Behavioural and Welfare Effects of Basic Income Schemes

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Basic (or Minimum Guaranteed) Income: many versions

- If your income y is less than G, you receive G – y, otherwise you receive nothing (Negative Income Tax = **NIT**)
- If your income y is less than G and you work at least H hours you receive G – y, otherwise you receive nothing (In-work Transfer, Work-fare = **WF**)
- If you work, you receive a transfer B (Participation Basic Income = **PBI**)
- You receive an unconditional transfer B (Universal Basic Income = **UBI**)
- At the beginning of your (adult) life you receive a once-and-for-all transfer, or alternatively a loan (Universal Basic Wealth = **UBW**)

Depending on the scheme and on the amount of money transferred, the transfer is usually meant to replace in part or totally the current welfare payments, benefits etc.

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Motivations

O **Simplification** and rationalization of redistributive policies (Friedman, Tobin)

o **“Flexicurity”** (income - rather than job – stability and certainty, Denmark’s success etc.)

o A **“dividend”** from the “Common” or the “Social Capital” (Veblen, Meade etc.)

o **Efficiency** (incentive effects of rent distribution, like in efficiency wage models; dynamic efficiency, like in development economics, etc)

Problems

- Bad incentives on labour supply?
- Too expensive?
- Politically not sustainable?
- Complicated to implement and run?

This study

- Estimate a common model of labour supply for various European countries
- Simulate new choices under new tax rules with Basic Income keeping total tax revenue constant
- Compute changes in labour supply, income, tax rates, tax revenue etc.
- Evaluate with a Social Welfare function

The model of labour supply

Household n-th solves:

$$\max_{h_F, h_M, \varepsilon} U_n(X, h_F, h_M, \varepsilon)$$

s.t.

$$h_F, h_M, \varepsilon \in \Omega_n$$

$$X = R_n(w_F h_F, w_M h_M, Y)$$

where

X = net available income

w = wage rate

h = hours of work

Y = exogenous income(s)

$R(\ )$ = tax-benefit rule: gross incomes $\rightarrow$ net income

ε = other characteristics of the job-household match

The model of labour supply

Empirical specification of the Utility Function:

$$V(X,h_F,h_M;\theta) = \theta_x X + \theta_F(T-h_F) + \theta_M(T-h_M) +$$

$$+\theta_{xx}X^2 + \theta_{FF}(T-h_F)^2 + \theta_{MM}(T-h_M)^2 +$$

$$+\theta_{xF}X(T-h_M) + \theta_{xM}X(T-h_M) + \theta_{FM}(T-h_F)(T-h_M)$$

The model of labour supply

Some parameters depend on household characteristics:

$$\theta_F = \beta_{F0} + \beta_{F1}(\text{Wife's age}) +$$
$$+\beta_{F2}(\#\text{Children}) + \beta_{F3}(\#\text{Children under 6}) + \beta_{F4}(\#\text{Children 6-10})$$

$$\theta_M = \beta_{M0} + \beta_{M1}(\text{Husband's age}) +$$
$$+\beta_{M2}(\#\text{Children}) + \beta_{M3}(\#\text{Children under 6}) + \beta_{M4}(\#\text{Children 6-10})$$

$$\theta_X = \beta_{X0} + \beta_{X1}(\text{Husband's age}) +$$
$$+\beta_{X2}(\#\text{Children}) + \beta_{X3}(\#\text{Children under 6}) + \beta_{X4}(\#\text{Children 6-10})$$

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The model of labour supply

The choice set

- Each partner's choice set is represented by 12 discrete values of h (including h = 0)
- The household choice set is represented by 12X12=144 points (h_F, h_M)
- For each household and each point (h_F, h_M) the corresponding X = R($w_M h_M$, $w_F h_F$, Y) is computed using EUROMOD microsimulation algorithm.
- For those observed non working, wage rates are estimated and imputed using Heckman's two-step procedure

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The model of labour supply

Quantity constraints and alternative-specific preferences

- Not all the alternatives are equally available. For example part-time jobs might be more or less available with respect to full-time jobs.

- Moreover, some alternatives might have a specific utility or disutility component (besides the standard income/leisure trade-off)

- All this can be accounted for by adding alternative-specific dummies to the systematic utility V.

