Construction of Income Concepts and Components
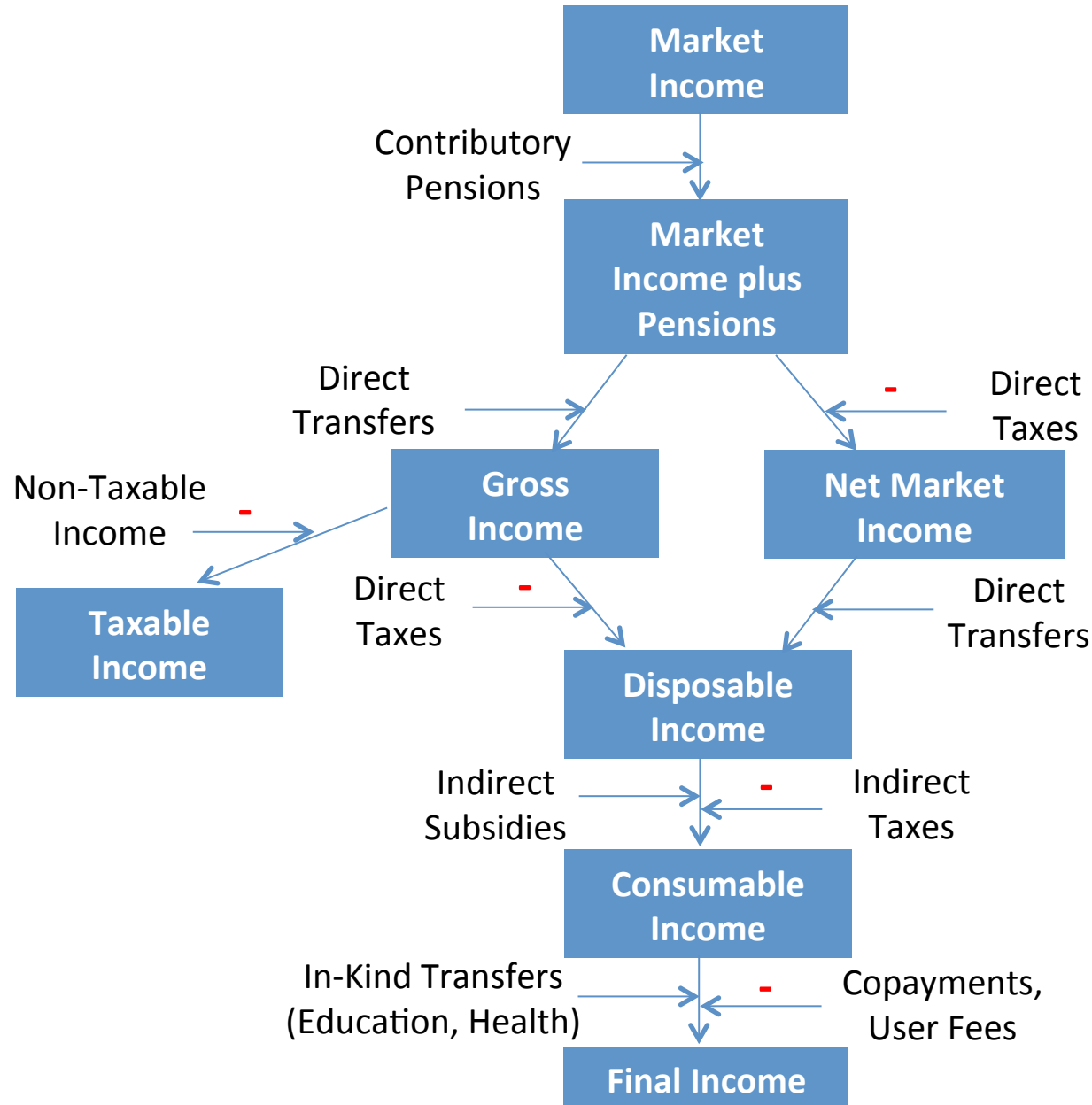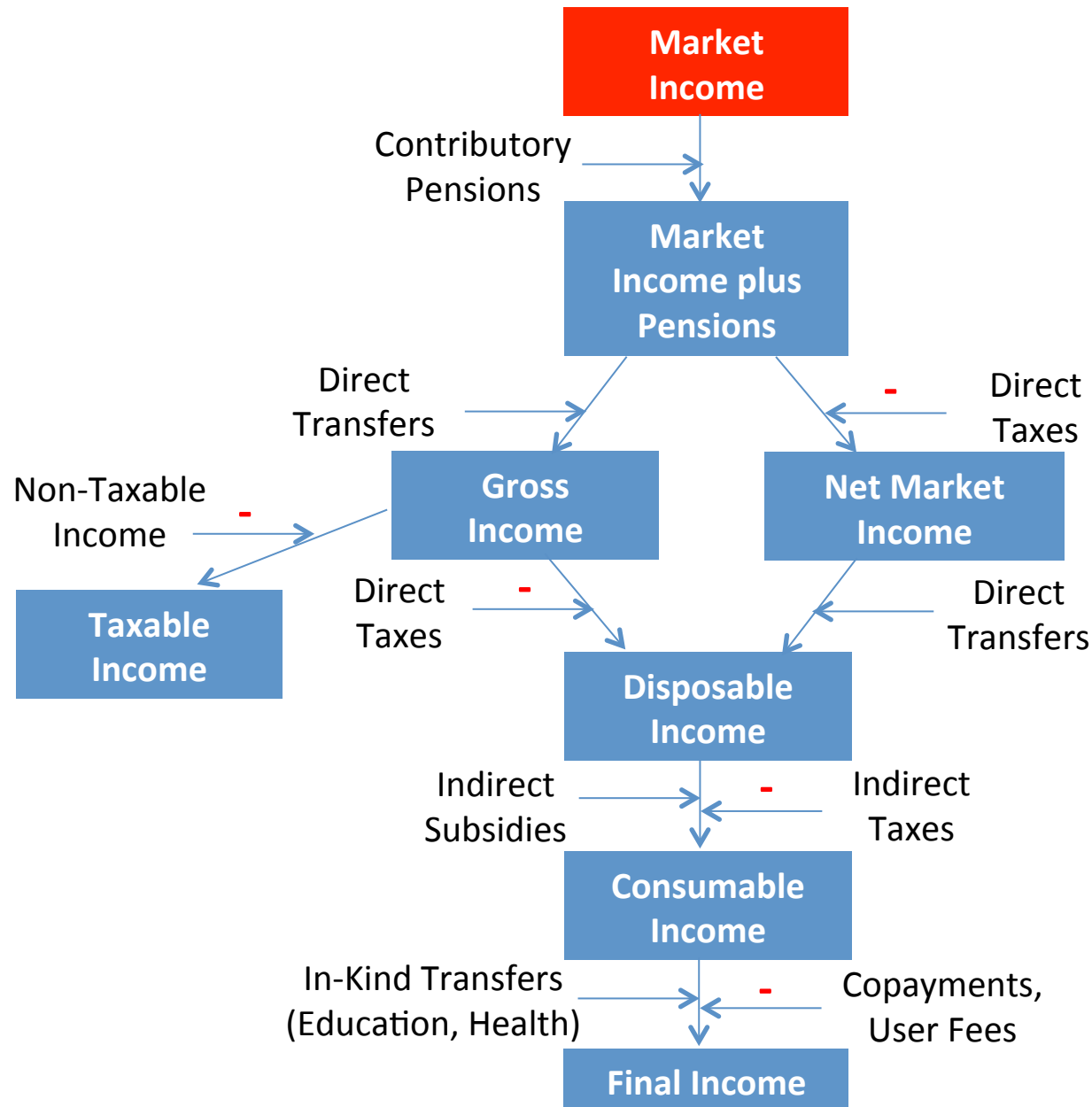
Sean Higgins
Tulane University

