Striking a Balance:

Optimal Tax Policy with Labor Market Duality

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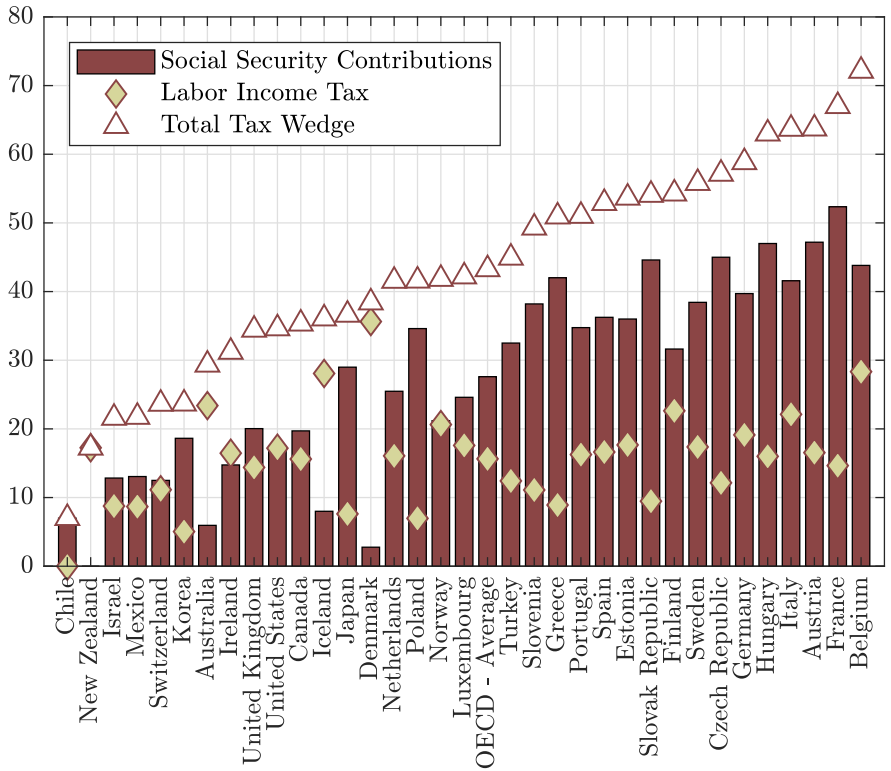
Remarkable dispersion in how labor is taxed and benefits financed

Figure: Labor taxes and social security contributions in the OECD



Data: OECD, 2014, SINK at 100% of average

Implications of this dispersion

- Little theory to explain this dispersion: literature focuses on optimal tax rate
  - Trabandt and Uhlig (2011) get an "optimal" tax rate without evasion
- But this dispersion can have implications for unregistered employment (not explored in the literature)
  - Measuring unregistered employment (predominantly Schneider 2014), mostly about Latin America, Italy and (some) Germany. Busato and Chiarini (2013), Orsi et al. (2014) mostly Italy (good data on unregistered work)

Our contribution to the literature

- plausible microfoundations for atypical employment (+ estimates of size)
- optimal policy mix: fiscal and welfare

Road map

Motivation

Model and calibration

Calibration

Results

Conclusions

Key elements

- Two types of labor taxes:
  - Unavoidable τ^n paid by workers (e.g. labor income tax)
  - Avoidable τ^s paid by employers (e.g. social security contributions)
- Labor may be hired with a:
  - typical contract, both taxes (P=primary)
  - atypical contract, only labor income tax, τ^n (S=secondary)
- Both types of labor identical in terms of productivity
- Households have preference over types of contracts
- Government is not strategic about taxes

The model - firms

- Many firms, need both capital and labor

$$y = Ak^{\alpha}n^{1-\alpha}, \quad \text{where}$$
$$n = \left((1-\omega)n_P^{\rho} + \omega n_S^{\rho}\right)^{\frac{1}{\rho}}$$
$$\sigma = \frac{1}{1-\rho} \text{ and } \omega = \frac{n_S}{n}$$

- Hiring labor atypically exposes to risk of fine for tax evasion

$$\begin{aligned}\pi^e &= p\pi^D + (1-p)\pi^{ND} \\ &= y - dk - (1+\tau^s)w_P n_P - (1+p\bar{s}\tau^s)w_S n_S\end{aligned}$$

