16.10	24.94	45.68	3.94	9.97	16.51	24.55	45.03
1983	3.50	9.20	15.90	24.88	46.52	3.95	9.91	16.39	24.59	45.16
1984	2.70	8.75	15.65	24.75	48.15	3.96	9.86	16.34	24.60	45.24
1985	2.86	8.61	15.45	24.67	48.40	3.86	9.79	16.25	24.44	45.66
1986	3.00	8.46	15.36	24.86	48.33	3.75	9.66	16.16	24.35	46.08
1987	3.38	8.76	15.34	24.37	48.16	3.78	9.62	16.08	24.30	46.22
1988	3.47	9.03	15.83	24.53	47.14	3.80	9.59	16.05	24.25	46.31
1989	3.66	8.88	15.25	23.99	48.21	3.83	9.53	15.84	23.96	46.84
1990	3.54	8.86	15.38	24.09	48.13	3.83	9.64	15.92	24.01	46.59
1991	3.53	8.75	15.40	24.13	48.18	3.81	9.57	15.90	24.24	46.48
1992	3.54	8.64	14.85	23.82	49.16	3.74	9.36	15.77	24.21	46.92
1993	3.67	8.65	14.95	24.07	48.66	3.55	9.01	15.10	23.46	48.88
1994	3.29	8.74	15.11	23.84	49.03	3.58	8.91	15.02	23.37	49.13
1995	3.42	8.74	15.31	24.27	48.26	3.71	9.08	15.18	23.33	48.69
1996	3.45	8.53	14.91	24.38	48.73	3.65	8.95	15.06	23.31	49.03
1997	3.55	8.64	15.18	24.30	48.32	3.56	8.89	14.96	23.18	49.41
1998	3.45	8.64	14.90	24.15	48.87	3.56	8.98	15.03	23.24	49.19
1999	3.31	8.21	14.52	23.83	50.14	3.62	8.90	14.89	23.17	49.42
2000	3.44	8.55	14.75	23.89	49.36	3.56	8.88	14.78	22.98	49.80
2001	3.35	8.56	14.97	23.97	49.15	3.48	8.75	14.65	22.97	50.15
2002	3.37	8.57	14.97	23.96	49.13	3.45	8.78	14.80	23.28	49.69
2003	3.21	8.41	14.69	23.93	49.76	3.38	8.69	14.76	23.36	49.80
2004	3.37	8.86	15.29	23.92	48.56	3.39	8.67	14.69	23.16	50.09
2005	3.30	8.71	14.53	23.11	50.35	3.36	8.64	14.62	22.99	50.39
2006	3.30	8.81	14.85	23.46	49.57	3.41	8.65	14.49	22.93	50.52
2007	3.34	8.78	14.66	22.98	50.24	3.42	8.71	14.78	23.40	49.69
2008	3.23	8.64	14.86	23.32	49.95	3.41	8.63	14.65	23.31	50.00
2009	3.13	8.67	14.65	23.37	50.18	3.40	8.61	14.57	23.15	50.27
2010	3.17	8.57	14.58	23.30	50.37	3.26	8.47	14.59	23.41	50.27
2011	3.08	8.52	14.51	23.25	50.65	3.23	8.38	14.31	22.99	51.10
2012	3.05	8.42	14.42	23.17	50.95	3.22	8.33	14.36	23.04	51.04
2013	3.03	8.24	14.36	23.37	51.01	3.08	8.20	14.29	23.00	51.43
2014	3.08	8.08	14.07	23.03	51.73	3.08	8.21	14.27	23.19	51.24
2015	3.14	8.16	14.27	23.25	51.18	3.14	8.23	14.34	23.22	51.06
2016	3.05	7.75	13.53	22.52	53.15	3.11	8.30	14.23	22.90	51.46
2017	3.10	8.10	14.24	23.46	51.10	3.04	8.10	14.00	22.60	52.26
2018	2.87	7.95	13.97	23.03	52.17	3.06	8.29	14.12	22.57	51.96
Ave.	3.28	8.62	14.92	23.82	49.36	3.50	8.92	15.05	23.47	49.05

Source: CE Data1980-2018.