*Learning Event on the
Commitment to Equity Methodology*

Commitment to Equity Institute, Tulane University, and the World Bank
Washington, D.C. – February 1-3, 2015

WORLD BANK GROUP
Poverty & Equity

CEQ INSTITUTE
COMMITMENT TO EQUITY
Tulane University

Income Concepts

Income Concepts

Market Income

- Wage and salary income
- Fringe benefits
  - Bonus pay
  - Employer contributions to health insurance
- Self-employment income (farm and non-farm)
- Retirement income
- Captial income
  - Interest
  - Dividends
  - Rent
- Private transfers
  - Child support
  - Alimony
  - Remittances
  - Private contributory pensions
- Imputed rent for owner-occupied housing
- Value of own production

Imputed Rent for Owner-Occupied Housing

- Direct identification
  - e.g., Brazil
  - "How much would this house be rented for if it were rented?"
- Prediction
  - e.g., Bolivia
  - Take households that rent and use the question asking how much they pay in rent
  - Predict rental rates based on characteristics (number of rooms; access to electricity, sanitation, piped water; geographic location; household income; etc.)
  - Use coefficients from this regression in an out-of-sample prediction to predict rental value of owner occupied housing
  - See Appendix C of the CEQ Handbook

Imputed Rent for Owner-Occupied Housing

- Alternate Survey (with Prediction)
  - e.g., United States
  - No question on how much paid in rent
  - Predict using alternate housing survey with this question
- Secondary Source (National Accounts)
  - e.g., Armenia
  - Use a secondary source estimate of average imputed rent as a proportion of income and inflate market income by that amount
  - National Income Accounts have imputed rent for owner-occupied housing, and it is 2.74% of household expenditure
  - Imputed rent = expenditure (equivalent to disposable income) * 2.74% for households that own their dwelling

Value of Own Production

- Direct Identification (for each item consumed)
  - e.g., Brazil
  - For each item purchased, ask how obtained
  - If own production or taken from own business inventory, value is still asked; use this value
- Direct Identification (one question only)
  - Some surveys ask one question about the total value of own production
  - Use this value in market income