The model - households

- Representative household with labor endowment
- No auditing of households (no tax evasion on labor income tax)

$$U(c, l(n_P, n_S)) = \frac{1}{1-\eta}\left(c^{1-\eta}(1-\kappa(1-\eta)(n_P + \phi n_S)^{1+\frac{1}{\varphi}})^{\eta} - 1\right)$$

- With the following budget constraint

$$\begin{aligned}
(1+\tau^c)c + b + x = & \\
(1-\tau^n)w_P n_P + (1-\tau^n)w_S n_S & \Leftarrow \text{labor income} \\
+\pi^e + (1-\tau^k)(d-\delta)k + \delta k & \Leftarrow \text{capital income} \\
+R^b b_{-1} + s + m & \Leftarrow \text{bond interest, etc.}
\end{aligned}$$

Calibration I

Standard parameters

Table: Calibration of model parameters

Parameter		Value	Source
α	Capital share in output	Country Specific	EC
ψ	TFP growth	1.017	EC
$\bar{R}$	Gross interest rate	1.04	Standard
η	Inverse of IES	2	Standard
φ	Frisch's elasticity	1	Standard
τ^c, τ^n, τ^k	Taxes on consumption, labor and capital	Country Specific	OECD
τ^s	Social Security Taxes	Country Specific	OECD
b	Public debt (in % of GDP)	Country-specific	OECD
g and s	Gov. cons. and social transfers (in % of GDP)	Country Specific	OECD
m and x	Trade balance and other (in % of GDP)	Country Specific	OECD

Calibration II

Four tough parameters

- $p\bar{s}$ – expected penalty for tax evasion.
- ω – weight of atypically employed labor n_s in labor.
- ρ – elasticity of substitution between the two types of labor.

  Imposing $\omega = \frac{n_S}{n}$ in $n = ((1-\omega)n_P^{\rho} + \omega n_S^{\rho})^{\frac{1}{\rho}} \implies$

$$1 = (1-\omega)^{1+\rho} + \omega^{1+\rho}$$

$$FSS = \tau^s w_P n_P + p\bar{s}\tau^s w_S n_S = (1-\alpha)\left(\frac{\tau^s(1-\omega)^{1+\rho}}{1+\tau^s} + \frac{\tau^s p\bar{s}\omega^{1+\rho}}{1+p\bar{s}\tau^s}\right)$$

$$LTR = \tau^n(w_P n_P + w_S n_S) = (1-\alpha)\tau^n\left(\frac{(1-\omega)^{1+\rho}}{1+\tau^s} + \frac{\omega^{1+\rho}}{1+p\bar{s}\tau^s}\right)$$