The model of labour supply

Choice probabilities (Multi-nomial Logit)

$$P_n(f,m;\theta,\gamma) = \frac{\exp\left\{V\left(R(w_{nF}f, w_{nM}m, y_n), f, m; Z_n, \theta\right) + \sum_{k=1}^{5}\gamma_{Fk}D_{Fk} + \sum_{k=1}^{5}\gamma_{Mk}D_{Mk}\right\}}{\sum_{h_F\in\Omega}\sum_{h_M\in\Omega}\exp\left\{V\left(R(w_{nF}h_F, w_{nM}h_M, y\ ), h_F, h_M; Z_n, \theta\right) + \sum_{k=1}^{5}\gamma_{Fk}D_{Fk} + \sum_{k=1}^{5}\gamma_{Mk}D_{Mk}\right\}}$$

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The model of labour supply

Estimation

The parameters are estimated by Maximum Likelihood:

$$(\theta^{ML}, \gamma^{ML}) = \arg\max_{\theta,\gamma} \sum_{n=1}^{N} \ln P_n(f_n, m_n; \theta, \gamma)$$

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The model of labour supply

Data

- Couples
- Aged 20 – 55
- Not self-employed
- Around 1998
- Italy, France, Spain, Portugal, Finland, UK, Germany, Denmark, Austria (Central Bank or ECHP surveys)
- Various estimation exercises, single-country and pooled countries

Reforms

- Negative Income Tax (NIT)
- Work-Fare (WF)
- Universal Basic Income (UBI)

NIT + Flat

Net income = G + (1 – t)*(Gross Income – G) if Gross Income > G

Net income = G otherwise

where

t is a constant marginal tax rate

G (= guaranteed minimum income) is some fraction ***a*** of the Poverty Line: **G = *a**(Poverty line).**

The poverty line for a 2-person household is set equal to (1/2)*(median household gross income).

The poverty line for household with more components (children) is then computed according to a standard **equivalence scale**.

We simulate various versions with different values of **a**: 1, 0.75, 0.50 and 0.25.

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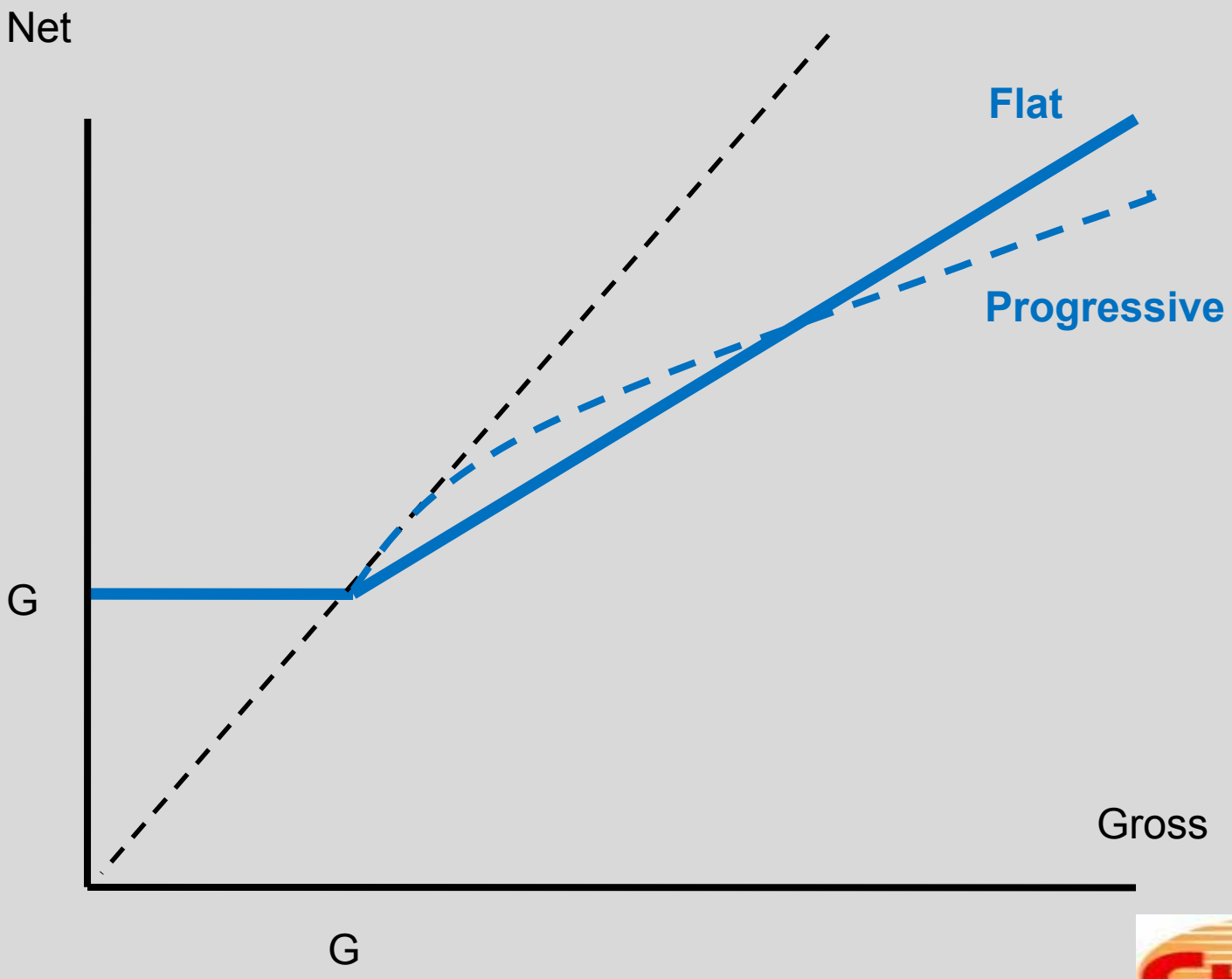
NIT + Progressive