Income Concepts

Contributory Pensions
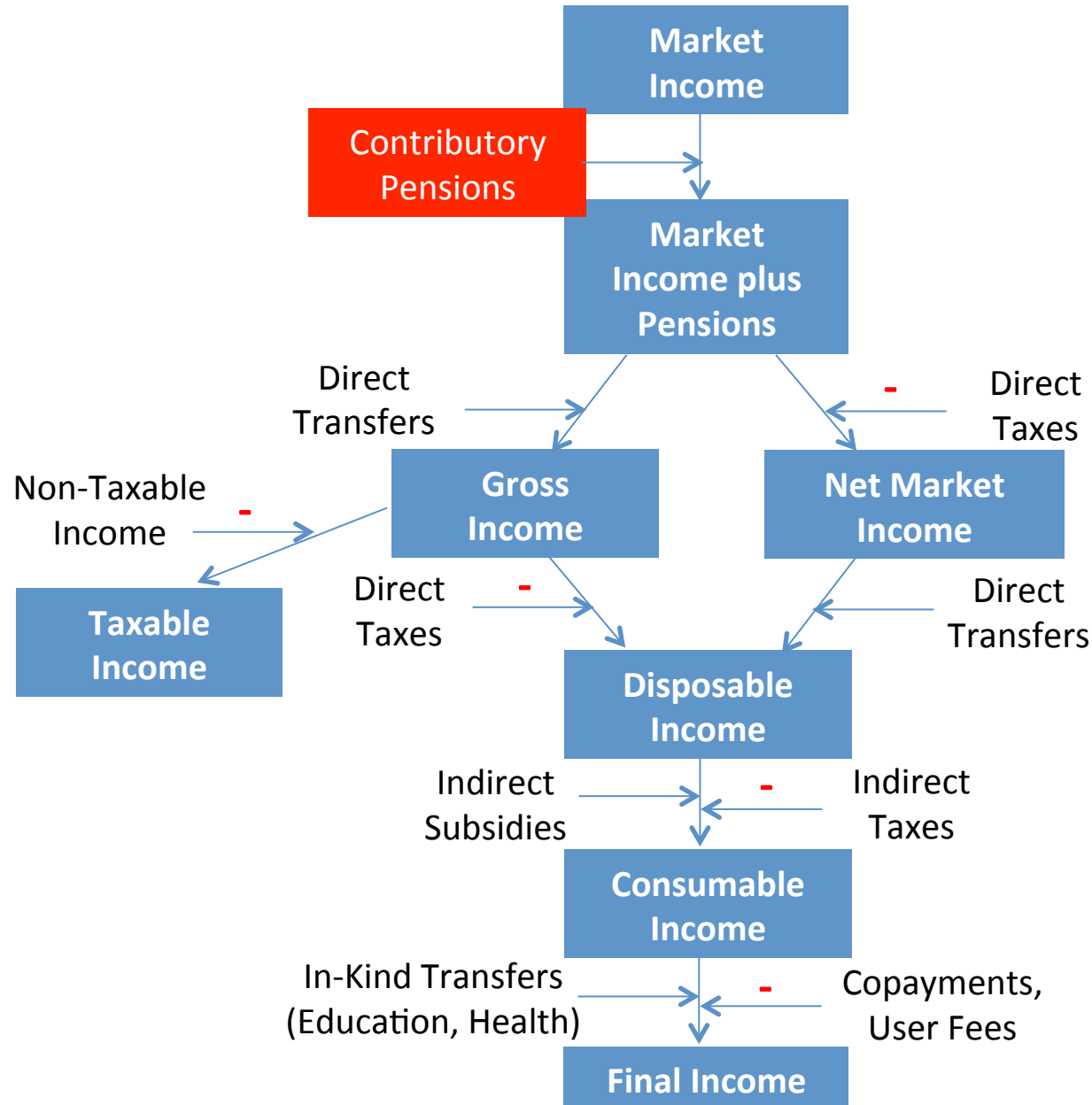
- Only includes pensions from the <u>public contributory system</u>
  - Non-contributory pensions are included in **direct transfers**
  - Private contributory pensions are included in **market income**
- Direct identification
  - Some surveys ask one question about the total value of own production