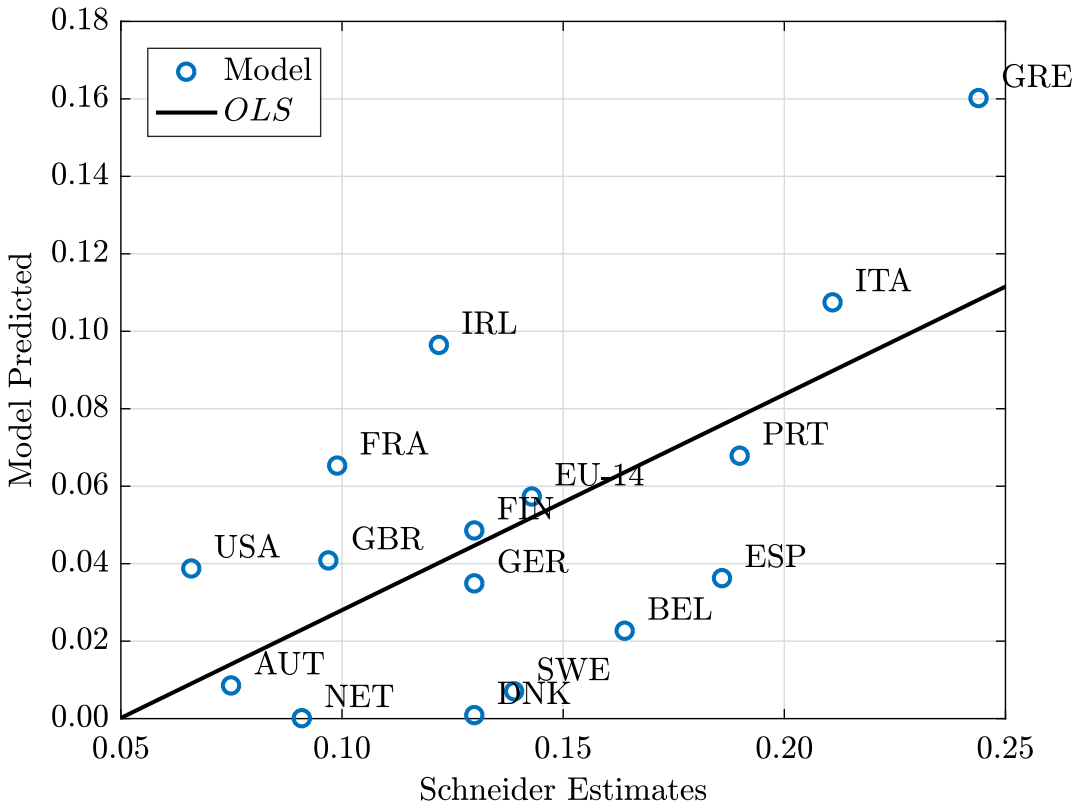
- ϕ – disutility of atypical contract

$$\frac{1}{\phi} = \frac{w_p}{w_s} = \left(\frac{1-\omega}{\omega}\right)^{\rho}\frac{1+p\bar{s}\tau_s}{1+\tau_s}$$

Model fits data (fairly) well

Share of output due to secondary workers/labor: $y_S = \frac{(1-\alpha)\omega^{1+\rho}}{1+p\bar{s}\tau^s}$

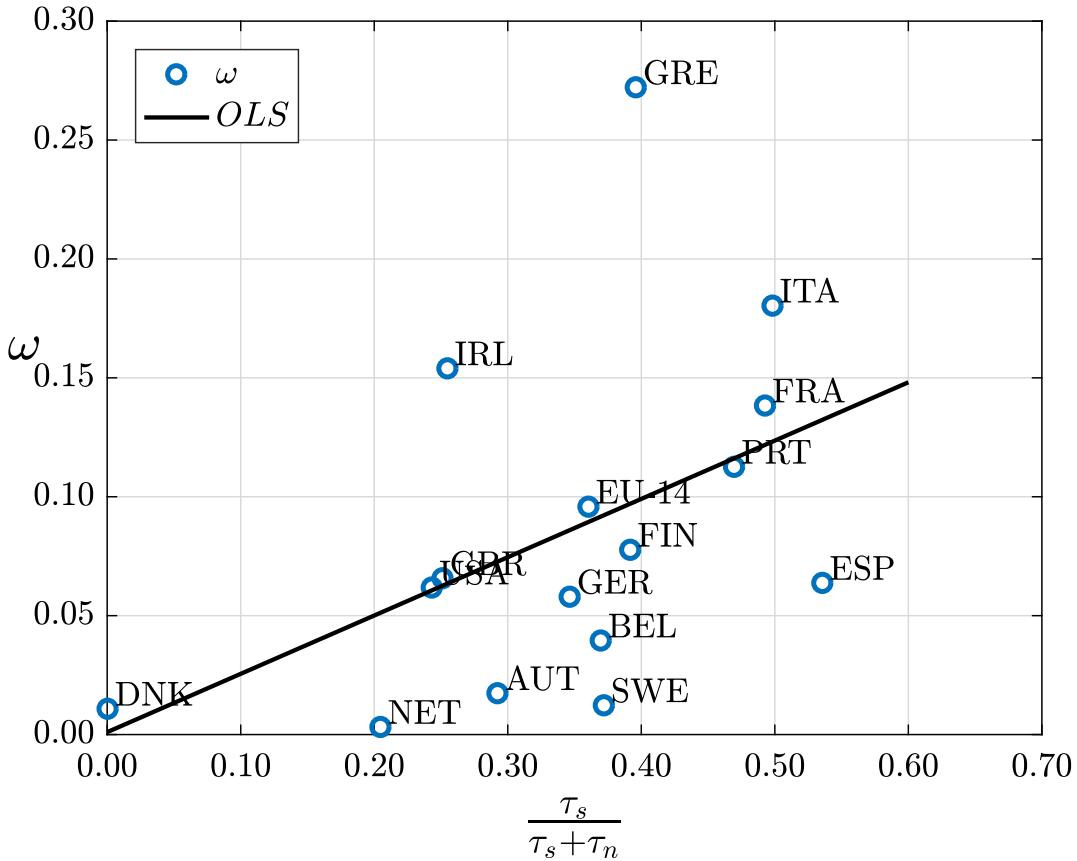
Figure: Model Predicted Size of Informal economy vs. Schneider (2014)



Pearson's r at 0.6419 (p-value=0.0073).