Net income = G + (Gross Income – G)$^{(1-\tau)}$ if Gross Income > G

Net income = G otherwise

NIT



WF + Flat

Net income = G + (1 – t)*(Gross Income – G) if
Gross Income > G and (h_M > H and/or h_F > H).

Net income = G if Gross Income <= G otherwise

We simulate three versions with different values of **H**, corresponding to 15, 20 and 36 weekly hours.

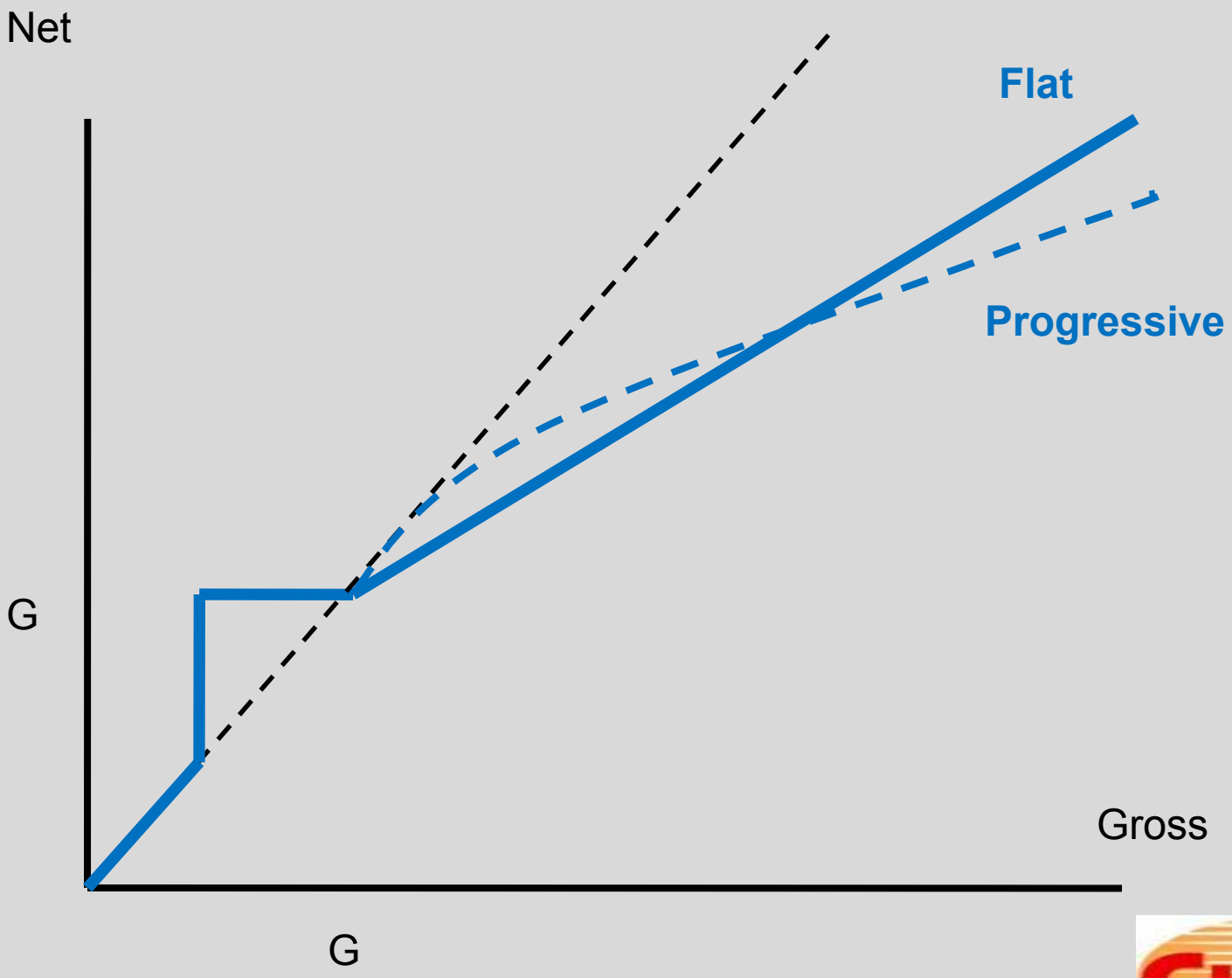
WF + Progressive

Net income = G + (Gross Income – G)$^{(1-\tau)}$ if Gross Income > G

if (h_M > H and/or h_F > H).