  - Use this value in market income
- Inference
  - e.g., Argentina
  - One question about pensions; use amount to infer whether it was a contributory or non-contributory pension since the latter was a specified amount
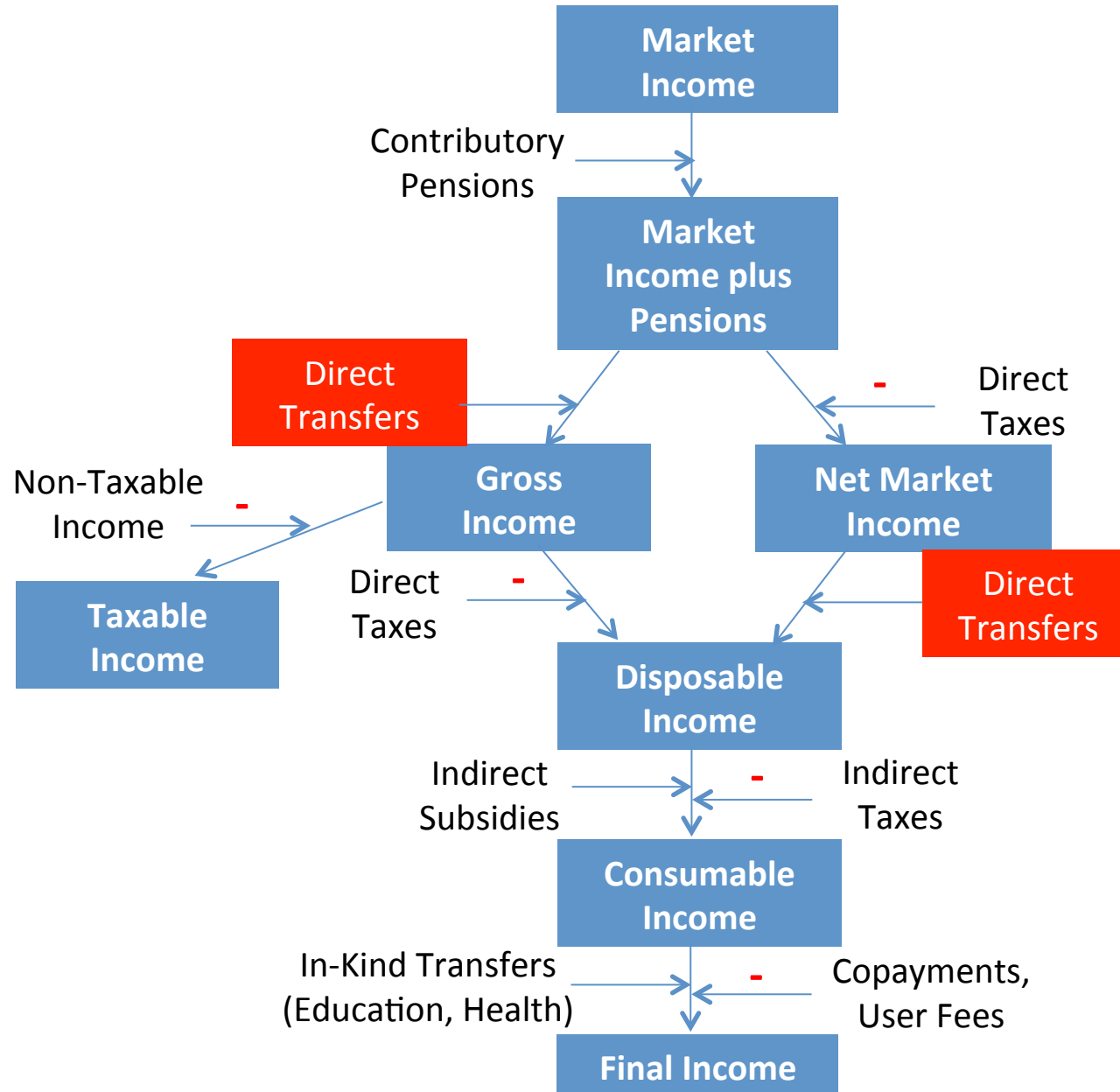
Income Concepts
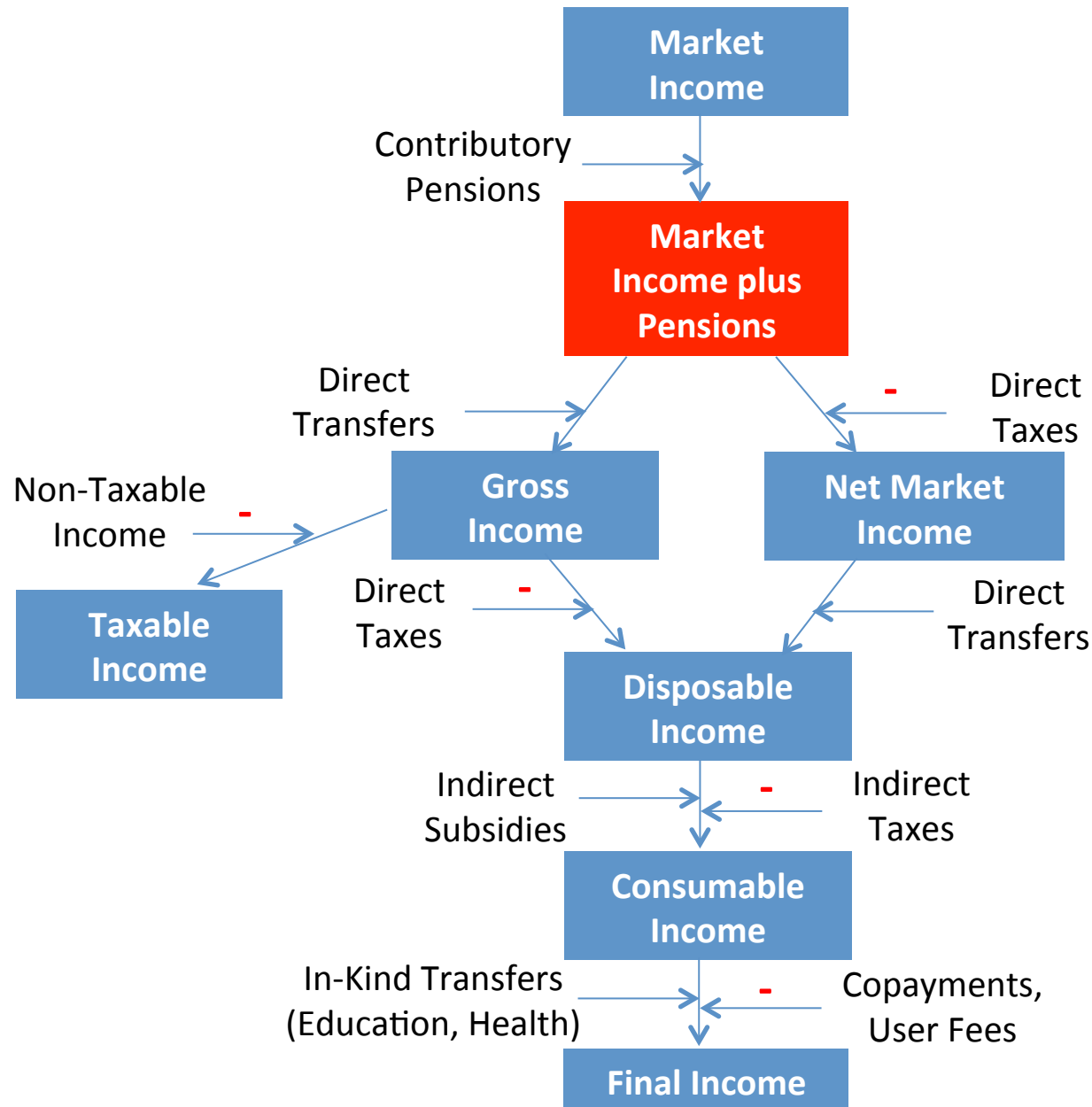
Market Income plus Pensions