Firms Social Security Contributions vs. ω

Figure: Model predicted ω vs tax structure



Pearson's r at 0.4553 (p-value$=$ 0.0764).

Statics

Out of Steady State Approximations

- Need to obtain out of steady state approximations of ω when changing τ^s:
- Assume: $\omega = f\left(\frac{\tau^s}{\tau^s+\tau^n}\right)$, hold the ratio constant while picking different values of τ^s and τ^n.
- Compute the approximation:

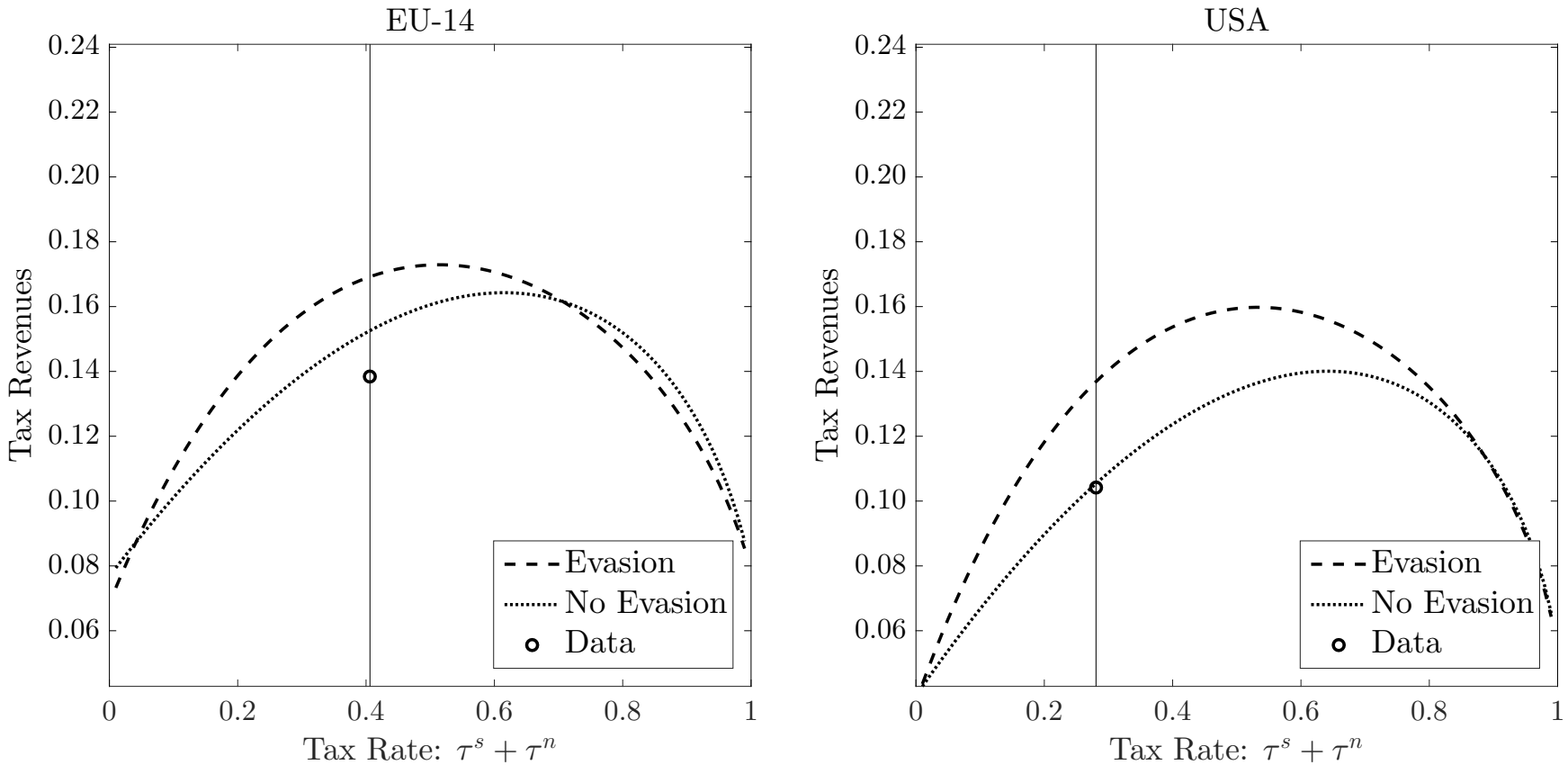
$$\widehat{\text{FSS}} = \tau^s(1-\alpha)\left(\frac{(1-\widehat{\omega})^{1+\rho}}{1+\tau^s} + \frac{p\bar{s}\widehat{\omega}^{1+\rho}}{1+p\bar{s}\tau^s}\right); \quad \widehat{\omega} = P_m\left(\frac{\tau^s}{\tau^s+\tau^n}; \epsilon_m\right)$$

