Errata, corrigenda and addenda

An indirect route to equality: Taxing consumers to build the Swedish welfare state

The adult individual’s factor income is the baseline income concept of the thesis. It is the pretax-pretransfer income and thus a suitable reference point concerning tax fairness. The age limit for adults is set to 20 years, in line with the accounting conventions of the World inequality database.¹ One exception is the starting year 1958, which adds 16 to 19 year olds with incomes above the tax assessment threshold to the adult population, as reported in the given income statistics. Subtracting these younger income earners would not fundamentally change the results.

The 1958 income data is reported for income units, either single-adult or married-couple, rather than for households. The income group tables of the 1958 household budget survey report do however only cover households in certain categories, those that the survey makers could connect to tax assessment income data: singles and married couples with and without children. They considered it too difficult to locate other types of households in the tax registers. This narrow household concept happens to lie close to the tax assessment’s income unit concept. The consumption-to-income ratios generated from matching these group averages of consumption with the tax assessment group averages of income should consequently be a good match. The population register’s household concept does not match that of the household budget survey in later years either. The surveys favour the residential household, whereas the population registers connect individuals by using marital status and the parent-child relation. My assumption is that the consumption-to-income rate of a given income bracket is a sufficiently good match in every year covered to be employed as a base for imputing consumption taxes even though the household concepts differ between sources.

The estimations for 1985 onwards rely on digitised survey microdata instead of group-level tables. From 1995 onwards, the matching and imputation is made on a base of disposable income instead of factor and taxable transfer income, which is not available in the 1995 HBS microdata. The expenditure microdata is homogenised to averages of 200 equally sized groups before calculating consumption-to-income rates to assign to observations in the population register dataset, in order to mitigate the potential distortive effects of certain households making extreme purchases that are not representative to everyone at their income level.

¹ Alvaredo et al. (2016).
Consumption expenditure is restricted so that it never falls below a certain poverty threshold in any year. The baseline relies on the average of a threshold for absolute extreme poverty (here IPL) and a national poverty line (here prisbasbelopp). The average level of expenditure at the bottom ought to be somewhere between absolute and relative poverty in Sweden throughout the period covered. For comparison, an alternative version where imputations of consumption taxes rely on a floor of extreme poverty (IPL) is presented in a dotted line in Figure 9. The difference compared to the baseline version appears negligible.

Consumption taxes are imputed for a selection of umbrella categories: alcohol and tobacco, vehicles and energy, customs duties, and other specific consumption taxes. The value added tax is included as a separate category from the year of its introduction 1969 onwards. The public revenue aggregates of these groups of taxes are imputed using combinations of the following bases of consumption expenditure: alcohol and tobacco, vehicles and transportation, housing and energy, and total consumption expenditure. The combinations are given below in the section on construction of variables.

Before distributing aggregate tax revenue over the sample, weights are adjusted to improve the fit between national-level aggregates derived from different sources and procedures, in line with the recommendations of the Canberra Group.\textsuperscript{2} Weights are adjusted so that the inflated sample’s sum of factor and taxable transfer income will match the tax assessment’s income aggregate of that category. The procedure assures that any revenue aggregate that is added will be on par with the weighted sums of the variables of the sample. The shape of the distribution and all income and tax averages remain intact.

The method of imputing on group rates of consumption comes with a risk of distortions caused by the bottom group’s consumption rate. Data for the higher bracket groups in the household budget surveys are not difficult to match in an acceptable way with tax assessment income data, but the bottom group’s ratio of consumption to income is volatile and dependent on the extent to which low-income households have participated in the survey. The results for 1978 show some tendency towards exaggeration caused by that practice.

The official income statistics do not report the average of debited direct taxes per income group in the early part of the period. For 1958, this author calculates the progressive national income tax using a separate scheme for singles and for jointly assessed couples. A problem is that the income statistics do not report group averages of income after deductions, the income tax base, for groups of income units sorted by income before deductions. This author’s solution is to apply standardised amounts of deductions, based on Söderberg (1996). to the

\textsuperscript{2} Canberra Group (2011).
synthetic income distribution of segments generated from interpolation. See further details in the variable construction list below. The 1969 tax register data is primitive and does not include the variable of final debited tax calculated by the tax authorities. Consequently, direct taxes are estimated in a similar way as for 1958. An advantage is that the registers provide the individual’s income before and after deductions, so there is no need for the extra step of estimating the tax base using standardised amounts of deductions.

**Construction of variables**

Negative and missing values in the population and tax register microdata and household budget survey microdata are set to zero. Negative values generated from subtraction are set to zero accordingly.