- Market Income plus Pensions =
  Market Income + Contributory Pensions

$$m\uparrow + P = m + P$$

Income Concepts

Direct Transfers: Components

- Cash Transfer Programs
  - Conditional and Unconditional
- Non-Contributory Pensions
- Scholarships
- Public Works Programs
  - Also known as "Pay for Work" and "Welfare to Work" programs
  - Include full wage and do not attempt to subtract opportunity cost of individual's time
- Food transfers
  - Considered direct transfers because have well-defined market value, are close substitutes for cash
- Refundable Tax Credits
  - Pay cash to low-income families with no tax liability
  - Function as a transfer

Direct Transfers: Allocation

- Direct Identification
  - Many examples from all countries
- Inference
  - Non-Contributory Pensions in Argentina
    - All pensions grouped together; infer whether non-contributory or contributory based on amount and program rules for non-contributory pensions
  - Milk Transfers in Brazil
    - For families that live in eligible region, assume that if they reported the milk they consumed as having been donated, it was from the government
  - Public Scholarships in United States
    - All scholarships grouped together; infer whether Pell grant (government scholarship for low-income) based on amount and program rules

Direct Transfers: Allocation

- Simulation
  - Targeted Transfers in Argentina and Bolivia
    - Simulated according to program rules and eligibility criteria (based on income, having children, etc.)
    - Assumed perfect targeting, full coverage and take-up of target population, and no leakages
  - Refundable Tax Credits in US
    - Simulated according to program rules and eligibility criteria (based on income, having children, etc.)
    - Adjusted for imperfect take-up by attributing no benefit to households in which no members reported filing a tax return

Direct Transfers: Allocation

- Imputation
  - Food aid in Ethiopia
    - Whether a household receives food aid is reported in survey, but not amount received
    - Total government spending on food aid distributed equally across households that report receiving aid
  - School lunches, uniforms, and textbooks in Ecuador
    - Whether a child receives free school lunches, uniform, and textbooks is reported in the survey
    - Value imputed by distributing total spending from national accounts to households that receive these benefits
  - School uniforms and textbooks in Sri Lanka
    - Same method as in Ecuador
  - Note: scale down totals from national accounts

Direct Transfers: Allocation

- Alternate Survey (with Direct Identification)
  - Conditional Cash Transfer in Indonesia
    - Included in a 2013 survey but not the 2012 survey used in the analysis
    - Compute distribution of benefits by region and expenditure decile in 2013 survey
    - Distribute benefits in 2012 survey among eligible households within each region-decile pair

Underestimation of Beneficiaries

- Combines Direct Identification with Imputation
- In most surveys, number of recipients of direct transfers underestimated
  - Compared to national accounts
  - e.g., Bolsa Família in Brazil
    - 7.3 million beneficiaries according to survey
    - 12.4 million beneficiaries according to Ministry of Social Development
  - Even a large problem in developed country surveys
- Solution
  - Assume some beneficiaries erroneously did not report receiving benefit
  - Assume they are similar to beneficiaries that did report receiving benefits
  - Impute benefits to households that did not report benefit but similar to those that did

Underestimation of Beneficiaries

- Let
  - N = number of recipients according to national accounts
  - S = number of recipients according to survey
  - H = N - S = number of recipients we will impute benefits to
- Requirement: H < S < N
- Estimate propensity score for program participation
  - Probit of program participation dummy on
    - household income
    - possession of various household assets, consumer durables
    - number of children
    - race of household head
    - region or state
    - rural or urban area
    - etc.
- Randomly sample H of the S beneficiary households
- Match them to non-beneficiary households with closest propensity score

Underestimation of Beneficiaries

- Caveat: probit has to converge for method to work
  - In other words, covariates predict program participation
  - Works well for targeted transfer programs
  - Unlikely to work for non-targeted programs
- Whether to make this adjustment is country team's decision
- Depends on
  - size of discrepancy
  - local knowledge about which is closer to truth: survey or national accounts
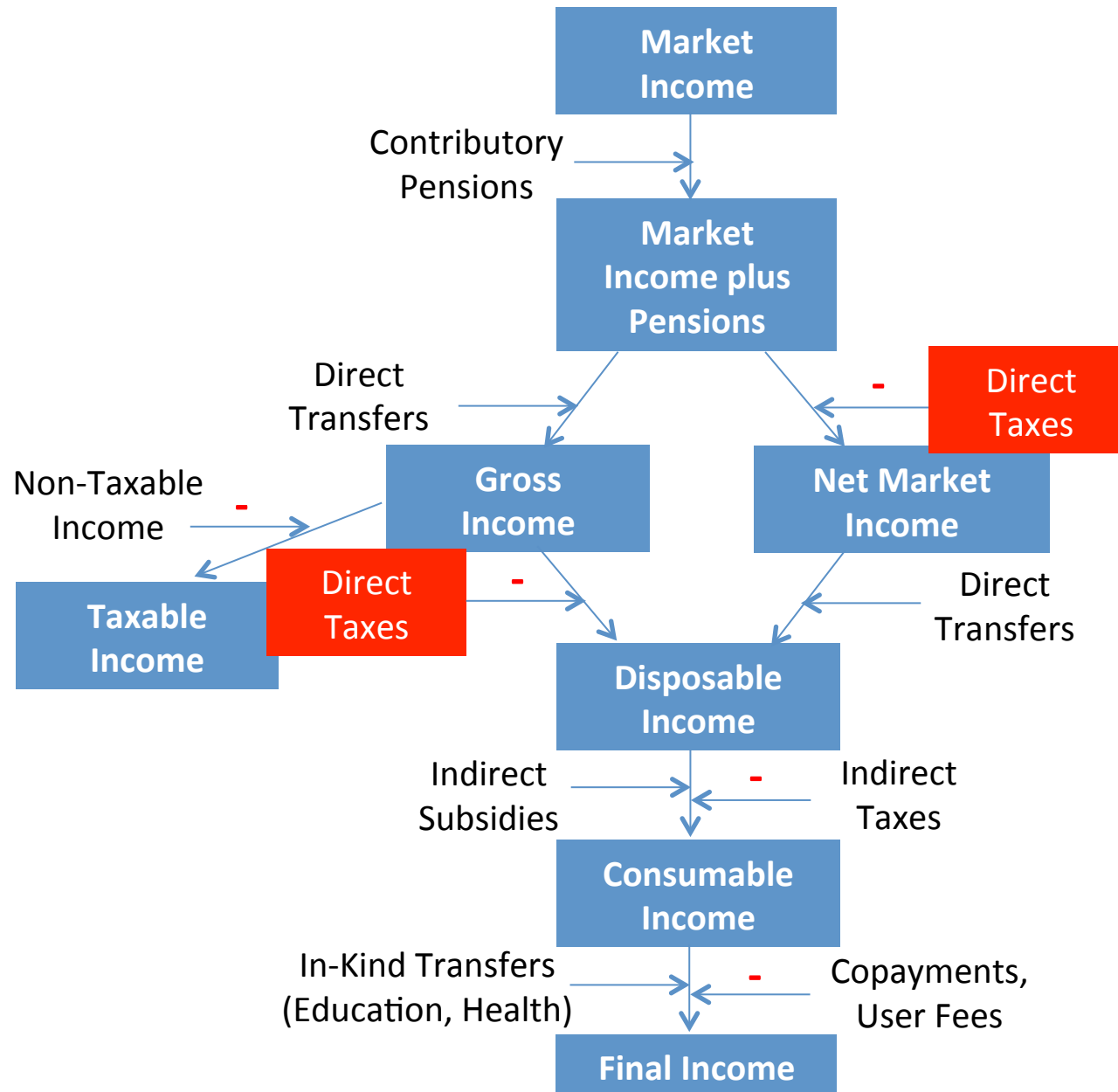- Ideally, run results both ways

