Distribution Neutral Fiscal Policy with Distorting Taxes and Transfers

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Motivation

1. Rising inequality within nations is a widely recognized empirical phenomenon, along with a decline in inequality among nations over the last three decades.

IMF volume on Fiscal Policy and Inequality, Clements et.al (2015), Baldwin (2016) - The Great Convergence

2. This has led to within country political changes and a move away from free trade and/or immigration, BREXIT, Trump's policies, political unrest etc.

Has Fiscal Policy (Taxes and Transfers) failed or succeeded to contain inequality? How to evaluate Fiscal Policy?

These questions lead to the concept of Distribution Neutral Fiscal Policy (DNFP)

Literature – Very Few

Gupta, Marjit and Sarkar (2018, Working paper ,IMF) → Examples. India (IHDS data)/ USA

Marjit, Mukherjee and Sarkar (2018)] → Theoretical Foundation and Relationship with First Welfare Theorem.

Dixit (1986), Kemp and Wan (1986) on Non-Lump sum transfers and Gains from Trade. Burman, Shiller, Leiserson and Rohaly (2007) on Inequality indexed taxation, IMF Fiscal Monitor (2017) etc.

Whether taxes and transfers can be designed so that inequality is not aggravated further with reference to a base period. These are distribution neutral tax/ transfer rates.

Whether countries are pursuing fiscal policy that is addressing such concerns and to what extent they are away from DNFP rates.

This may constitute as an evaluating yardstick of fiscal policy.

Somehow the explicit or implicit welfare criterion in fiscal policy (compensation principle) to contain adverse impact of aggregate shocks (Trade/ Growth etc.) on individuals seems to be absolutist. Our task is to provide a distributional justification behind fiscal policy in theory and practice.

Results show

(i) With no tax/ transfer distortions, DNFP rates will always exist and can be calculated from the data.

(ii) This method extends Pareto Criterion by focusing on the relative income rather than the absolute income and is coined as **Strongly Pareto Superior Allocation (SPS) as it preserves initial distribution not the initial real income of the loser as in the standard Pareto principle.** This is a **unique point** on the Edgeworth-Walrasian contract curve with non-comparable Pareto allocations.

Data

Groups	Before tax 2009	Before tax 2010	After Tax 2009	After Tax 2010
Lowest Quintile	23800	24100	23600	23700
Second Quintile	44000	44200	41000	41000
Middle Quintile	65200	65400	58000	57900
Fourth Quintile	95100	95500	80800	80600
Highest Quintile	227100	239100	174500	181800
Mean	92200	89800	74200	75000

Source: Congressional Budget Office.
For each entries the average amount (Dollars) is reported.

We compute SPS allocation in the following fashion--

$$\text{SPS Income=(After tax income 2009)} \times \frac{Mean\ After\ tax\ 2010\ income}{Mean\ After\ tax\ 2009\ income}$$

$$\text{i.e. SPS Income = After tax 2009 income} \times \frac{75000}{74000}$$

$$\text{SPS Tax Rate} = 100 \times \frac{Before\ Tax\ 2010\ income - SPS\ INCOME}{Before\ Tax\ 2010\ Income}$$