*Factor and taxable transfer income*

The standard income concept used by the tax authorities. Until 1985 *sammanräknad nettoinkomst* and from 1995 onwards *förvärvs- och kapitalinkomst*. The first year 1958 precedes a major expansion of the public pension system, so we let tax authorities’ concept factor and taxable transfer income equal factor income in that year, except in one detail. Factor incomes are allowed to approach zero, but for the broader income concept, we set a floor to half the minimum public pension of a single recipient. This is a lower bound, since a household of two adults might share a single-person pension in some cases.

*Factor income*

1958: Interpolation of group averages from the official income statistics that rely on tax assessment data. Separate interpolations are made for tax units defined as married co-habiting couples on the one hand, and singles on the other. Incomes of non-filers are recreated using local Pareto extrapolation. An estimated payroll tax is added to recreate the full factor income. Factor income is used instead of labour income as base for calculating the payroll tax, since labour income is not reported. The tax rate is however only 1 per cent, making the error small.

1969: The highest of registered factor and taxable transfer income, assessed income before deductions for calculating national income tax (*statligt taxerad inkomst*) and tax base for local income tax after deductions (*kommunalt beskattningsbar inkomst*) for individuals below the pension age 67 years at the end of the income year. The factor income of an adult individual below the taxfiler threshold (*deklarationspliktgräns*) is replaced by an income generated by local Pareto extrapolation if higher than the registered factor income. For individuals

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3 The tax code’s category married couples or jointly assessed (*samtaxerade*) included not only the actual married co-habiting couples, but also for instance single parents with small children and single-person households with housekeeper. The exact definition varies over time along with political decisions. For the present purposes, however, married-couple units can be counted as two-adult households without serious negative effects on the results.
above the pension age, factor income is set to the sum of incomes from business and capital (inkomst av kapital, inkomst av tillfällig förvärvsverksamhet and inkomst av rörelse). After calculating taxes, the estimated payroll tax and employer’s social security contributions are added to recreate the full factor income. Any registered sailor’s income (treated separately by the tax authorities) is added as well.

1978: Factor and taxable transfer income less pension, unemployment benefits and sickness benefits (highest of deklarerad pension and pension, plus sjukpenning mm vid anställning and dagpenning vid arbetslöshet). Otherwise calculated in the same way as 1969. From 1978 onwards, transfer incomes are reported separately, which makes it viable to make adjustments for all adults and not only those above the pension age. Factor incomes of low earners above the pension age 65 years are not replaced through extrapolation.

1985: The sum of incomes from work, business and capital (arbetsinkomst less sjukpenning mm vid anställning, plus inkomst av kapital and inkomst av tillfällig förvärvsverksamhet). The other method of subtracting transfer incomes from total factor and taxable transfer income becomes increasingly less viable as the number of taxable transfers increases. No extrapolation of bottom incomes from 1985 onwards. The data coverage is better than previous years, making bottom extrapolation decreasingly necessary. Employers report wage payments to the tax authorities and these are registered regardless of size and regardless of whether the individual files tax returns.

1995–2012: The sum of income from work (löneinkomst), income from capital (kapitalinkomst) and income from business (inkomst av aktiv näringsverksamhet and inkomst som grundar egenavgifter mm).

Disposable income (lower bound)
This variable is used to illustrate the order of magnitude of tax payments at the bottom where average factor income is zero. It serves as an alternative denominator for the lowest two decile groups in Figure 9. The lower-bound disposable income is set to total consumption expenditure in 1958 and 1969. For 1978 to 2012, the registered disposable income is used instead, but it is replaced with total consumption expenditure if the household total of registered disposable income is below the employed poverty line.

Payroll tax (and social security contributions)
Statutory payroll tax rates from Söderberg (1996) and Flood et al. (2013) applied to labour income. Note that rates need to be recalculated so that they can be applied to net labour income after payroll tax payments. Labour income is calculated in the same way as in Bengtsson et al (2012). Social security contributions paid by employees constituted a significant part in the 1950s and 1960s. The employee-paid part was then merged into a unified payroll tax system that included social security contributions. Small business owners, the ‘self-
employed', continued to pay their own social security contributions (egenavgifter). Whenever the tax registers report social security contributions paid directly by an individual, I subtract these from the payroll tax calculated from statutory rates in order to avoid overstating the sum of payroll tax and social contributions. Social security contributions included in debited final tax are subtracted accordingly before making adjustments of income and wealth taxes as subcategories to debited final tax. Employee-paid social security contributions for 1958 and 1969 (folkpensionsavgift and sjukförsäkringsavgift) are calculated from the rates used in Söderberg (1996).

**Income tax**
There is a proportional local income tax and a progressive national income tax throughout the period. In the 1990s, the national-level part is divided into a proportional capital income tax and a progressive tax on earned income. The tax registers provide preliminary local and national income tax values from 1978 onwards. For earlier years, this study relies on the average local tax rates of Söderberg and the statutory national income tax rates. The sum of registered preliminary income taxes is always restricted so that it does not exceed the debited final tax (slutlig skatt) reported from 1978 onwards. This procedure safeguards against potential tax expenditures, reductions of the sum of preliminary direct taxes calculated by the tax authorities from statutory rates.