Income Concepts
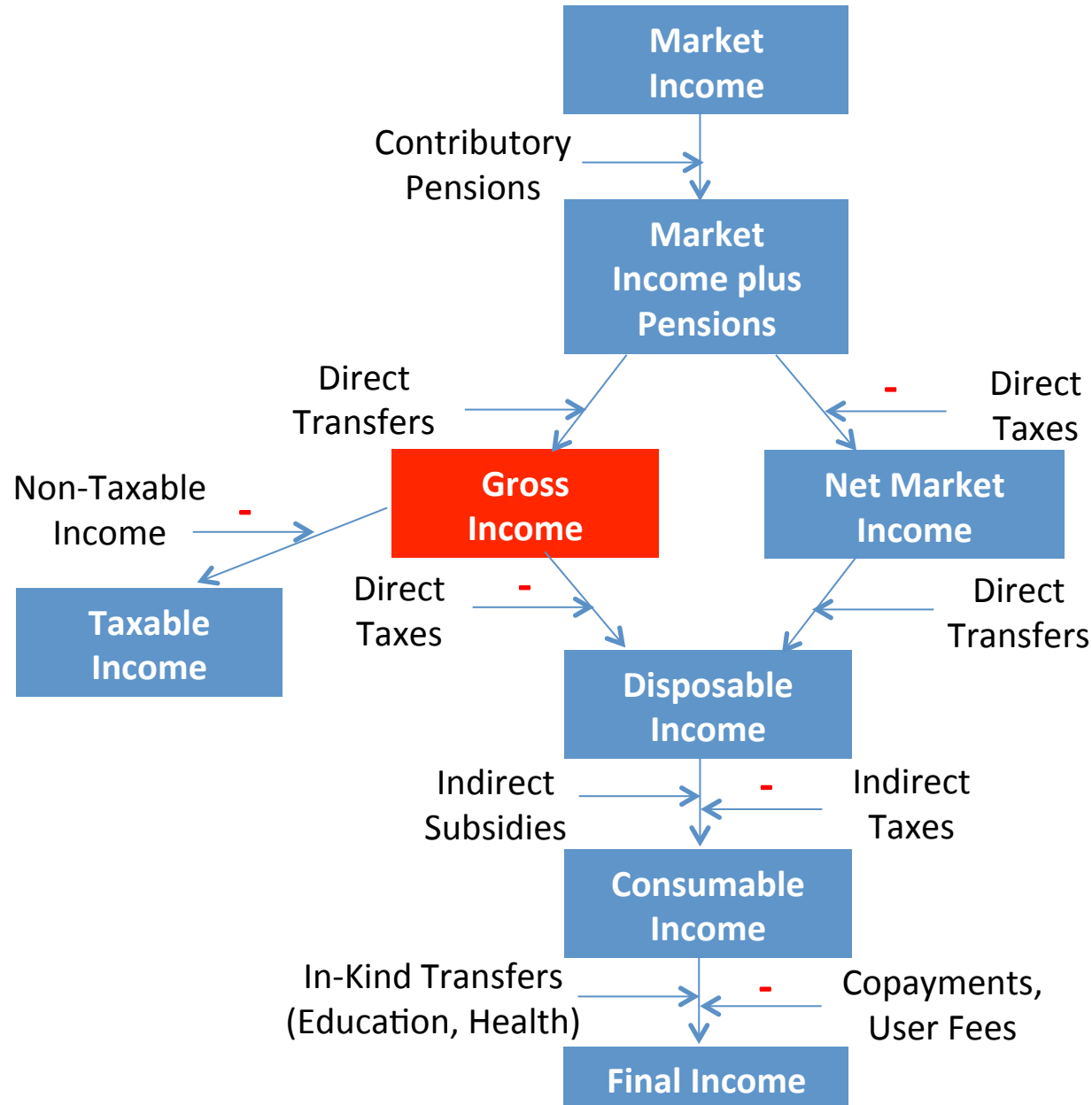
Gross Income

- Gross Income =
  Market Income plus Pensions + Direct Transfers

$$g = m\uparrow + P + B\downarrow d$$

Income Concepts

Direct Taxes: Components

- Individual income taxes
- Agricultural income tax (e.g., Ethiopia)
- Payroll taxes
  - Paid by both employee and employer
- Contributions to social security
- Property taxes
- Corporate income taxes
  - Included if possible