Net income = G if Gross Income <= G otherwise

WF



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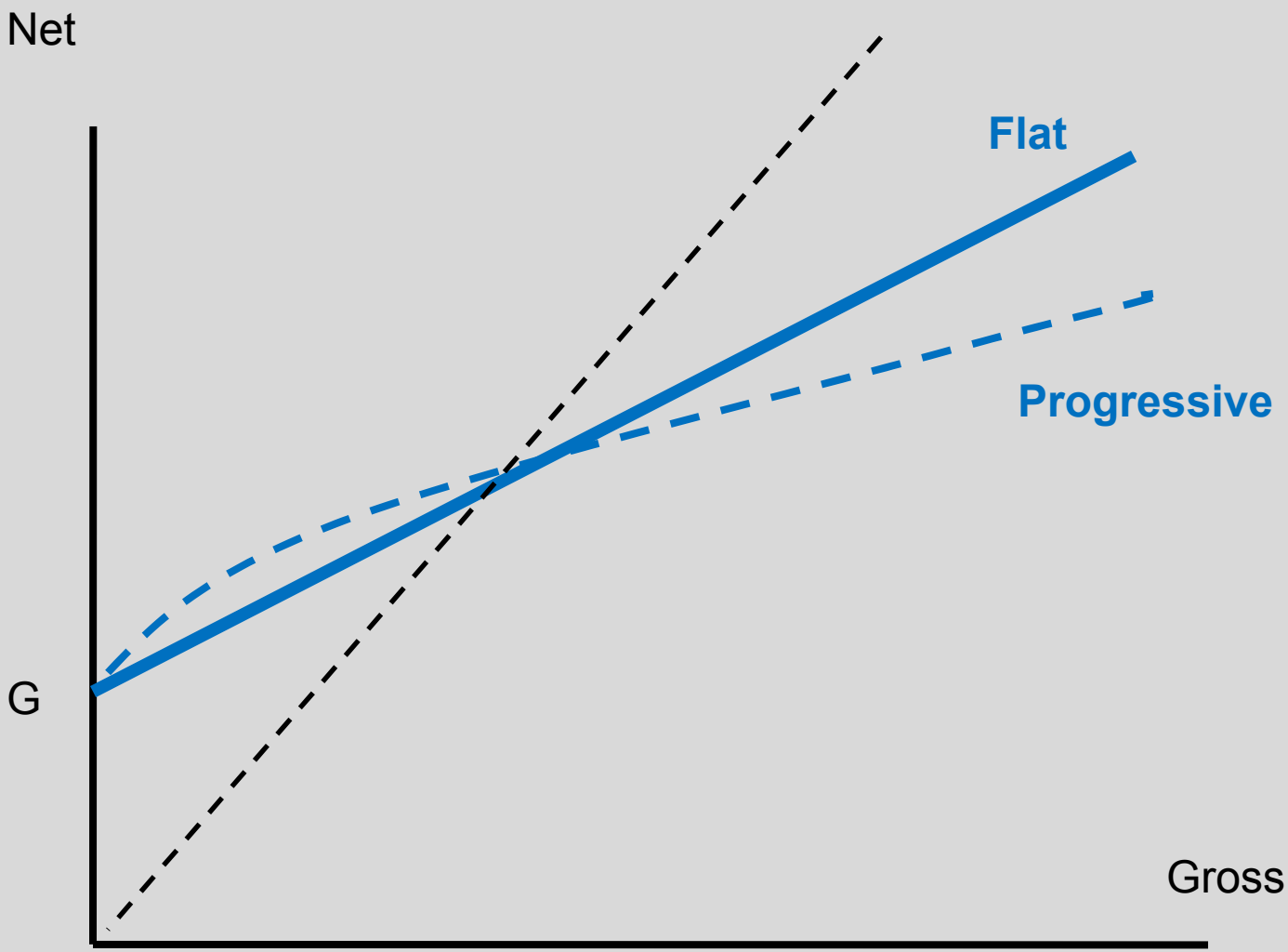
UBI + Flat

Net income = G + (1 – t)*(Gross Income)

UBI + Progressive

$$\text{Net income} = G + (\text{Gross Income})^{(1-\tau)}$$

UBI



Simulating reforms

- For each household and each point in the choice set, compute the new net available income given the new tax-transfer rule, **which completely replaces the current rule**

- Run the model to simulate the households' new choices under the new tax-transfer rule: iterate (over tax-benefit rule parameters) until the **total net tax revenue is the same as under the current rule**

- Apply a social welfare evaluation method and **identify the optimal tax-transfer rule**

Social evaluation

Let $U_n(r)$ the utility level attained by household n under tax-transfer rule r.