- Choose polynomial coefficients by:

$$\min_{\epsilon_m} \frac{1}{2m}\sum_{j=1}^{m}\left(\text{FSS}_j - \widehat{\text{FSS}_j}\right)^2$$

Labor tax Laffer Curve

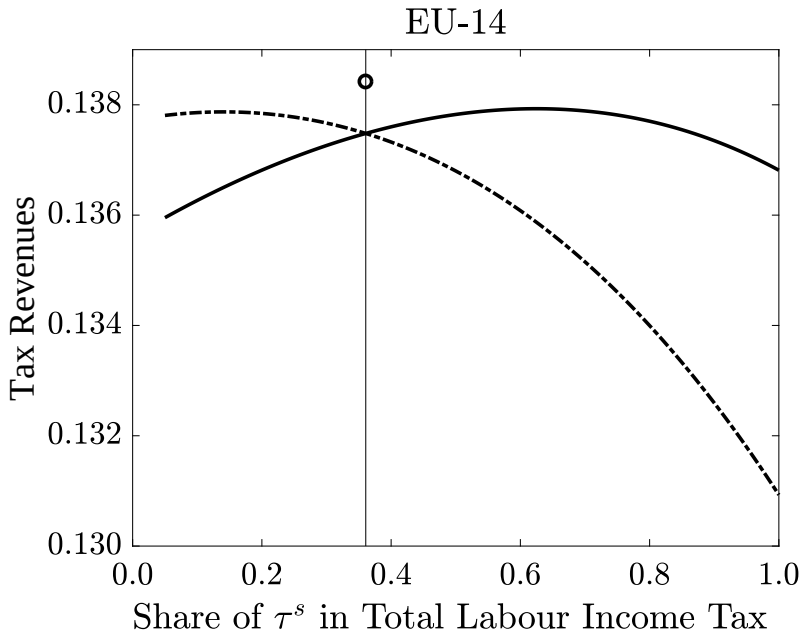
Figure: The shape of Laffer curves



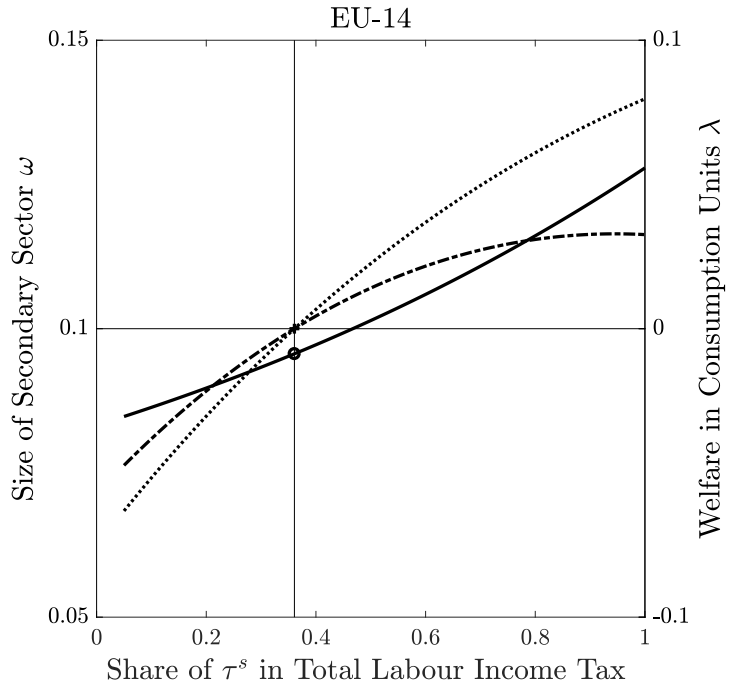
Tax revenue refer to overall tax revenue T. Parameters conditional on τ^s and τ^n fixed.