- Assumption: direct taxes fully shifted forward to labor in the form of lower wages

Grossing Up

-Case in which reported income in the survey is **gross** of taxes. Suppose that:

- Reported income (gross of employee-paid income taxes) in the survey is 10
- Individual income taxes (reported o simulated) are 2
- Employer pays 3 in payroll taxes
- The income gross of taxes of 10 is already *net* of the employer-paid taxes, so we gross up income from this job to 10+3 = 13
  - 13 is the grossed up income use when we construct market income
- Direct taxes (ignoring for illustration other components like property taxes) are 2+3 = 5
- Income net of direct taxes is 13-5 = 8

25

Grossing Up

Case in which reported income in the survey is **net** of taxes (if not specified, normally we assume net). Suppose:

- Income reported in the survey, which is net of employee-paid income taxes, is 10
- Direct taxes are 2
- The employer pays 3 in payroll taxes
- The income of 10 is already net of taxes paid by *both* the employee and employer, so we grossit up to 10+2+3 = 15
  - 15 is the grossed up income we use when constructing market income
- Direct taxes (ignoring for illustration other components like property taxes) are 2+3 = 5
- Income net of direct taxes is 15-5 = 10

Direct Taxes: Allocation

- Direct Identification
  - Individual income taxes in Brazil, Colombia, Peru
    - Brazil: for each income source, next question is how much was paid in direct taxes for that income source
  - Property taxes in Brazil (expenditure module of survey)
- Imputation
  - Agricultural income tax in Ethiopia
    - Distribute total collected from national accounts proportionally to land holdings

Direct Taxes: Allocation

- Simulation
  - Individual income taxes in many countries
    - Simulated according to reported incomes, household characteristics, and tax code
    - Account for evasion by only simulating for those working in the formal sector
    - In case of US (large formal sector), only simulate for those reporting filing a tax return
  - Payroll taxes paid by employer in Brazil
  - Corporate income taxes in Brazil and US
    - Requires very broad assumptions about burden of corporate income tax