The corresponding **social welfare** level is measure by:

$(\sum_n U_n(r)/N)(1 - C)$

where C is the of Gini-index of the distribution of U_n.

The term $\sum_n U_n(r)/N)$ = average utility, can be interpreted as a measure of **efficiency**.

The term 1 – C is a measure of **equality**.

We also use an **alternative criterion** where the measure of individual household welfare is $X_n(r)$ (= **net available income** of household n under tax rule r)

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Optimal tax-transfer rules

Call M the current total net tax revenue and $\Re$ a tax-transfer rule. Then we solve (computationally) the following problem, i.e. we look for the tax rule $\Re$ that maximizes the Social Welfare Function under the Incentive Compatibility constraints and under the Total Revenue constraint:

$$\max_{\Re} \sum_{n} U_n^*(1 - C(U_1^*, ..., C_N^*))$$

s.t.

$$U_n^* = \text{argmax}_{h_F, h_M, \varepsilon} U_n(\Re(w_{nF}h_F, w_{nM}h_M, Y_n), h_F, h_M, \varepsilon) \text{ s.t. } (h_F, h_M, \varepsilon) \in \Omega_n$$

$$\sum_{n=1}^{N} \left[w_{nF}h_F + w_{nF}h_F + Y_n - \Re(w_{nF}h_F, w_{nM}h_M, Y_n) \right] = \text{M}$$

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Optimal tax-transfer rules

In the two following Tables we show the optimal tax-transfer rules for each country.

Blue cells identify the optimal rule according to the utility-based social welfare function.

Yellow cells identify the optimal rule according to the income-based social welfare function.

For the majority of countries, the best rules belong to the UBI class or to the WF class.

Flat	Austria	Denmark	Finland	France	Germany	Italy	Portugal	Spain	UK
Current									
NIT									
a=1.00									
a=0.75									
a=0.50									
a=0.25									
WF (H = 20)									
a=1.00									
a=0.75									
a=0.50									
a=0.25									
UBI									
a=1.00									
a=0.75									
a=0.50									
a=0.25									

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Progressive	Austria	Denmark	Finland	France	Germany	Italy	Portugal	Spain	UK
Current									
NIT									
a=1.00									
a=0.75									
a=0.50									
a=0.25									
WF (H = 20)									
a=1.00									
a=0.75									
a=0.50									
a=0.25									
UBI									
a=1.00									
a=0.75									
a=0.50									
a=0.25									

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Optimal tax-transfer rules

More details: the case of Italy

The simulations produce many results, both on behavioural responses and on welfare effects.

As an example we look into the Italian case.

	Average Utility	Gini Utility	Average Income	Gini Income	Hours (males)	Hours (females)	Average net tax rate	Top marginal tax rate	Social Welfare (utility based)	Social Wefare (income based)
Current (1998)	24.34	0.03	1816	0.24	35.76	14.33	0.150	0.45	23.71	1389
NIT + Flat										
a=1.00	-	-	-	-	-	-	-	-	-	-
a=0.75	24.38	0.03	1648	0.17	32.59	12.10	0.193	0.48	23.74	1368
a=0.50	24.34	0.03	1775	0.23	34.60	13.81	0.164	0.29	23.71	1367
a=0.25	24.31	0.03	1853	0.26	36.01	14.82	0.155	0.20	23.68	1371
WF + Flat (H = 20)										
a=1.00	24.35	0.03	1847	0.16	36.44	13.94	0.150	0.48	23.71	1550
a=0.75	24.33	0.03	1872	0.21	36.68	14.60	0.150	0.32	23.68	1479
a=0.50	24.31	0.03	1884	0.25	36.78	15.00	0.147	0.23	23.67	1423
a=0.25	24.30	0.03	1891	0.27	36.82	15.23	0.147	0.18	23.65	1390
UBI + Flat										
a=1.00	-	-	-	-	-	-	-	-	-	-
a=0.75	24.39	0.03	1601.	0.13	32.29	11.27	0.169	0.71	23.75	1401
a=0.50	24.37	0.03	1737	0.18	34.31	13.06	0.158	0.50	23.74	1432
a=0.25	24.34	0.03	1830	0.23	35.78	14.36	0.151	0.32	23.70	1415

