Dominance

This section looks at the primal dominance conditions for ordering poverty and inequality across two distributions of living standards. Corresponding dual dominance conditions are considered in the section on **Curves**.

Distribution 1 dominates distribution 2 at order s over the conditional range $\left[z^-, z^+\right]$ if only if: $P_1(\zeta; \alpha) > P_2(\zeta; \alpha) \quad \forall \quad \zeta \in \left[z^-, z^+\right]$ for $\alpha = s - 1$.

This involves comparing stochastic dominance curves at order s or FGT curves with $\alpha = s - 1$. This application checks for the points at which there is a reversal of the dominance conditions. Said differently, it provides the crossing points of the dominance curves, that is, the values of ζ and $P_1(\zeta; \alpha)$ for which $P_1(\zeta; \alpha) = P_2(\zeta; \alpha)$ when

$$\mathrm{sign}(P_1(\zeta - \eta; \alpha) - P_2(\zeta - \eta; \alpha)) = \mathrm{sign}(P_2(\zeta + \eta; \alpha) - P_1(\zeta + \eta; \alpha))$$
for a small η.

The crossing points of ζ can also be referred to as "critical poverty lines". To check for the crossing points of the dominance curves of two distributions:

- From main menu, choose the item: "Dominance $\Rightarrow$ Poverty Dominance".
- After confirming the configuration, the application appears. Choose the different vectors and parameter.

Among the buttons, you find the following commands:

COMPUTE:	to provide the critical poverty lines and the crossing points of the sample dominance curves. When the option "with STD" is specified, the standard deviation on the estimates of the critical poverty lines and on the estimates of the crossing points of the FGT curves are also given.
RANGE:	to specify the range of poverty lines over which to check for the presence of critical poverty lines. With this command, you can also specify the incremental step of search for these crossing points
GRAPH:	to draw the FGT curves for the two distributions.

Distribution 1 dominates distribution 2 in inequality at order s over the conditional range of proportions of the mean $\left[l^-, l^+\right]$ only if $\overline{P}_1(\lambda\mu_1, \alpha) > \overline{P}_2(\lambda\mu_2, \alpha) \quad \forall \quad \lambda \in \left[l^-, l^+\right]$ where $\alpha = s - 1$

These are normalised stochastic dominance curves at order s or normalised FGT curves for $\alpha = s - 1$. This application checks for the points at which there is a reversal of the above

dominance conditions for inequality orderings. Said differently, it provides the crossing points of the FGT curves, that is, the values of λ and $\overline{P}_1(\lambda\mu_1;\alpha)$ for which

$\overline{P}_1(\lambda\mu_1;\alpha) = \overline{P}_2(\lambda\mu_2;\alpha)$ when

$\text{sign}(\overline{P}_1((\lambda-\eta)\mu_1;\alpha) - P_2((\lambda-\eta)\mu_2;\alpha)) = \text{sign}(P_2((\lambda+\eta)\mu_2;\alpha) - P_1((\lambda+\eta)\mu_1;\alpha))$
for a small η.

These crossing points at λ can also be referred to as "critical relative poverty lines", when the poverty lines are a proportion of the mean and when the indices are normalised by the poverty line. To check for those crossing points:

- From main menu, choose the item: "Dominance $\Rightarrow$ Inequality Dominance".
- After confirming the configuration, the application appears. Choose the different vectors and parameter values.

Among the buttons, you find the following commands:

COMPUTE:	to provide the critical relative poverty lines and the crossing points of the sample normalised dominance curves. When the option "with STD" is specified, the standard deviation on the estimates of the critical relative poverty lines and on the estimates of the crossing points of the normalised FGT curves are also given.
RANGE:	": to specify the range of λ over which to check the presence of critical values. With this command, you can also specify the incremental step of search for these crossing points
GRAPH:	to draw the normalised FGT curves for the two distributions along values of the parameter λ.

INDIRECT TAX DOMINANCE

Taxing commodity 2 is better than taxing commodity 1 at order of dominance s over the conditional range $\left[z^-, z^+\right]$ if only if: $\overline{CD}_1^s(k;\zeta) > \gamma\overline{CD}_2^s(k;\zeta)$ $\forall$ $\zeta \in \left[z^-, z^+\right]$.

These are CD curves of order *s*. If this condition holds, then an increase in the price of good 2, with the benefit of a decrease in the price of good 1, will decrease poverty for poverty lines between z$^-$ and z$^+$ and for poverty indices of order "s". The ratio of the marginal cost of public funds (MCPF) from a tax on 2 over the MCPF from a tax on 1 is also used to determine whether increasing the tax on 2 for the benefit of decreasing the tax on good 1 can be deemed to be "socially efficient".

This application computes differences between $\overline{CD}_1^s(k;\zeta)$ and $\gamma\overline{CD}_2^s(k;\zeta)$. It also checks for the points at which there is a reversal of the dominance conditions. Said differently, it provides the crossing points of the CD curves, that is, the values of ζ and $\overline{CD}^s(k;\zeta)$ for which

$\overline{CD}_1^s(k;\zeta) = \gamma\overline{CD}_2^s(k;\zeta)$ when

$\text{sign}(\overline{CD}_1^s(k;\zeta-\eta) - \gamma\overline{CD}_2^s(k;\zeta-\eta)) = \text{sign}(\overline{CD}_2^s(k;\zeta+\eta) - \overline{CD}_1^s(k;\zeta+\eta))$ for a small η. The crossing points of ζ can also be referred to as "critical poverty lines".

Critical values of   are also provided. These are the minimum of $\overline{CD}_1^{\alpha+1}(k;z)/\overline{CD}_2^{\alpha+1}(k;z)$ over an interval $\left[z^-,z^+\right]$ of poverty lines z. It gives the maximum ratio of the MCPF (for commodity 2 over that for commodity 1) up to which taxing commodity 2 can be deemed socially efficient.

To use these functions:

1- From the main menu, choose the item: " Dominance $\Rightarrow$ Indirect tax dominance".
2- Choose the different vectors and parameter values as follows:

Vectors	
x_1	Commodity 1
x_2	Commodity 2
Parameters	
z	Poverty line
s	s
γ	gamma

Among the buttons, you find the following commands:

CRITICAL z:	to compute the values of the poverty lines at which the CD curves $\overline{CD}_1^s(k;z)$ and $\gamma\overline{CD}_2^s(k;z)$ cross. To specify a range for a search of crossing points, choose the command **RANGE**.
GRITICAL γ:	to compute the critical gamma for tax dominance. The range $\left[z^-,z^+\right]$ is specified under **RANGE.**
GRAPH z:	to draw the value of $\overline{CD}_1^s(k;z)$ and $\gamma\overline{CD}_2^s(k;z)$ as a function of a range of poverty lines z. To specify that range, choose the command **RANGE.**
GRAPH δ₁,₂:	to draw the value of $\overline{CD}_1^s(k;z)/\overline{CD}_2^s(k;z)$ as a function of a range of poverty lines z. To specify that range, choose the command **RANGE.**
DIFERENCE:	to compute the difference $\overline{CD}_1^s(k;z)-\gamma\overline{CD}_2^s(k;z)$.
STEP:	the value of the incremental steps with which the critical z is searched