Policy Mix: Revenue, Employment and Welfare

(a) Fiscal revenues



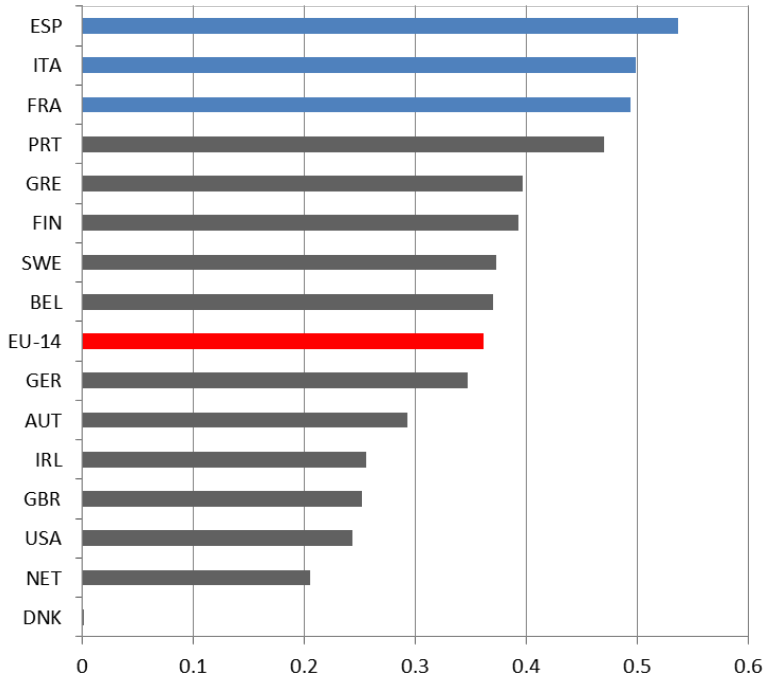
(b) Employment and Welfare



Solid lines: T (panel (a)) and ω (panel (b)) with ϕ fixed at steady state level. Dotted–dashed lines: ϕ changing based on ω and τ^s. Circle: steady state share of τ^s in labor income taxes and corresponding tax revenue.

Dynamics

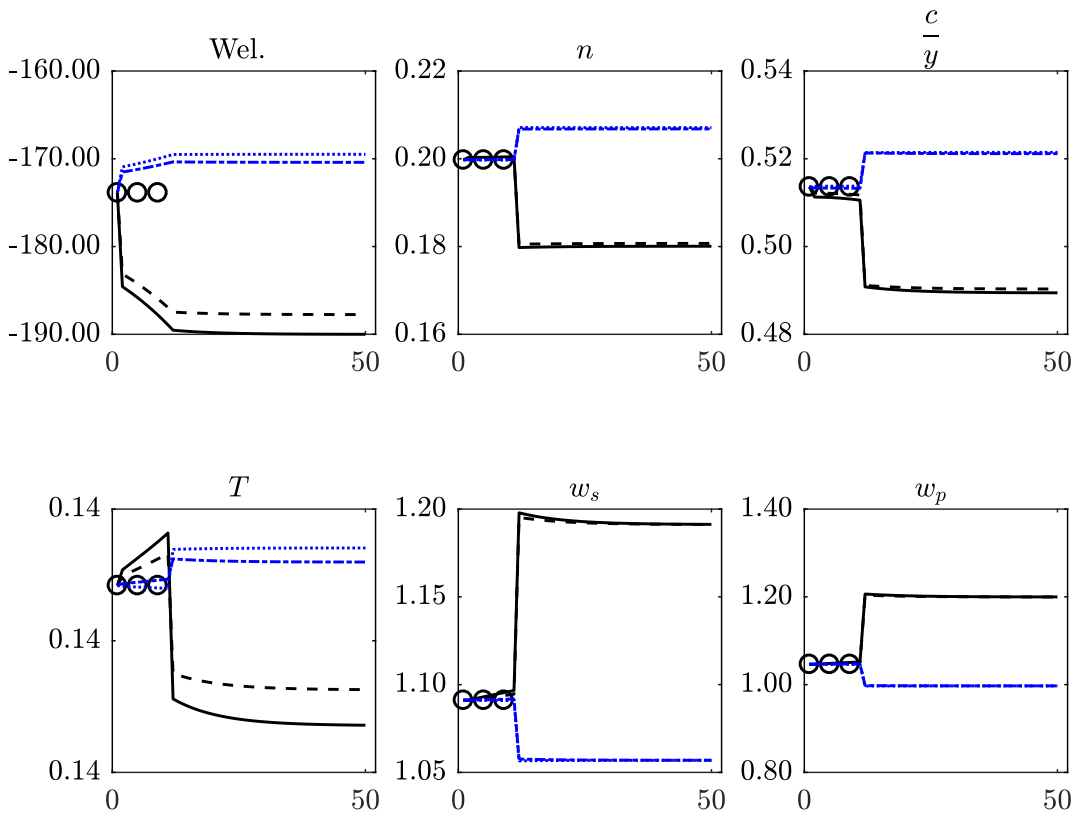
Two thought experiments: EU baseline: 37% share of τ_s; ω=16%; ϕ=1.07