YR	Money Income			Gini		Q5/Q1	
	CE	CPS	Chi-Sq	CE	CPS	CE	CPS
1980	46,288	51,050	.161	39.3	37.9	13.2	10.8
1981	46,309	50,684	.066	39.0	38.2	12.5	11.0
1982	46,833	51,224	.054	39.7	38.7	12.2	11.4
1983	46,661	51,758	.161	40.7	38.8	13.3	11.4
1984	45,653	53,493	.741	42.8	38.9	17.8	11.4
1985	47,244	54,705	.605	42.8	39.3	16.9	11.8
1986	46,866	56,659	.461	42.8	39.7	16.1	12.3
1987	48,796	57,915	.236	42.1	39.8	14.3	12.2
1988	49,032	58,501	.084	41.1	39.9	13.6	12.2
1989	51,540	60,174	.114	41.7	40.2	13.2	12.2
1990	50,285	59,038	.155	41.8	40.0	13.6	12.2
1991	51,727	57,920	.170	41.9	40.0	13.6	12.2
1992	50,317	57,782	.235	42.6	40.5	13.9	12.6
1993	50,569	60,134	.036	42.2	42.0	13.3	13.8
1994	51,388	61,328	.038	42.6	42.2	14.9	13.7
1995	51,364	62,578	.078	42.1	41.7	14.1	13.1
1996	51,777	64,246	.083	42.6	42.0	14.1	13.4
1997	53,468	66,592	.089	42.1	42.4	13.6	13.9
1998	55,288	68,943	.055	42.5	42.2	14.2	13.8
1999	57,536	71,704	.118	43.7	42.3	15.2	13.6
2000	57,027	73,029	.056	42.9	42.6	14.3	14.0
2001	59,534	72,999	.080	42.8	43.0	14.7	14.4
2002	61,150	71,610	.036	42.8	42.8	14.6	14.4
2003	62,047	71,721	.033	43.5	43.0	15.5	14.7
2004	64,480	71,633	.100	42.2	43.2	14.4	14.8
2005	67,593	72,967	.003	43.4	43.4	15.3	15.0
2006	67,844	74,650	.046	42.9	43.4	15.0	14.8
2007	68,958	73,940	.017	43.2	42.9	15.0	14.5
2008	67,455	72,653	.012	43.2	43.1	15.5	14.7
2009	66,770	72,242	.024	43.5	43.3	16.0	14.8
2010	65,283	70,416	.005	43.7	43.6	15.9	15.4
2011	64,898	71,005	.018	44.0	44.1	16.4	15.8
2012	65,560	71,274	.012	44.2	44.1	16.7	15.8
2013	62,957	74,196	.011	44.4	44.6	16.8	16.7
2014	65,027	73,655	.010	44.9	44.5	16.8	16.6
2015	67,451	76,920	.001	44.5	44.3	16.3	16.2
2016	71,817	79,875	.134	46.0	44.5	17.4	16.5
2017	69,501	82,736	.064	44.5	45.2	16.5	17.2
2018	72,658	83,243	.037	45.5	44.8	18.2	17.0
Ave.	57,614	66,338	.033	42.9	42.3	15.0	14.0

Source: CE Data1980-2018.

Appendix C. CE Disposable Income (YD), Inequality Statistics.

YR	YD	Q1	Q2	Q3	Q4	Q5	Gini	Q5/Q1
1980	33,562	4.88	13.49	6.17	28.32	47.15	39.7	9.7
1981	32,503	5.32	14.12	5.18	28.87	46.50	38.8	8.7
1982	34,153	5.37	13.13	7.42	28.10	45.98	38.5	8.6
1983	34,894	4.89	12.35	8.24	27.72	46.80	39.7	9.6
1984	34,262	3.68	11.71	9.01	27.75	47.84	41.7	13.0
1985	34,960	4.01	11.69	8.18	27.83	48.29	41.9	12.1
1986	35,040	4.21	11.37	8.48	27.84	48.10	41.7	11.4
1987	40,444	4.07	10.63	13.52	25.77	46.01	39.6	11.3
1988	40,863	4.16	10.90	13.66	25.65	45.63	39.1	11.0
1989	42,142	4.82	10.93	11.99	25.35	46.91	39.4	9.7
1990	41,658	4.57	10.76	13.19	25.15	46.33	39.2	10.1
1991	42,037	4.35	10.85	11.96	25.64	47.21	40.2	10.9
1992	44,712	4.31	9.80	18.04	23.44	44.42	37.5	10.3
1993	44,681	4.55	9.88	17.63	23.72	44.22	37.3	9.7
1994	44,453	4.13	10.22	16.45	24.06	45.14	38.3	10.9
1995	44,711	4.54	10.16	16.71	24.26	44.34	37.5	9.8
1996	45,087	4.11	9.92	17.16	24.25	44.56	38.1	10.8
1997	45,418	4.94	10.30	14.94	24.58	45.25	38.0	9.2
1998	48,386	4.11	9.98	17.44	24.04	44.43	37.9	10.8
1999	49,817	3.98	9.59	16.83	23.98	45.62	39.1	11.5
2000	48,841	4.20	10.09	15.84	24.30	45.57	38.8	10.9
2001	51,505	4.05	10.01	16.20	24.60	45.14	38.7	11.2
2002	52,752	4.09	10.05	16.01	24.61	45.25	38.8	11.1
2003	56,073	3.71	9.41	18.05	23.92	44.91	38.8	12.1
2004	56,466	4.03	10.23	16.26	24.48	45.00	38.5	11.2
2005	58,537	3.98	10.17	15.44	23.86	46.55	39.5	11.7
2006	58,655	4.03	10.31	15.39	24.20	46.06	39.2	11.4
2007	59,245	4.08	10.34	14.89	23.86	46.83	39.6	11.5
2008	58,069	3.92	10.17	15.15	24.16	46.61	39.7	11.9
2009	59,715	3.64	9.83	17.38	23.69	45.46	39.0	12.5
2010	59,041	3.65	9.62	18.13	23.42	45.18	38.8	12.4
2011	57,485	3.60	9.75	16.76	23.64	46.25	39.7	12.8
2012	57,833	3.58	9.67	16.47	23.65	46.63	40.0	13.0
2013	57,084	3.47	9.22	18.23	23.32	45.76	39.5	13.2
2014	58,385	3.59	9.13	17.64	23.13	46.52	39.9	13.0
2015	58,565	3.77	9.52	15.27	23.99	47.45	40.7	12.6
2016	61,177	3.73	9.22	14.14	23.55	49.36	42.2	13.2
2017	58,975	3.81	9.67	13.80	24.55	48.17	41.4	12.7
2018	60,687	3.59	9.64	13.01	24.38	49.39	42.5	13.8
Ave.	48,792	4.14	10.46	14.26	24.91	46.23	39.5	11.3