Tax Rates

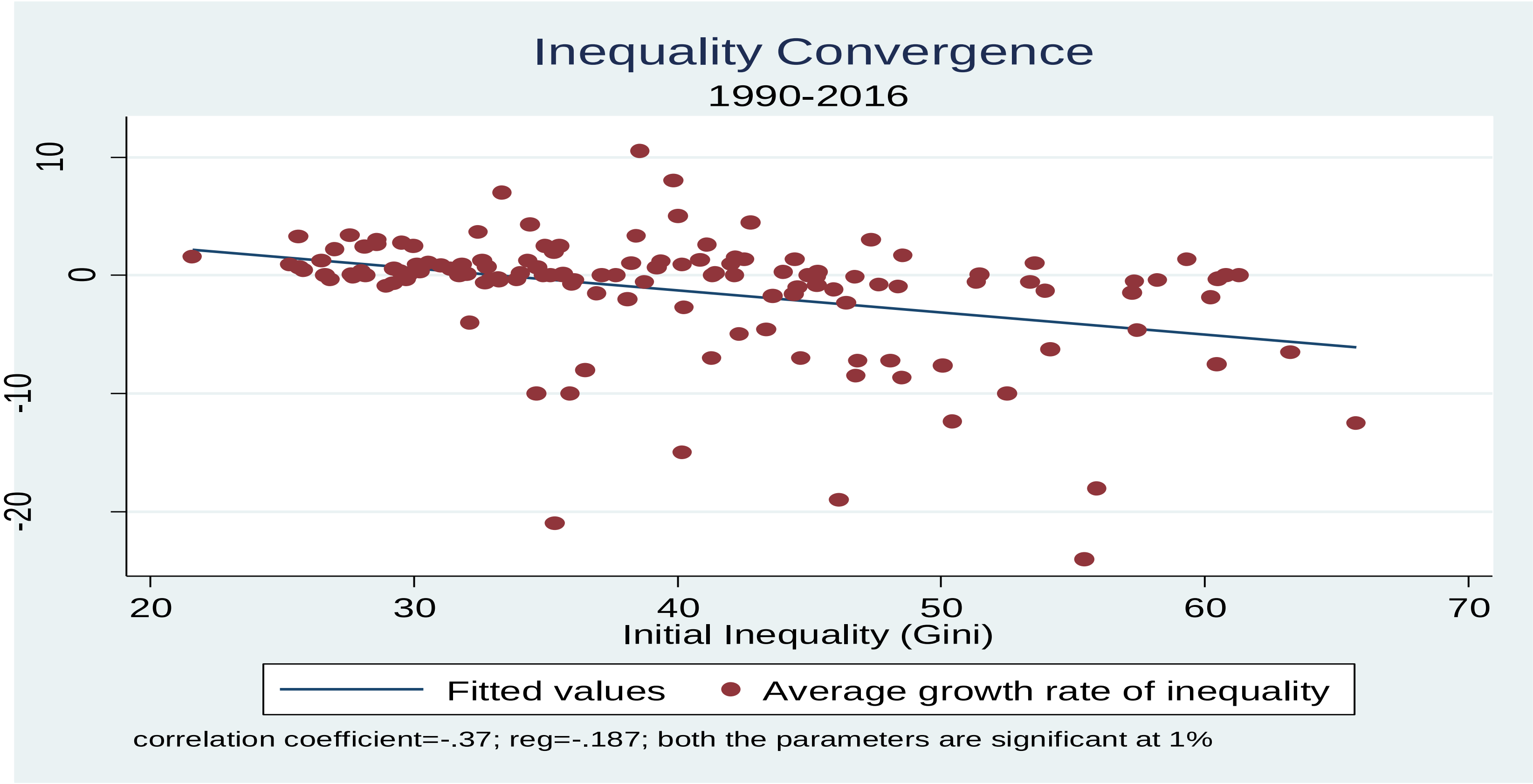
Groups	Tax Rate USA Govt 2009	Tax Rate USA Govt 2010	SPS tax Rates
Lowest Quintile	0.84	1.66	0.36
Second Quintile	6.82	7.24	5.61
Middle Quintile	11.04	11.47	9.76
Fourth Quintile	15.04	15.6	13.91
Highest Quintile	23.16	23.96	25.74
Authors' computation			

We extend the results with Distorting Taxes and Transfers

We can only talk about constrained DNFP allocation it might not exist. But the following will hold.

Lower initial inequality makes it hard for DNFP to follow. countries with higher degree of inequality are in a better position to follow such policies. Growth in income and lower inequality in the current period helps formulation of such policies.

If this is the case then, *ceteris paribus*, low inequality countries will have a faster growth in inequality.



(Initial years vary from country to country due to unavailability of data)

Figure 1

We of course do not claim that our model uniquely explains the phenomenon. But it is not inconsistent.

DNFP with distortionary taxes and transfers has to satisfy these conditions in a 2-class economy.

$w_1 \rightarrow$ Income of the rich.

$w_2 \rightarrow$ Income of the poor.

[In fact almost all popular and well known measures of inequality are monotonic with respect to relative income such as Gini or Atkinson etc.]