The local income tax base for 1958 is calculated using standardised deductions from Söderberg, sjukförsäkringsavgift, kostnader för intäkternas förvärvande and kommunalt grundavdrag. The national income tax base is calculated by subtracting the estimated local income tax from that local income tax base. In 1969, a lower-bound sailor’s income tax calculated as the minimum rate 15 per cent of registered sailor’s income is added after the other income tax calculations.

From 1995 onwards, earned income and capital income are taxed separately. The national tax on earned income is progressive and the national capital income tax proportional. The baseline series reduces income taxes in proportion to the share of the tax base that consists of taxable transfers. The constraints on the sum of subcategories not to exceed debited final tax are placed before these adjustments for clawbacks on public transfer income.

**Wealth and property tax**
Wealth taxes are not calculated for 1958 due to lack of appropriate wealth data by income group in the official income statistics. Real estate was however taxed as an income tax on imputed income calculated from assessed value of real estate, which means that it is already included in the category income tax. This changed with the introduction of a distinct real estate tax in 1985. Real estate taxes and real estate fees are included in the category labelled wealth and property tax. Wealth and property taxes are restricted by debited final tax as well.
The order of priority is to replace income taxes with debited final tax if they exceed it, and then replace wealth and property tax with the residual if the sum of income, wealth and property taxes exceeds debited final tax. The final tax from statutory rates (income and wealth) in 1969 is restricted so that it does not exceed 80 per cent of factor and taxable transfer income, in accordance with the reduction clause applicable in that year.

**VAT**
Imputed using total consumption expenditure less housing, energy, vehicles and transportation. No VAT levied in 1958.

**Customs duties**
Imputed using total consumption expenditure.

**Alcohol and tobacco tax**
Imputed using alcohol and tobacco expenditure.

**Vehicles and energy tax**
Imputed using housing, energy, vehicles and transportation expenditure.

**Other indirect tax**
Imputed using other consumption expenditure (total consumption expenditure less housing, energy, vehicles, transportation, alcohol and tobacco).

**Data**
Table 1 presents data sources organised by year. The population and tax register microdata used for this article encompasses a sample of about three per cent of the Swedish population plus their household members. It is accessed through Statistics Sweden, as is the household budget survey microdata. Other data is taken from published official statistics and survey reports, and from the OECD and Statistics Sweden websites.

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Variables for 1958 are calculated from group-level income statistics, statutory tax rates and group-level household budget survey data. Variables for 1969 are calculated from population and tax register microdata, statutory tax rates and group-level household budget survey data. From 1978 onwards, the tax registers...
report all personal taxes except payroll taxes, which reduces the need to estimate variables using statutory tax rates. Consumption taxes for 1978 onwards are estimated using household budget survey microdata. Further description of the construction of variables follows in the appendix.

The use of group-level income data at the beginning of the period requires interpolation. The method devised by Blanchet et al. for polynomial spline interpolation of local inverted Pareto coefficients is used to that end. An extrapolation method that extends local inverted Pareto coefficients through polynomial regression and integral approximation is outlined in this thesis and employed to recreate unknown bottom incomes before 1985 when the coverage of tax assessments was more limited.

Purchase power parities for converting the World Bank’s international poverty line (IPL) from US dollars to SEK are taken from the World Bank website (International Comparison Program). The official consumer price index from Statistics Sweden is used as deflator to extend the IPL across time and to convert current SEK to constant SEK in 2012 prices. The official reference price sum prisbasbelopp is employed as a national poverty line of relative poverty and that data is retrieved from the Statistics Sweden website.

**Various errata and corrigenda**

P. 51, Table 2, column 5 under ‘Population & housing census’: ‘N: 10% of total population’ should be replaced with ‘N: 3% of total population’.

P. 67: The sentence ‘One alternative version is presented where posttax incomes are allowed to fall below zero.’ should be removed. The Peichl & Kerm (2007) Stata module for calculating progressivity indices discards negative observations (here percentile groups), making that alternative specification non-sensical.

P. 182: The phrase ‘all citizens were obliged to file tax returns regardless of income level, and employers were obliged to report wage payments to the tax authorities’ should be replaced with ‘employers were obliged to report wage payments to the tax authorities (kontrolluppgift) and incomes were registered regardless of size and regardless of whether the individual filed tax returns or not’.

For 2005 and 2012, the tax register variable capital gains (kapitalvinst) is erroneously replaced with imputed earned income from realisation of business (inkomst från färmandes företag som redovisas som inkomst av tjänst) if lower. The latter should be counted separately as part of earned income. The error has little impact on the overall results.