Source: CE Data1980-2018.

Appendix D. CE Earner Income (YE), Inequality Statistics.

YR	YE	Q1	Q2	Q3	Q4	Q5	GINI	Q5/Q1
1980	26,778	5.84	16.83	19.45	24.21	33.66	25.2	5.8
1981	27,641	5.96	16.55	20.11	23.40	33.98	25.2	5.7
1982	28,615	6.12	15.62	20.27	24.01	33.98	25.6	5.6
1983	28,798	5.67	14.90	19.82	23.72	35.89	27.7	6.3
1984	26,969	4.58	14.81	18.92	24.65	37.05	29.9	8.1
1985	27,887	4.85	14.59	18.70	24.59	37.27	29.9	7.7
1986	28,149	4.99	14.09	18.26	24.35	38.31	30.8	7.7
1987	29,452	5.60	14.51	18.15	23.75	37.99	29.6	6.8
1988	29,361	5.79	15.08	18.89	22.76	37.49	28.4	6.5
1989	30,782	6.12	14.87	18.24	22.32	38.44	28.8	6.3
1990	30,014	5.93	14.85	18.41	22.42	38.40	29.0	6.5
1991	30,848	5.92	14.68	18.44	22.48	38.48	29.2	6.5
1992	30,701	5.80	14.16	18.72	22.97	38.36	29.6	6.6
1993	31,112	5.97	14.06	18.69	21.74	39.54	29.9	6.6
1994	31,954	5.28	14.05	18.69	22.55	39.42	30.7	7.5
1995	30,592	5.74	14.67	18.37	22.64	38.59	29.5	6.7
1996	31,169	5.72	14.18	19.06	22.50	38.54	29.6	6.7
1997	31,841	5.96	14.52	18.21	22.67	38.64	29.4	6.5
1998	33,738	5.65	14.16	18.78	23.28	38.13	29.6	6.7
1999	35,092	5.42	13.46	18.31	21.70	41.10	31.8	7.6
2000	34,268	5.73	14.23	17.54	23.39	39.12	30.4	6.8
2001	35,318	5.64	14.43	18.03	22.45	39.45	30.3	7.0
2002	36,285	5.67	14.44	18.03	22.43	39.43	30.2	6.9
2003	37,891	5.26	13.77	17.19	23.05	40.74	32.1	7.8
2004	38,910	5.58	14.68	18.10	23.32	38.32	29.6	6.9
2005	40,015	5.57	14.71	17.53	21.69	40.50	30.7	7.3
2006	40,272	5.55	14.85	17.87	21.96	39.77	30.2	7.2
2007	41,704	5.52	14.51	17.31	21.11	41.54	31.4	7.5
2008	41,267	5.28	14.12	17.35	22.43	40.82	31.8	7.7
2009	41,335	5.06	14.00	18.20	22.21	40.53	31.7	8.0
2010	40,380	5.13	13.86	18.13	22.16	40.72	31.8	7.9
2011	40,077	4.99	13.79	18.07	22.14	41.01	32.2	8.2
2012	40,423	4.94	13.65	17.99	22.11	41.32	32.5	8.4
2013	37,993	5.02	13.65	18.31	22.78	40.25	31.8	8.0
2014	39,129	5.12	13.43	17.99	22.51	40.94	32.3	8.0
2015	40,999	5.17	13.42	18.06	21.25	42.10	32.7	8.1
2016	42,767	5.12	13.02	16.23	21.01	44.63	34.8	8.7
2017	41,366	5.20	13.61	18.41	21.90	40.88	31.9	7.9
2018	43,022	4.85	13.43	18.15	21.61	41.96	33.0	8.6
Ave.	34,741	5.46	14.32	18.25	22.61	39.36	30.4	7.2

Source: CE Data1980-2018.