	Average Utility	Gini Utility	Average Income	Gini Income	Hours (males)	Hours (females)	Average net tax rate	Top marginal tax rate*	Social Welfare (utility based)	Social Wefare (income based)
Current (1998)	24.34	0.03	1816	0.24	35.76	14.33	0.150	0.450	23.71	1389.27
NIT + Progressive										
a=1.00	-	-	-	-	-	-	-	-	-	-
a=0.75	24.38	0.03	1650	0.17	32.61	12.08	0.148	0.310	23.75	1376
a=0.50	24.35	0.03	1775	0.23	34.61	13.79	0.147	0.258	23.71	1369
a=0.25	24.32	0.03	1852	0.26	36.02	14.80	0.146	0.231	23.68	1372
WF + Prog (H = 20)										
a=1.00	24.35	0.03	1847	0.16	36.45	13.94	0.147	0.342	23.72	1561
a=0.75	24.33	0.03	1873	0.21	36.68	14.60	0.147	0.276	23.70	1489
a=0.50	24.31	0.03	1885	0.24	36.78	14.99	0.147	0.240	23.68	1432
a=0.25	24.30	0.03	1890	0.26	36.82	15.21	0.147	0.222	23.66	1399
UBI + Progressive										
a=1.00	-	-	-	-	-	-		-	-	-
a=0.75	24.39	0.03	1587	0.11	32.18	11.09	0.154	0.799	23.75	1406
a=0.50	24.38	0.03	1731	0.17	34.26	12.95	0.150	0.655	23.74	1446
a=0.25	24.34	0.03	1827	0.22	35.75	14.30	0.147	0.430	23.71	1425

(*) Top marginal tax rate evaluated at 2 × (Average Gross Income)

Current and future research

- More sophisticated progressive tax rules
- Individual- (rather than household) based transfer
- Transfers more closely related to children
- Other basic income schemes (PBI, UBW)

Tentative conclusions

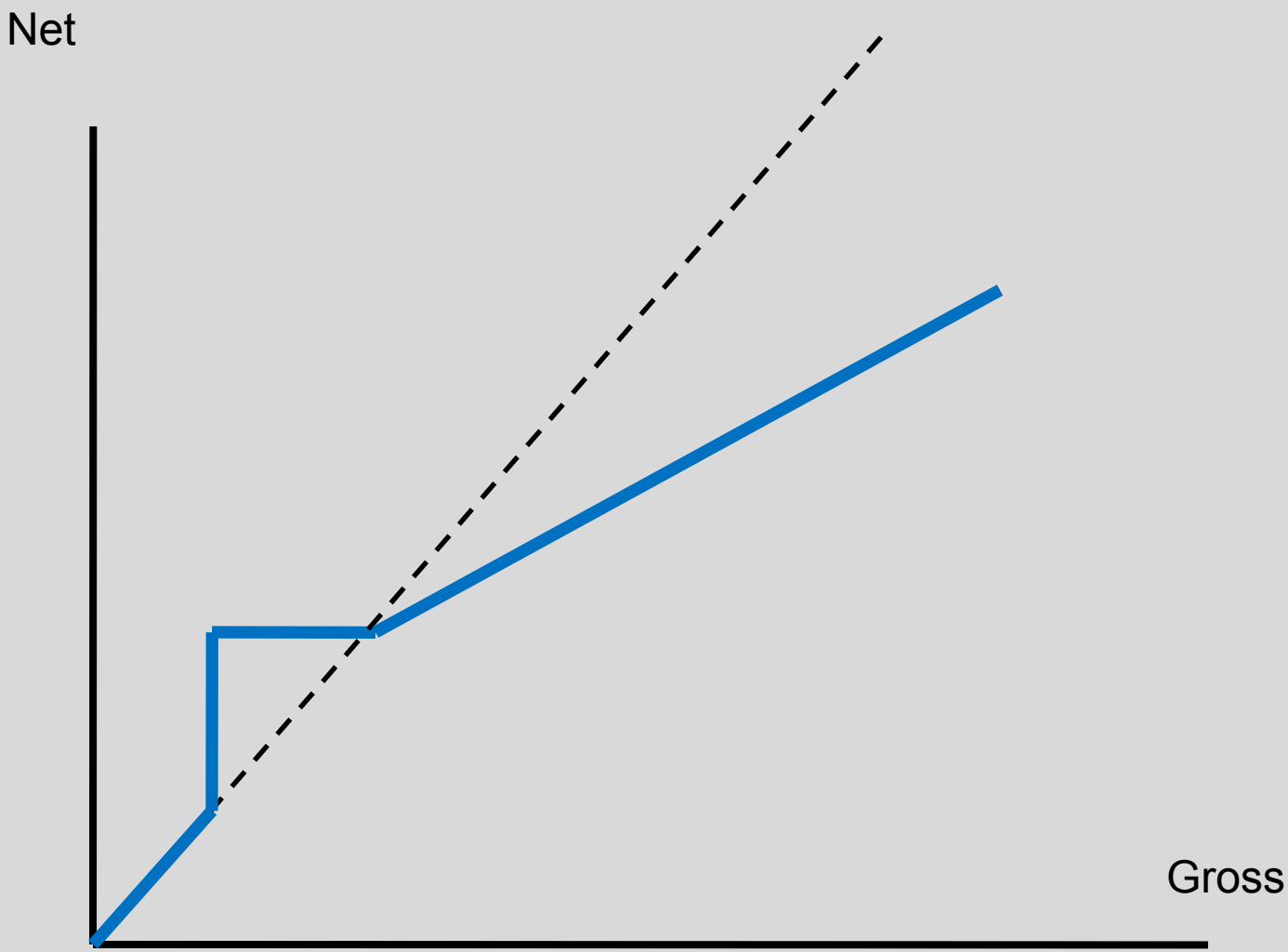
o UBI optimal but – at the moment – probably too costly and politically not sustainable.