Direct Taxes: Components

- Alternate Survey (with Direct Identification)
  - Property taxes in US
    - Property taxes paid reported in alternate survey
    - Use common covariates of dwelling and household characteristics to match households between the two surveys
    - Use property taxes paid of matched household
- Secondary Source
  - Individual income taxes in Mexico
    - Distribution of income taxes by decile obtained from Ministry of Finance and allocated by decile in survey data
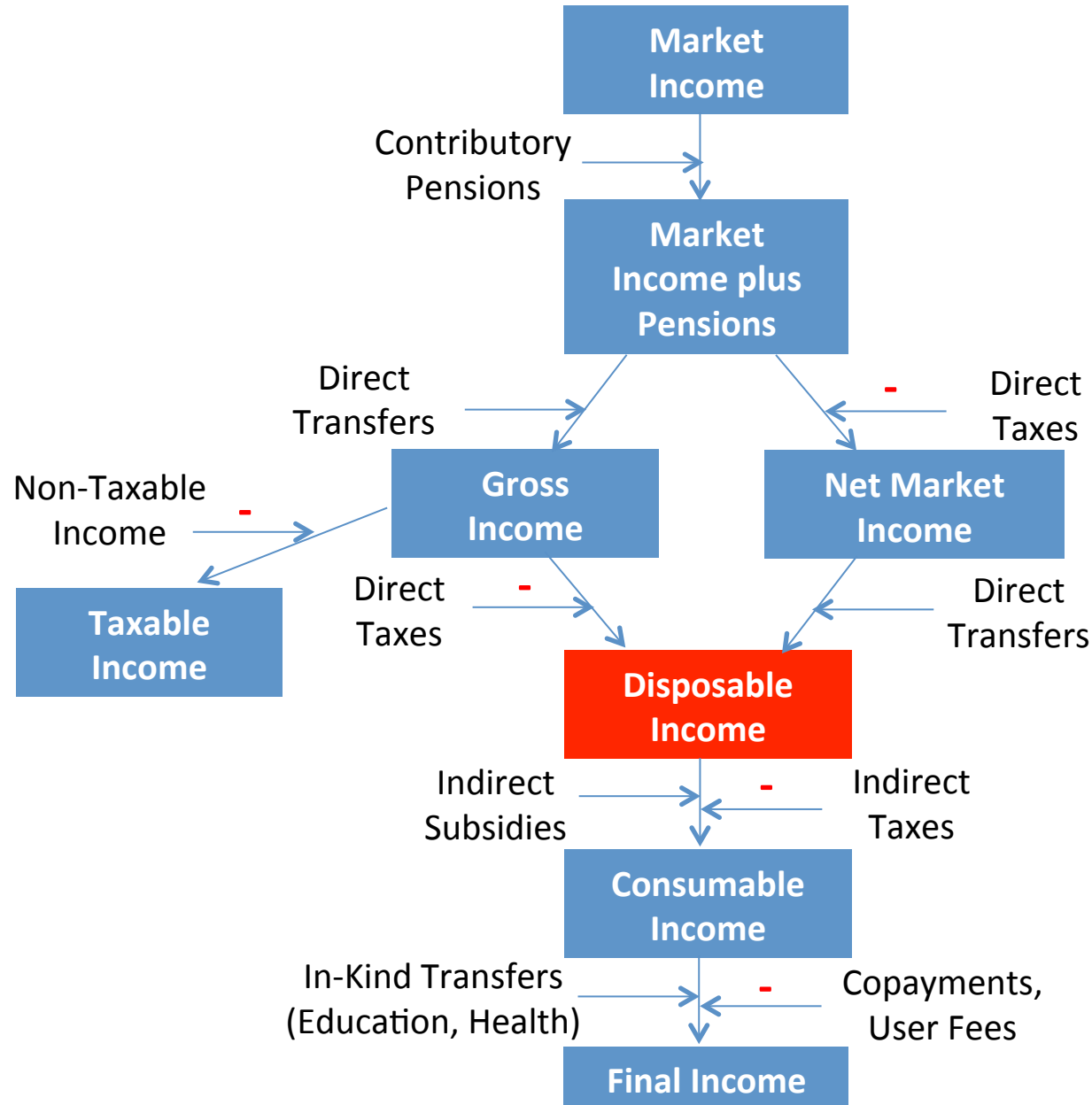
Income Concepts
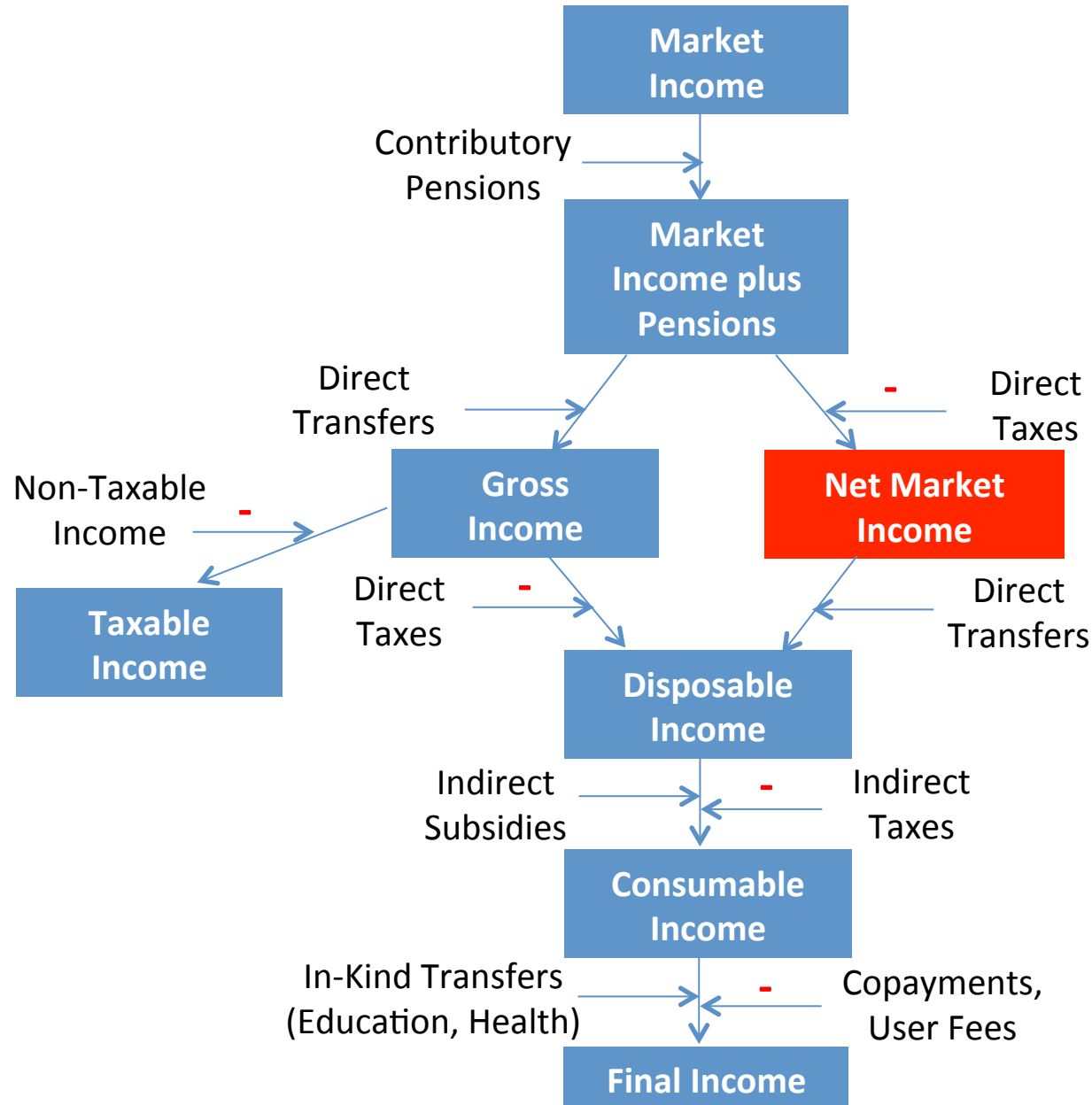
Net Market Income

- Net Market Income =
  Market Income plus Pensions – Direct Taxes

$$n = m\uparrow + P - T\downarrow d$$

Income Concepts

Disposable Income

- Disposable income
  = Net Market Income + Direct Transfers

$$d = n + B{\downarrow}d$$

  = Gross Income - Direct Taxes

$$d = g - T{\downarrow}d$$

Income Concepts