Scenario 1 (DNK): 0.0% share of τ_s; $\hat{\omega}$=12%; $\hat{\phi}$=0.98
Scenario 2 (FRA): 50% share of τ_s; $\hat{\omega}$=28%; $\hat{\phi}$=1.10

Changing the mix of avoidable and unavoidable

Figure: Policy experiments in tax mix for EU-14: transition paths

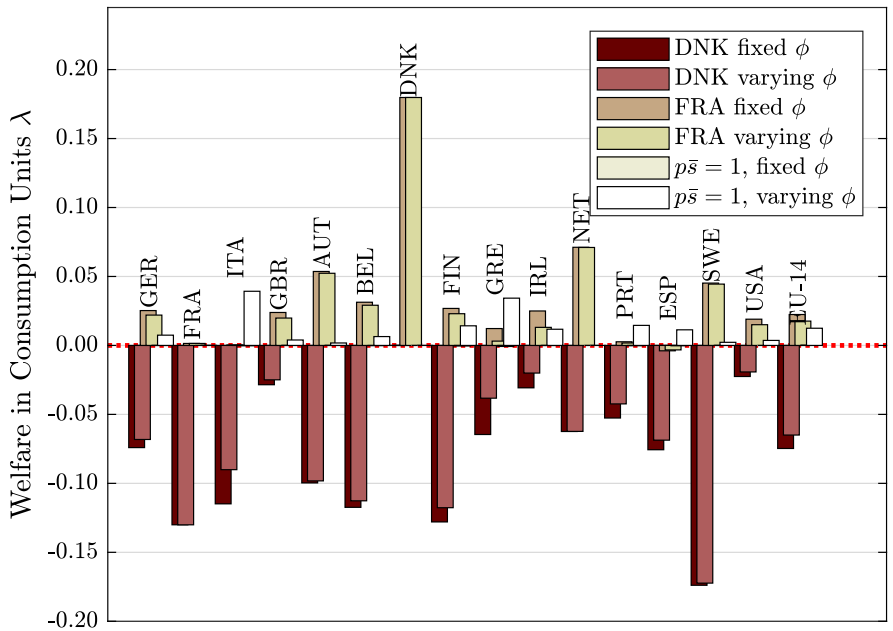


Responses to a change in the ratio of taxes: from $\tau^s = 0.147$ to $\tau^s = 0.0$ (black line - Policy 1: DNK) and to 0.204 (blue line - Policy 2: FRA), τ^n adjusts accordingly.

Conclusion: Welfare Effects across Countries

Equivalent units: $\lambda = 1 - \left(\frac{1 + (1-\beta)(1-\eta)\text{Welfare}_{baseline}}{1 + (1-\beta)(1-\eta)\text{Welfare}_{reform}} \right)^{\frac{1}{\eta - 1}}$

Figure: Policy experiments transition summary in consumption units



Bars: welfare changes in λ at the end of transition to new steady state.

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