o WF not bad. Good effects on Gini, Income, Labour Supply. Tax-wise sustainable. Implementation needs careful design.

o Progressive rules looks more efficient: they require slightly lower average tax rates.

o Possible long-term strategy: start with WF, progressively (maybe via PBI) shift to UBI…

WF



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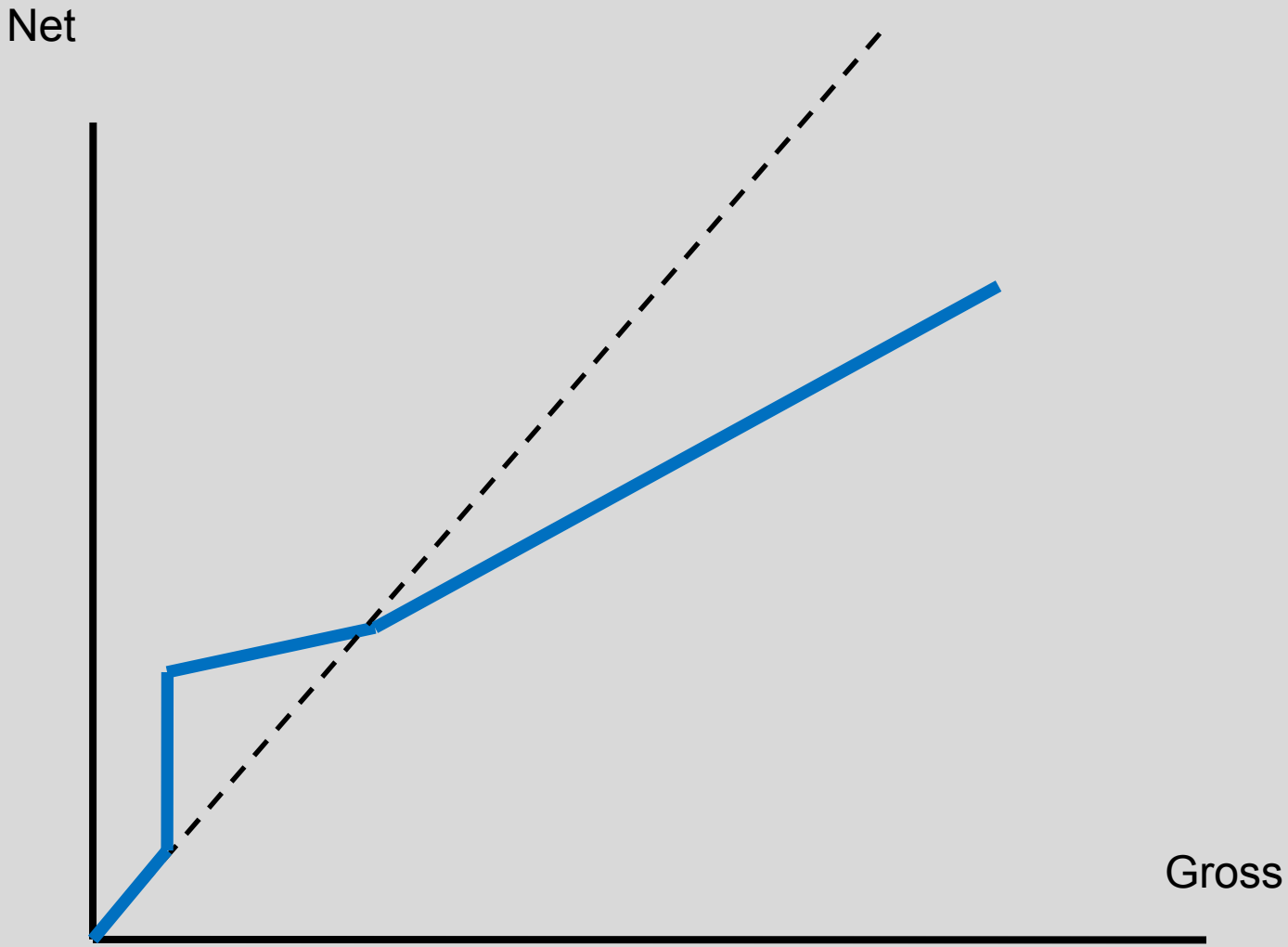
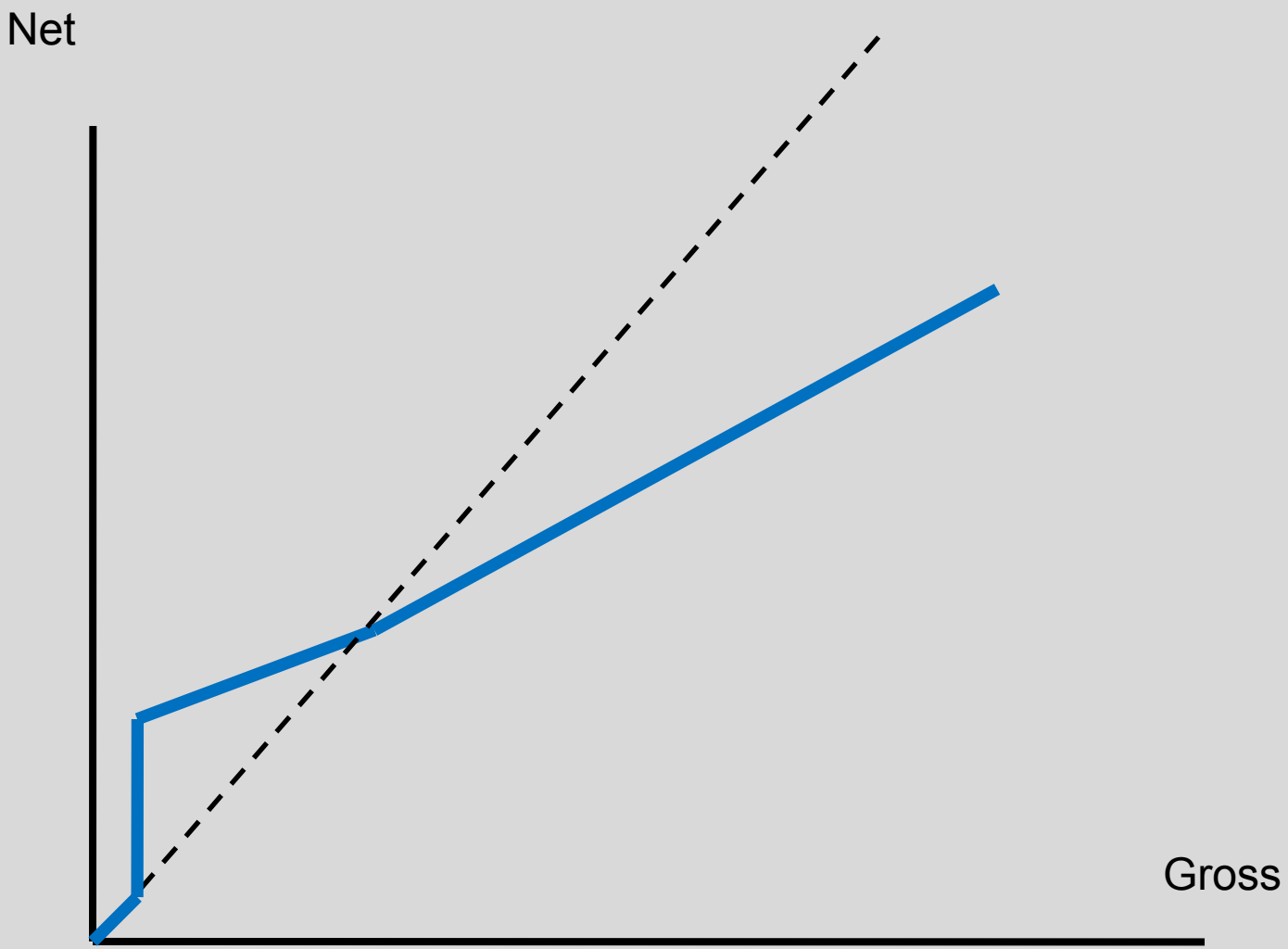
WF → PBI



WF → PBI



UBI