With proportional tax the conditions that will guarantee the existence of DNFP are

$$w_1(t)(1-t) \geq w_{10} \qquad (1)$$

$$\frac{w_1(t)(1-t)}{w_2(tw_1)+tw_1} \leq \frac{w_{10}}{w_{20}} = i_0 \qquad (2)$$

With $w_1'(t) < 0$, $w_2' \gtreqless 0$ etc. one can show $t > 0$ will exist satisfying (1) and (2), iff $w_1(t) + w_2(tw_1) > w_{10} + w_{20}$.

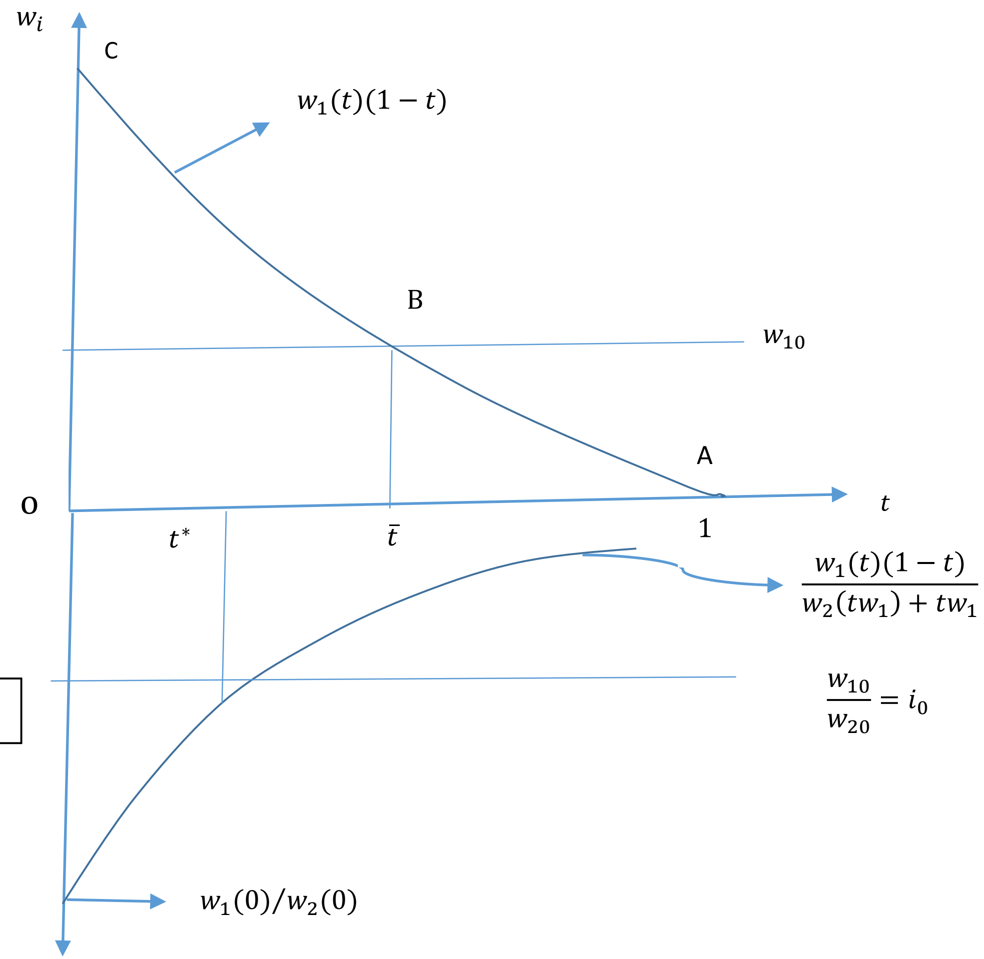
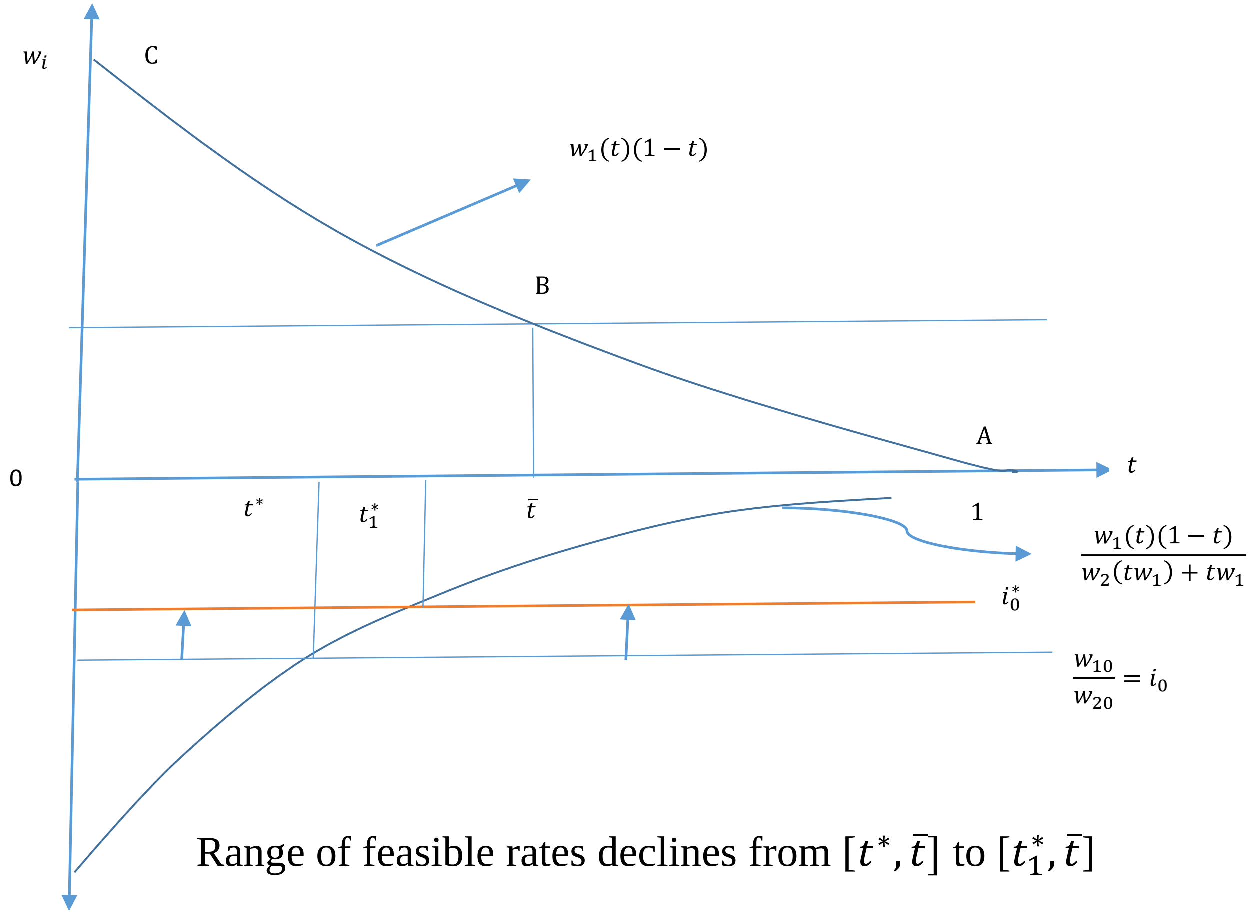


Figure-2

Feasible rates belong to $[t^*, \bar{t}]$



Range of feasible rates declines from $[t^*, \bar{t}]$ to $[t_1^*, \bar{t}]$

Figure-3

Let us work with that t^* from Fig-2.

$$t^* W_1(t^*) i_0 + W_2 i_0 = W_{10}$$

$$t^* W_1(t^*) = \frac{W_{10}}{i_0} - W_2$$

Or, $t^* = \frac{W_{10}}{W_1(t^*)} . \frac{1}{i_0} - \frac{W_2}{W_1(t^*)} = \frac{1}{1+g} . \frac{1}{i_0} - \frac{1}{i_1}$

Hence $t^* = t^* \begin{pmatrix} g, & i_0, & i_1 \\ - & - & + \end{pmatrix}$

General Proof

Assume that a society is observed for two time points.

$0 \rightarrow$ Initial time.

$1 \rightarrow$ Final time point.

$W_0 = (w_{10}, w_{20}, .., w_{n0}) \rightarrow$ Initial income distribution.

g_i ($g_i \in \mathbb{R}_+$) $\rightarrow$ Growth rate of income of individual *i*.

$C_i \rightarrow$ Fixed cost of each individual. Thus income distribution of the final time point can be written as:

$$W_1 = (g_1 w_{10} - C_1, g_2 w_{20} - C_2, .., g_n w_{n0} - C_n) \quad (1A)$$

$$g_i w_{i0} - C_i \equiv w_i(t_i)(1 - t) \quad (2A)$$

(2A) represents the net income function in this text.

Contd.

Distribution neutral fiscal policy implies

i) $\widehat{w}_i = \delta w_i$, where $\delta = \frac{\sum_{i=1}^{n} w_i g_i - C_i}{\sum_{i=1}^{n} w_i}$

ii) $\delta > 1$

Definition: Effort Function: $E_i = (w_{i0} g_i - C_i) - w_{i0}$

Maximum Tolerance Cost: An individual pays no effort if $E_i = 0$. We define the cost that satisfies this condition as maximum tolerance cost. Now

$$E_i = 0 \Rightarrow (w_{i0} g_i - C_i) - w_{i0} = 0 \Rightarrow (\delta - 1). w_{i0} = 0$$

The non-trivial case is given by $\delta = 1$. This implies

$$\sum_{i=1}^{n} w_i g_i - C_i = \sum_{i=1}^{n} w_i \quad (3A)$$

Let the maximum tolerance cost of individual i is $TC(W_0, W_1)$. Then following the above equation we can also write

$$TC_i(W_0, W_1) = \sum_{i=1}^{n} \bar{g}_i w_i - \hat{C} \qquad \text{(4A)}$$

where $\bar{g}_i = g_i - 1$ and $\hat{C} = \sum_{i=1, j\neq i}^{n-1} C_j$.

Proposition: Let initial and final income distributions given by $W_0 = (w_1, w_2, .., w_n)$ and $W_1 = (g_1 w_{10} - C_1, g_2 w_{20} - C_2, .., g_n w_{n0} - C_n)$, such that both W_0 and W_1 are arranged in ascending order. *If the relative positions of the individuals in the initial distribution and the growth rates (i.e. g_i) remain unchanged then the maximum tolerance cost of an individual given by equation (4A) is higher (lower) for a society with higher (lower) degree of initial inequality.*

Proof: Consider the following two income profiles as initial income distributions

$$\widetilde{W}_0 = (w_1, w_2, .., w_i, w_{i+1}, .., w_n) \text{ and}$$

$$\overline{W}_0 = (w_1, w_2, .., w_i - \epsilon, w_{i+1} + \epsilon, .., w_n)$$

such that both $\widetilde{W}_0$ and $\overline{W}_0$ are arranged in an ascending order. Now given growth rate is the same the final distributions of $\widetilde{W}_0$ and $\overline{W}_0$ can be written as

$$\widetilde{W}_1 = (g_1 w_{10} - C_1, g_2 w_{20} - C_2, .., g_n w_{n0} - C_n) \text{ and}$$

$$\overline{W}_1 = (g_1 w_{10} - C_1, g_2 w_{20} - C_2, ., g_i(w_{i0} - \epsilon) - C_i, g_{i+1}(w_{i+10} + \epsilon) - C_{i+1}, ., g_n w_{n0} - C_n)$$

respectively.

Contd.

In this case $\bar{W}_0$ is obtained from $\tilde{W}_0$ following a regressive transfer of ϵ from individual i to $i+1$. Thus inequality in $\tilde{W}_0$ is lower than $\bar{W}_0$. In order to complete the proof we show that tolerance cost increases if we replace $\tilde{W}_0$ by a more unequal distribution $\bar{W}_0$.

$$TC_i(\bar{W}_0, \bar{W}_1) = \hat{C} + (g_{i+1} - g_i)\epsilon + \sum_{i=1}^{n}(g_i - 1)w_i$$
$$= (g_{i+1} - g_i)\epsilon + TC_i(\tilde{W}_0, \tilde{W}_1)$$

Given the initial and final distributions is arranged in ascending order we can write $g_{i+1} \geq g_i$. This implies $TC(\bar{W}_0, \bar{W}_1) \geq TC(\tilde{W}_0, \tilde{W}_1)$. ***Q.E.D.***

THANK YOU